Government of Nepal

Ministry of Population and Environment

Singhadurbar, Kathmandu

Updated National Implementation Plan (NIP)

for

Stockholm Convention on Persistent Organic Pollutants in Nepal

Enabling Activities to Review and Update NIP for the Stockholm Convention on Persistent Organic Pollutants (POPs) in Nepal

August, 2017

The National Implementation Plan (NIP) for the Stockholm Convention was prepared by Ministry of Population and Environment (MOPE) under the GEF Project ID: 5224 within the framework of the Project (Project Number: SAP ID: 100314) entitled "Enabling Activities to Review and Update NIP for the Stockholm Convention on Persistent Organic Pollutants (POPs) in Nepal", funded by the Global Environment Facility (GEF) and technically supported by United Nations Industrial Department Organizations (UNIDO).

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Ministry of Population & Environment

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Foreword

The international community has been working to protect human health and environment from toxic and hazardous agents through multilateral agreements. Being a party to a number of multilateral environment agreements, Nepal is fully committed to fulfill the obligations of such agreements. Article 30 of the Constitution of Nepal highlights the fundamental right as *"Every citizen shall have the right to live in a clean and healthy environment"*. Guided by constitution and provisions of international agreements, Nepal is putting its efforts to address the issues of environmental and chemical pollutions.

Nepal became party to Stockholm Convention (SC) on Persistent Organic Pollutants (POPs) in 2007 after preparing initial National Implementation Plan (NIP) in 2006 and successfully disposed off the stocks of POPs chemicals and other obsolete pesticides in an environmentally sound manner, for which technical and financial assistance were provided by different development partners, as required. As new POPs are added to the list and each Party has to review and update the status of old and new POPs as well as prepare the updated NIP periodically to submit to the SC, Nepal has done this after wider consultation with concerned stakeholders. Government of Nepal will put its effort in the implementation of updated NIP, for which lessons learned from the successful implementation of initial NIP will be very helpful. Nepal is strongly committed to fulfill the obligations of the Stockholm Convention, however, the technical and financial resources may not be adequate for the implementation of Updated NIP, for which Nepal as a Party may be in need of required technical and financial support.

Finally, I would like to thank Ministry of Population and Environment and the NIP Update project team for preparing the Updated NIP. My sincere thanks also go to Global Environment Facility (GEF) and United Nations Industrial Development Organization (UNIDO) for their support in the preparation of the NIP.

Mithila

August, 2017

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Foreword

Nepal became party to Stockholm Convention in 2007 after preparing the initial National Implementation Plan (NIP) in 2006. In line with Article 7 of the convention, each party needs to periodically review and update the NIP. Accordingly, the project ***"Enabling Activities to Review and Update NIP for the Stockholm Convention on Persistent Organic Pollutants (POPs) in Nepal"*** was started to prepare the upadted NIP with the financial support of Global Environment Facility (GEF) and technical support of United Nations Industrial Development Organization (UNIDO). The preparation of updated NIP has been guided by the Constitution of Nepal and provisions of Stockholm Convention to protect human health and environment from the harmful impacts of POPs. The Ministry of Population and Environment is committed to create an enabling environment for the effective implementation of the updated NIP. Like the initial NIP, the action plans with activities are prepared to address the new priorities. Moreover, the present updated NIP is expected to provide information and knowledge about possible future developments in the field of chemicals management to the policy- and decision-makers, so that unsustainable decisions on chemicals production and management can be avoided.

Along with the disposal of POPs chemicals, Nepal took substantial steps in the legal harmonization by formulating and promulgating new regulations and developing few guidelines during the implementation of initial NIP. Coordination among the stakeholder organizations helped to regulate the import, production and use of old and new POP pesticides, though the effort in the reduction of unintentionally produced POPs was not at the desired level. Nepal has experiences of technical and financial support from its development partners to its attempts in the management of POPs in the past and such support may be needed in the future, especially where the in-country resources are not adequate.

The present updated NIP is prepared in line with the NIP Review and Update process provided by the Stockholm Convention Guidance for Developing a National Implementation Plan. Part I of the document is "Reviewed and Updated NIP" and Part II is "Inventory of Old and New POPs".

The inventory of old and new POPs and Updated NIP is the outcome of the contributions of many organizations and personalities, to whom I am very thankful. My sincere thanks go to Joint Secretary and National Project Director Mr. Rameshwor Dangal, National Project Manager Mr. Akhanda Sharma, Environment Standard Section Chief Mr. Bipin Rajbhandari, POPs Desk Officer and Mechanical Engineer Mr. Tulsi Narayan Maharjan, Chemist Ms. Anuradha Gyawali and Section Officer Mr. Rabindra Singh Lama and Old and New POPs Pesticides Expert Mr. Youb Raj Bhatta. The support rendered by the then Joint Secretaries and NPD Mr. Mahendra Man Gurung and Mr. Narayan R Timilsena, then POPs Desk Officer and Chemist Mr. Shankar P Paudel at the initial stage of this project is highly acknowledged.

I would like to acknowledge the support of the members of the steering committee. I wish to thank the members of the working groups representing National Planning Commission, Ministry of Finance, Ministry of Agriculture Development, Ministry of Industry, Department of Customs, Federation of Nepalese Chamber of Commerce and Industries, Ministry of Health, Department of Drug Administration, Ministry of Law, Justice and Parliamentary Affairs, Department of Environment and other organizations for their support and cooperation during the inventory preparation.

My special thanks go to National Project Coordinator Dr. Bhupendra Devkota, who prepared this Updated NIP after wider consultation with the project team within the ministry and different stakeholders, including UNIDO.

At the end, I would like to thank GEF and UNIDO for the financial and technical support, which has helped the Government of Nepal in fulfilling the obligations of the convention.

August, 2017

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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 Nepal signed it in April 2002 and became Party to it in 2007 after preparing the initial NIP in 2006 and ratifying the SC by the Nepalese Parliament. Parties are required to review and update their NIPs in a manner specified by a decision of the COP. Among others the addition of chemicals to the Annexes in COP5 (2009), COP6 (2011) and COP 7 (2013) is a factor that leads to the need to review and update the original NIP for a Party and this Upadted NIP of Nepal is prepared in line with Article 7 of SC with the financial support of GEF and technical support of UNIDO. The NIP structure is consistent with the GEF initial guidelines for enabling activities for the Stockholm Convention on POPs, and the interim guidance for developing a NIP (UNEP and The World Bank Group). It is prepared to provide information and knowledge to the policy and decision-makers about possible future developments in the field of chemicals management so that unsustainable decisions on chemicals production and management which can lead to negative consequences on human health and the environment can be avoided.

The land-locked Nepal lies in South Asia between India and China with a population of 26.49 million (CBS 2011). This Himalayan country is divided into three broad ecological regions mountains (35.2%), hills (41.7%) and Terai lowland (23.1%) (CBS 2015). There are three major river systems in Nepal, viz, Koshi river system in the east, Gandaki River system in the middle and Karnali River system in the west.

The demographic parameters show a change in CBR (33.06 to 21.8), CDR (9.62 to 7.3), IMR (61.5 to 40.5) and TFR (4.2 to 2.5) (all per thousand) from 2001 to 2011; also, the average life expectancy has significantly increased from 59.7 to 66.6 years during the same period (CBS 2011). These changes are due to increasing literacy and medical facilities. 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 is currently in a political transition and has a multiparty democracy. The country is going to replace the central and unitary form of the state by an inclusive democratic federal governance system with progressive restructuring consisting of seven federal provinces, with **744 local units** (479 Rural Municipalities and 265 Municipalities).

Agriculture is the mainstay of economic activity in Nepal. The agriculture sector occupies almost one third of Gross Domestic Product (GDP) while about two third of country's population is dependent in this sector for subsistence living. Production in Agriculture sector is estimated to grow by 1.9 percent in fiscal year 2014/15 against the previous fiscal year's growth of 2.9%. The geographic challenges have intensified the poverty in this mountainous country. Nepal remains one of the very low income countries in the world in spite of half a century of development efforts; per capita GDP of Nepal in 2011 was US$ 712, which was lowest among the South Asian countries. The Human Development Report (UNDP 2015) ranked Nepal 145 out of 187 countries in human development.

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**.

With the promulgation of Constitution of Nepal in 2015 (2072 BS), Nepal is amending some of the laws or formulating new ones to suit with the new political situation. Setting up of environmental standards and extended rules and regulations for enforcement and necessary institutional setting are gradually progressing. Nepal is Party to 21 international conventions and signatory of five conventions related to environment and while amending or formulating new laws GON is taking into account the provisions of such conventions. Also, Nepal is committed to fulfil the obligations of such international agreements.

Nepal prepared a baseline initial inventory of POPs during 2004-2005, after which initial NIP was prepared in 2007 to implement SC. Successful completion of different projects helped to manage the identified stocks of obsolete pesticides including POPs pesticides (74.51 mtons) and PCBs (54 mton of PCBs oil and 155 mtons of PCBs contaminated equipment) in an environmentally sound manner during the last decade and Nepal thus reached the major milestone well before the target.

The proactive steps taken by the GON already since 2009 to gradually reduce the import of endosulfan by informing the importers that the SC will decide to ban it in 2013, led to the situation that endosulfan was imported only till the year 2011/12. Due to regular information sharing among the stakeholders during trainings or counselling programmes not only endosulfan, but also other pesticides under IA, IB and II of WHO category were found increasingly replaced (but POPs and IA & IB totally banned) by other pesticides like pyrethroids and carbamates in the recent years. Still, some pesticides under the Rotterdam Convention (PIC chemicals) like methyl parathion, monocrotophos and phosphamidon are not given the import license any more.

Government of Nepal banned lindane for agricultural purpose already in 2001, but it is still in use against the ectoparasites (lice and scabies). DDA is now taking step to inform the importing and producing companies to go for the alternatives of lindane. A notification to the Secretariat of SC is sent on 16 April 2017 about the pesticides banned in agriculture in Nepal.

Regarding the new POPs industrial chemicals PBDE and HBCD, they were neither produced nor imported for industrial purpose in Nepal and no stock of these chemicals were found; however, there were some imported items, in which these POPs might be present or during the production (process) of which these POPs might have been used.

A Tier I initial assessment showed that 15870 Kg to 46333 Kg of POP-PBDEs is estimated to be present in different electrical and electronic equipment (EEE) products. Similar assessment of commercial-PentaBDE revealed that an amount of 3079.3 Kg POPBDE might be present in transport sector in Nepal. It is therefore necessary to notify the Convention Secretariat that CRT casings of TVs and computer monitors containing HexaBDE and HeptaBDE (c- OctaBDE) as well as transport vehicles with c-PentaBDE containing PUR foams in their seats may remain in use within the country.

In case of HBCD, it can be assumed that the imported polystyrene for EPX/XPS applications in construction does not contain HBCD; however HBCD that might be present in imported electric

equipment needs to be properly addressed. A follow-up action could be a project for the management of hazardous materials and wastes containing PBDE and HBCD.

Nepal has already disposed off old stock of DDT and new inventory could not reveal any stock of this Annex B POP pesticide, however there might be some PFOS in Nepal in some product, although no stock of it was found during inventory update, which was largely based on the information that could be retrieved from the records of custom, industries and relevant documents, and also through personal contacts, though analytical determination of the POPs (including HBCD and PFOS) was highly desirable. Establishment of required laboratory facilities would help to generate such data, and thus support Nepal in its international commitments.

Inventory of PCDD/PCDF for the base year 2003 was reviewed using the UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases, 2012 and similar inventory was updated for 2014/15. The annual dioxin and furan releases was found to be 237.7 gTEQ/year for the base year 2003 when calculated using Toolkit 2012 and this release was reduced to 175.2 gTEQ in 2014/15. This lower value was due to new emission factors prescribed for some source categories in Toolkit 2012 and also due to reduction of PCDD/F from heat and power generation as well as from open burning process. The required activity data of different source categories for 2014/15 could not be acquired because of weak information updating or weak institutional memory; in such case the data of old inventory 2005 were used with the view that the emissions from these source categories are at least included in the present inventory. A comparison of total PCDD/F releases from each group for the inventory years 2003 and 2014/2015 showed the changes in releases between the two periods, and thus a change during the implementation of Stockholm Convention.

Old pesticides stores, transformer maintenance workshops, temporary landfill sites and scrap vendors *Kawadis)*, are the potential sites which may be contaminated by different types of POPs, namely pesticides, PCBs, PCDD/F and POP-PBDEs. As of now no remediation measure has been taken for the POPs contamination sites in Nepal, though initial NIP had identified several sites and included their remediation as one of the national priorities.

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. Awareness on POPs was not found adequate among general public and even the authorities of stakeholder organizations were found to be quite unaware of the adverse effects of POPs.

There are NGOs, which 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 however gives preliminary information on the potential sources of POP chemicals, their

stockpiles or their amount in products and release into the environment, as well as the rough estimation of contaminated areas in Nepal.

The existing acts and regulations are not enough to address overall chemicals which are 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 import and production of any new chemicals.

Legal and institutional systems to regulate the import, production and use of hazardous and toxic chemicals were not effective as desired, so GON formulated SWMA 2011 to replace the older one. Also, Hazardous Substances Management Regulation is at the final stage of approval. EPA 97 and EPR 97 have made strong provisions for hazardous substance management demanding a full scale environmental assessment for the recycling and recovering of wastes containing hazardous substances and for projects dealing with production, import, sale of pesticides. Regarding POPs management there is no specific regulation in Nepal.

Guiding principles for the updated NIP were *inter alia* constitutional provision to clean and healthy environment and SC provisions to protect human health and environment from the harmful impacts of POPs by managing them in an environmentally sound manner.

It is anticipated that the GON will create an enabling environment for the effective implementation of the Updated NIP.

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

After reviewing the priorities of the initial NIP and the activities carried out to address these priorities, the Updated NIP has considered both the incomplete or partially completed priorities as well as the new ones based on the updated inventory data and information. The priorities identified and approved during priority validation and endorsement workshops are grouped and prioritized for the next NIP implementation.

Priorities for the Updated NIP Implementation in Nepal	
Activities	**Final Priority**
Legislative framework: Institutional strengthening, legislation/policy formulation on POPs; Harmonization of sector legislation	1
POPs in general : Public awareness raising, information and education & training	2
Establish research and laboratory facilities with focus on chemicals and developing PRTR	3
Environmental monitoring (pre and post disposal)	4
Capacity building at Custom, Quarantine offices and Armed Police	5
Establishment of network for inter-institutional information sharing (focusing on Coordination, Responsibilities and Authorities)	6
PCDD/F emission control	7
BAT/BEP : Renewable energy program for household energy need	8
CP/EE/EM technology : Release reduction from industrial process/establishment	9
Promotion of intermediate technological solution on hazardous waste disposal	10
Decontamination and site remediation for POPs contaminated sites	11
Promotion of electrical crematoria	12

The MOPE, as the NIP National Executive Agency and Focal Point to the Stockholm Convention, will implement the NIP, for which there will be a team led by National Project Director and supported by a National Project Manger and POPs Desk Officer. For this a POPs Unit will be established under the Population and Environment Management Division within the Ministry. Steering Committee (StC) on Implementation of Stockholm Convention will coordinate the implementation of the Action Plans, whereas POPs Management Technical Committee (PMTC), formed **to support** the StC, will execute different action plans by employing National Project Coordinator and Experts for different action plans.

The following table gives a summary of the major activities under the given action plans to be undertaken for the management (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 alternative energy programs	• Establishment of the enforcement agency for environmental requirements under MOPE • Establishment of interagency coordination mechanism • Implementation of Action Plan on Stockholm Convention • Enhancement of synergy between Basel, Rotterdam, Stockholm Conventions in Nepal • Cooperation and Coordination of Activities Concerning Promotion of BAT and BEP • Amending current legislations • Ban on the use of chemicals potential for generating POPs • Ban on open burning of kitchen and garden waste in urban areas • Formulation of Hazardous Chemicals Management Rules • Harmonization of sector legislations • 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	• Harmonization and amendment of relevant laws • Establishing and strengthening of relevant institution (MOPE and MOAD)	• Harmonization of sectoral laws and amendment with respect to time requirement and in line with Stockholm Convention • Establishment and strengthening of institutional aspect of both line ministries (MOAD and MOEST) for permanent set up of monitoring mechanism.
Production, import and export, use, stockpiles and wastes of Annex A	• Contaminated sites remediated and stabilized • Further accumulation of	• Site stabilization and remediation • Establishment of a system for control of illegal import, application and balance

Action Plans	Objectives	Activities
POPs pesticides	pesticides prevented	between import and demand of pesticides
Production, import and export, use, stockpiles and wastes of Annex B POPs chemicals (DDT & PFOS)	• ***Nepal has already banned DDT*** • Preparation of a countrywide PFOS inventory • Further accumulation of PFOS prevented	• Preparation and adoption of strategy for PFOS inventory • Establishment of a system for control of import, application and balance between import and demand of PFOS
Register for specific exemptions and the continuing need for exemptions (article 4)	Nepal has lodged no registration for any sort of exemption at present, but it is necessary to notify about the acceptable purposes and specific exemptions for relevant uses of PFOS in fire fighting purposes to the SC secretariat until Nepal goes for other affordable alternatives.	
Measures to reduce releases from unintentional production (article 5)	• Complete and updated inventory of all Annex C POPs, both old and new • 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	• Review and update inventory of Annex C POPs in Nepal • Household energy switch for controlling emission of PCDD/Fs • Capacity building activities • Control of open burning of agriculture residues and forest fires • Expansion of Electrical Crematoria • Establishment of hazardous waste management facility • Establishing system for long-term permanent monitoring and reporting on Annex C POPs • Development of Regulatory framework for release limit values
Measures to reduce releases from stockpiles and wastes (article 6)	• Established procedures for elimination of releases from stockpiles and wastes	• Identify and Mapping of stockpiles, products, and articles consisting of or containing chemicals listed in Annex A, B or C. • 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
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 of new POPs • Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee stockpiles, articles in use and wastes
Manage stockpiles and appropriate measures for handling and disposal of articles in use	***As there is no identified stock of POPs, Nepal should focus on other priority activities such as developing PRTR, which would address this activty, as well***.	
Identification of contaminated sites	• Prepared environmental assessment of contaminated	• Preparation of an implementation strategy for these activities

Action Plans	Objectives	Activities
(Annex A, B and C Chemicals) and remediation in an environmentally sound manner	areas; • Prepared strategy for contaminated areas recovery; • Realized decontamination activities	• Preparation of a methodology of the assessment in line with EIA/IEE format of EPA/EPR • Prioritization of contaminated areas for their recovery, based on 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	• Enhance the capacity of National Focal Point at MOPE and update the list of stakeholders • Establish system of information exchange between the National Focal Point and the stakeholders	• Capacity building of National Focal Point for an efficient information exchange • Preparation of stakeholders list • Establishment of a network for cooperation, data and information exchange among responsible institutions • Definition of formats for information exchange on POPs
Public awareness, information and education (article 10)	• Educated and trained government officials and business sector representatives for implementation of the Convention • National education system to incorporate POPs information and disseminate through education • Educate general public for principles and objectives of Stockholm Convention	• Preparation and realization of training for government officials and business sector at different levels and for different target groups • Introduction of courses on POPs at school and university level • 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 risks of POPs
Effectiveness evaluation (article 16)	Nepal needs to establish/create a monitoring system to facilitate effectiveness evaluation of the Updated NIP and the provisions of the Stockholm Convention.	
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 POPs; • 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	• 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

Action Plans	Objectives	Activities
	activities • Establish and adopt an internationally accepted system of standardization of methods for residue analysis in abiotic and biotic matrices; • Develop system of quality assurance and quality control in Nepalese laboratories	cooperation, data and information exchange among these institutions • Establishment of internationally accepted system of standardization • 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 at the time of development of proposals for new projects	

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 development partners will be required will be included in the projects developed for the implementation of Updated NIP.

A timetable to carryout different action plans of the Updated NIP is prepared considering the present facilities and future developments of the required infrastructures and capacities.
A total of USD 10,342,000 is estimated to be required for the period 2017 to 2022 to carry out different activities while implementing the Updated NIP. Contributions from national budget, development partners and also from industry sectors will be used to meet these huge expenses.

List of abbreviations and Acronyms

a.i. : active ingredient
AAS : Atom Absorption Spectrophotometer
ABC : Atmospheric Brown Cloud
AICC : Agriculture Information and Communication Centre
APCS : Air Pollution Control System
ATF : Aircraft Turbine Fuel
BAT : Best Available Techniques
BDE : Brominated diphenylethers
BEP : Best Environmental Practices
BFR : Brominated Flame Retardant
BHC : Benzene hexachloride
BS : Bikram Sambat (Nepali Official Calendar)
BSP-Nepal : Biogas Support Programme-Nepal
CAAN : Civil Aviation Authority of Nepal
CBR : Crude Birth Rate
CBS : Central Bureau of Statistics
CCD : Charge-coupled Device
CFRL : Central Food Research Laboratory
CITES : Convention on the International Trade in Endangered Species of Wild Fauna & Flora
CNI : Confederation of Nepalese Industries
COP : Conference of Parties
CP : Cleaner Production
CRT : Cathode Ray Tube
cu.m : Cubic meter
DADO : District Agriculture Development Office
DDA : Department of Drug Administration
DDT : Dichlorodiphenyl Trichloroethane
DFTQC : Department of Food Technology and Quality Control
DMU : Dechlorination/decontamination Mobile Unit
DOA : Department of Agriculture
DOC : Department of Custom
DOEnv : Department of Environment
DOF : Department of Forest
DOHS : Department of Health Services
DOI : Department of Industry
DOTM : Department of Transport Management

ECD : Electron Capture Detector
EEE : Electronic and Electrical Equipment
EIA : Environmental Impact Assessment
EMS : Environmental Management System
ENPHO : Environmental and Public Health Organization
EPA : Environment Protection Act
EPR : Environment Protection Regulations
EPS/XPS : Expanded/Extruded Polystyrene Insulation
ER : Emission Factor
ETFE : Ethylene tetrafluoroethylene
EVI : Economic Vulnerability Index
FAO : Food and Agriculture Organization
FCBT : Fixed Chimney Bull's Trench kiln
FID : Flame Ionization Detector
FNCCI : Federation of Nepalese Chamber of Commerce and Industries
FO : Furnace oil
FY : Fiscal Year
GC : Gas Chromatograph
GDP : Gross Domestic Product
GEF : Global Environment Facility
GIZ : Deutsche Gesellschaft fuer Intenationalen Zusammenarbeit
GJ : Giga Joule
GNI : Gross National Income
GON : Government of Nepal
gTEQ/y : gram Toxic Equivalent per year
ha : Hectare
HAI : Human Asset Index
HBB : Hexabromobiphenyl
HBCD : Hexabromocyclododecane
HCB : Hexachlorobenzene
HCH : Hexachlorocyclohexane
HCI : Health Care Institutions
HDI : Human Development Index
HIPS : High-Impact Polystyrene
HPLC : High Performance Liquid Chromatography
HPTLC : High Performance Thin Layer Chromatography
ICIMOD : International Centre for Integrated Mountain Development

ICT : Information and Communication Technology
IEC : Information, Education and Communication
IEE : Initial Environmental Examination
IFAD : International Fund for Agricultural Development
IFCS : International Forum for Chemical Safety
IMR : Infant Mortality Rate
INGOs : International Non-Governmental Organizations
IUCN : International Union on Conservation of Nature
KL : Kilolitre
KMC : Kathmandu Metropolitan City
KVA : Kilo Volt Ampere
LCD : Liquid Crystal Display
LDO : Low Density Oil
LPG : Liquefied Petroleum Gas
LRMP : Land Reform Mapping Project
MDG : Millennium Development Goal
MEA : Multilateral Environmental Agreement
MOAD : Ministry of Agricultural Development
MOEd : Ministry of Education
MOEn : Ministry of Energy
MOF : Ministry of Finance
MOFALD : Ministry of Federal Affairs and Local Development
MOFSC : Ministry of Forest and Soil Conservation
MOH : Ministry of Health
MOHA : Ministry of Home Affairs
MOI : Ministry of Industry
MOLJPA : Ministry of Law, Justice and Parliamentary Affairs
MOPE : Ministry of Population and Environment
MOSTE : Ministry of Science, Technology and Environment (Also MOEST)
MRL : Maximum Residual Limit
MS : Mass Spectroscopy
MSP : Medium Size Project
mton : metric tons
MUAN : Municipality Association of Nepal
MW : Megawatt
NADA : Nepal Automobile Dealers' Association
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
NEPAP : National Environmental Policy and Action Plan
NES : National Education System
NESS : Nepal Environmental and Scientific Services
NFL : National Forensic Laboratory
NGOs : Non Governmental Organizations
NIP : National Implementation Plan
NOC : Nepal Oil Corporation
NPC : National Planning Commission
NPD : National Project Director
NPM : National Project Manager
NPR : Nepalese Rupees
NTV : Nepal Television
PAN : Pesticide Entrepreneurs' Association of Nepal
PBDE : Polybrominated diphenyl ether
PCBs : Polychlorinated Biphenyls
PCDD/F : Polychlorinated dibenzo-p-dioxins and dibenzofurans
PFOS : Perfluorooctane sulfonic acid
PFOSF : Perfluorooctane sulfonylfluoride
PIC : Prior Informed Consent
PMTC : POPs Management Technical Committee
POPs : Persistent Organic Pollutants
PPD : Plant Protection Directorate
ppm : Parts per million
PRMD : Pesticide Registration and Management Division
PRSP : Poverty Reduction Strategy Paper
PRTR : Pollutants Release and Transfer Register
PUR : Polyurethane
PVC : Polyvenyl chloride
SAARC : South Asia Association for Regional Cooperation
SAICM : Strategic Approach to International Chemicals Management
SC : Stockholm Convention
SDG : Sustainable Development Goals
StC : Steering Committee

SWMA : Solid Waste Management Act
SWMTSC : Solid Waste Management and Technical Support Centre
TCD : Thermal Conductivity Detector
TCDD : Tetrachloro dibenzo-p-dioxin
TCDF : Tetrachloro dibenzo-p-furan
TFR : Total Fertility Rate
TJ : Terajoule
TLC : Thin Layer Chromatography
TU : Tribhuvan University
TYP : Three Year Plan
UNCCD : United Nations Convention to Combat Desertification
UNDESA : United Nations Department of Economic and Social Affairs
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
UPOPs : Unintentional POPs
USD : US Dollars
UV-Vis : Ultra Violet and Visual Spectroscopy
VDCs : Village Development Committees
WEEE : Waste Electronic and Electrical Equipment
WETC : Water Engineering and Training Center
WHO : World Health Organization
WTO : World Trade Organization
WWF : World Wildlife Fund
µg/l : Microgram per liter

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PART – II : Reviewed and Updated Inventory of Old and New Persistent Organic Pollutants (POPs)

PART - I

Updated and Reviewed National Implementation Plan (NIP)

1. Introduction

The Stockholm Convention on Persistent Organic Pollutants (POPs) was adopted in May 2001 with the objective of protecting human health and environment from toxic and hazardous POPs. It entered into force on 17 May 2004 initally listing twelve chemicals as POPs. Nepal signed the Stockholm Convention on April 5, 2002 and according to Article 7 of the Convention, Nepal developed the National Implementation Plan (NIP) under Stockholm Convention in 2006. The Nepalese Parliament ratified the Stockholm Convention on October 13, 2006 and following this Nepal became Party to this Convention. The NIP was developed by the then Ministry of Environment, Science and Technology with assistance from UNIDO and GEF to address the initial twelve POPs, was submitted to SC Secretariat in 2007.

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. Parties are required to review and update their NIPs in a manner specified by a decision of the COP. Among others the addition of chemicals to the Annexes in COP5 (2009), COP6 (2011) and COP 7 (2013) is a factor that leads to the need to review and update the original NIP for a Party. Thus, Parties to the Convention will have to review, update and submit their NIPs within two years of the date of entry into force of the amendments to the COP (for chemicals added at COP5 in August 2012).

The chemicals targeted by the Stockholm Convention till 2013 are listed in the annexes of the convention text as follows (**Table 1.1**).

Annex A (Elimination)

Parties must take measures to eliminate the production and use of the chemicals listed under Annex A. Specific exemptions for use or production are listed in the Annex and apply only to Parties that register for them.

Annex B (Restriction)

Parties must take measures to restrict the production and use of the chemicals listed under Annex B in light of any applicable acceptable purposes and/or specific exemptions listed in the Annex.

Annex C (Unintentional production)

Parties must take measures to reduce the unintentional releases of chemicals listed under Annex C with the goal of continuing minimization and, where feasible, ultimate elimination.

Table 1.1: Listing of POPs chemicals in the Annexes of the Stockholm Convention

Elimination (Annex A)	Restriction (Annex B)	Unintentional Production (Annex C)
Aldrin Alpha hexachlorocyclohexane Beta hexachlorocyclohexane Chlordane Chlordecone Dieldrin Endrin Heptchlor Hexabromobiphenyl Hexabromodiphenyl ether and heptabromodiphenylether Hexachlorobenzene Lindane Mirex Pentachlorobenzene Tetrabromodiphenyl ether and pentabromodiphenyl ether Toxaphene Endosulfan Polychlorinated biphenyls (PCBs) Hexabromocyclododecane (HBCD)	DDT Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride	Hexachlorobenzene (HCB) Pentachlorobenzene Polychlorinated biphenyls (PCBs) Polychlorinated dibenzodioxins (PCDD) Polychlorinated dibenzofurans (PCDF)

Pesticide, Industrial chemical, Unintentional production

1.2 Essential Aims of the Stockholm Convention

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

1.3 The key objectives of the Convention

- Eliminate the production and use of specific POPs listed in Annex A of the convention.
- 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).

1.4 Obligations under the Stockholm Convention

The Party shall inter alia:

- Develop and implement plan, as well as review and update plan (Article 7)
- Facilitate or undertake the exchange of information relevant to POPs (Article 9)
- Promote and facilitate widely the public information, awareness and education measures for all the concerned stakeholders including policy and decision makers (Article 10)
- Encourage and/or undertake appropriate research, development, monitoring and cooperation pertaining to POPs and their alternatives (Article 11)

The goal of present NIP Review and Update is to review and update the NIP and comply with the obligation under Article 7 of the SC

- Develop and implement action plans for unintentionally produced chemicals (Article 5)
- Develop and implement strategies for identifying stockpiles, products and article in use, and wastes with POPs (Article 6)
- Implement control measures to reduce or eliminate releases from intentional production and use (Article 3 and 4)
- Include new chemicals in the programme for the effectiveness evaluation (Article 16)
- Include new chemicals in the reporting (Article 15)

1.5 NIP Development Methodology

The NIP Review and Update was undertaken in accordance with the changes in the obligations arising from amendments to the Convention or its annexes, according to paragraph 7 of the annex to decision SC-1/12.

The NIP Review and Update process is in line with the guidance provided by the SC Guidance for Developing a National Implementation Plan (to include the POPs listed in 2009, 2011 and 2013).

Also during the NIP Review and Update process the following guidance were referred by the NIP Review and Update project team:

- Guidance for the review and updating of national implementation plans;
- Guidance on calculation of action plan costs for specific POPs (updated in 2012);
- Guidance on Socio-Economic Assessment for National Implementation Plan Development and Implementation under the Stockholm Convention (2007) (not revised);
- Guidance for the inventory of perfluorooctane sulfonic acid (PFOS) and related chemicals listed under the Stockholm Convention on POPs (Draft, 2012) (new);
- Guidance on best available techniques and best environmental practices for the use of perfluorooctane sulfonic acid (PFOS) and related (Draft, 2012) (new);
- Guidance for the inventory of polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on POPs (Draft, 2012) (new);
- Guidance on best available techniques and best environmental practices for the recycling and waste disposal of articles containing polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on POPs (Draft, 2012) (new);
- Guidance for the control of the import and export of POPs (Draft, 2012) (new);
- Guidance for the inventory, identification and substitution of Hexabromocyclododecane (HBCD) (UNEP-POPS-NIP-GUID-Guidance For Inventory And Substitution)

Moreover the following SC and BC available resources have been consulted:

- Step-by-step companion guide to the review and updating of the National Implementation Plans – 2011;
- Lessons learned and good practices in the development of national implementation plans for the Stockholm Convention on Persistent Organic Pollutants, 2006;
- New POPs – Publications;
- BAT/BEP – Guidelines on best available techniques and provisional guidance on best environmental practices;
- Toolkit – Standardized Toolkit (2012) for Identification and Quantification of Dioxins and Furan Releases;

The review and update process of the National Implementation Plan (NIP) was started in January 2014 by nominating the National Project Director (NPD), National Project Manager (NPM), POPs Desk Officer and establishing the POPs Unit within the Ministry of Population and Environment as the responsible implementing agency within the Government and UNIDO as the executing agency. The main funding source has been the Global Environment Facility (GEF). The practical work started in June 2015 by appointing the National Project Coordinator and different Experts for updating the Inventory and preparation of reviewed and updated NIP.

1.5.1 Gender policy in NIP development and implementation

Efforts to ensure sound management of chemicals, including POPs, have important gender dimensions, because in daily life, men, women, and children are exposed to different kinds of chemicals in varying concentrations. Gender policy should be adequately considered in NIP development and implementation, as the workplace exposure to POPs (to pesticides during application in the field and to PCBs during maintenance of PCBs contaminated transformers) of both women and men was observed during the implementation of NIP in the past. Not only the women farmers were found procuring and applying pesticides in the field (thus a strong evidence that they had applied POPs pesticides in the past), but some pesticide retailer shops were operated by women, when their male partners were busy in public jobs or jobs demanding heavy physical maneuvers. Biological factors, notably size and physiological differences between women and men and between adults and children, influence susceptibility to health damage from exposure to toxic chemicals. Also social factors, primarily gender determined occupational roles, also have an impact on the level and frequency of exposure to toxic chemicals, the kinds of chemicals encountered, and the resulting impacts on human health.

Gender dimensions need to be reflected at both field and policy level interventions for proper use and sound management of chemicals, especially in agrarian societies like Nepal where about 66% are farmers; here not only men but women are equally involved in agriculture and deal with or are exposed to the agrochemicals. The gender analysis needs to be done to identify, understand, and describe gender differences and the impact of gender inequalities on a sector or program at the country level. Gender analysis is a required element of strategic planning and is the basic foundation on which gender integration is built. The very societal composition of rural communities of Nepal requires an examination of the rights and opportunities of men and women, power relations, and access to and control over resources. Gender analysis needs to identify disparities, investigate why such disparities exist, determine whether they are detrimental, and if so, look at how they can be corrected. Consistent with the GEF Policy on

Gender Mainstreaming and the GEF-6 approach on gender mainstreaming, GEF projects funded under this strategy will not only acknowledge gender differences within their design but also determine what actions are required to promote both women and men's roles in chemical management, disproportionate chemical exposure and vulnerability, sustainable alternatives as well as proper occupational health and safety measures.

POPs such as PCBs have estrogen-like activity (xenoestrogens) and resemblance between the toxicants and the natural (endogenous) estrogen hormone of female. There are also similarities in chemical structures between endogenous estradiol and the xenoestrogens DDT, PCBs, dioxin, furans, etc. Exposures to some PCBs congeners have been correlated with reduced sperm motility and density in males, whereas increased foetal loss, reduced birth weight and behavioral and developmental effects are reported after severe *in utero* exposures (WHO 1995)[1]. Exposure to such POPs may bring hormonal imbalance in both sexes, exerting impacts on reproductive and sexual health.

During the NIP update project, Working Group (Legal and Institutional) had two female officers representing two government organizations (National Planning Commission and Ministry of Law and Justice); also, there was satisfactory female participation in different workshops (11 in Inventory training, 8 in Inventory Validation and Priority Setting and 10 in NIP Endorsement) organized by the Ministry of Population and Environment.

1.5.2 Consistency with NIP Update guidance

The NIP structure is consistent with the GEF initial guidelines for enabling activities for the Stockholm Convention on POPs, and the interim guidance for developing a NIP (UNEP and The World Bank Group). The process of developing the NIP was supported by the GEF (financially) and UNIDO (technically).

1.5.3 Further considerations

1.5.3.1 GEF strategies and visions

As the Global Environment Facility has been the main financial donor in dealing with POPs, the NIP Review and Update has correlated its vision in managing POPs substances taking also into account GEF 2020 Strategy, as well as the GEF-6 Strategy.

1.5.3.2 Considering forward looking information and strategy

Policy- and decision-makers need the information and knowledge about possible future developments in the field of chemicals management so that unsustainable decisions on chemicals production and management which can lead to negative consequences on human health and the environment can be avoided. Accordingly, the updated NIP needs to consider the precaution approach and needs forward looking information for sustainable long-term planning to avoid failures on chemicals management and their consequences including problems in the management of chemicals at different stages of their lifecycles.

1.6 NIP Structure

The current NIP is structured and based on the initial NIP and also adhering to NIP update guidance.

[1] WHO (1995): Basic Environmental Health, pp51-52

2. Country baseline

2.1 Country Profile

2.1.1 Geography and population

Nepal, with an area of 147,181 Km^2, lies within the latitude 26°22'N to 30°27'N and longitude 80°04'E to 88°12'E in South Asia (**Fig 2.1**). This Himalayan country has the border with China in the north and with India in the south, east and west. The average east to west length of country is 885 km and north to south width is 193 km. The altitude ranges from 60 m in the south to 8,848 m, the summit of Mount Everest, in the north within a short distance of only 160 km. The nearest point in Nepal from the sea is about 960 km away. Nepal is among the least developed countries and 47 land-locked countries of the world. The country has a population of 26.49 million (**Table 2.1**) (CBS 2011).

The country is divided into three broad ecological regions (1) Mountains (2) Hills and (3) Terai lowland, covering 35.2 percent, 41.7 percent and 23.1 percent, respectively and almost 50% of the population living in 23.1% of the of the country's total area (CBS 2015). 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. The altitude varies from 60m in the south-east 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.

Table 2.1: Areas and Population by Physiographic Region

Physiographic Region	Area		Number of Districts	Population Census, 2011
	Km^2	Percent		
Mountain	51817	35.2 (15% snow covered)	16	1781792 (6.7%)
Hill	61345	41.7	39	11394007 (43.6%)
Terai	34019	23.1 (17% flat)	20	13318705 (50.3%)
Total	147181	100	75	**26494504**

Source: CBS (2015): Statistical Pocket Book of Nepal, 2014

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. The Southern part (low land) occupies about 23% of the land, of which 17% is very flat and fertile with alluvial soil and produces about 60% of the total grain production of the country. About 50% of the total population of the country lives in this zone. The central part of the country has moderate size mountains ranging from 1000 to 3000m having warm to cold temperature climate. Kathmandu valley is a flat-bottomed valley and covers an area of about 351 Km^2. Kathmandu is the capital of the country with an average altitude of 1330 m.

Based on the National Population and Housing Census 2011, a total of 5,427,302 households having an average household's size of 4.88 were recorded. The average household size in urban area is 4.32 and in rural area 5.02. According to the National Population and Housing Census 2011, the actual population density of mountain, hill and Terai was 34, 186 and 392 respectively as of June 22, 2011. However, the population density has reached to 1,381persons/Km^2 in the urban areas and 153 persons/Km^2 in the rural areas in the year 2011. Nepal having three distinct ecological zones, the population and its growth is estimated to differ in three zones, as projected for 2002 to 2027 (**Table 2.2**).

Figure 2.1: Location of Nepal in Asia region

Nepal's increasing commercial ties and open border with India and high productivity of the land have all contributed to the rapid urban growth in the Terai during the last few decades. The decrease in the scope of rural to rural migration from mountain and hill to the Terai in the future really means heavy influx of people from rural to urban areas. This rural to urban stream of migration is bound to create imbalance in the spatial distribution of economic benefits between the hill and the Terai regions.

Table 2.2: Population Size and Growth and Density by Ecological Regions, 1911-2027, Nepal (New Era, 2005)

Year	MOUNTAIN			HILL			TERAI		
	Population '000	Growth rate percent per annum	Population Density (person/Km^2)	Population '000	Growth rate percent per annum	Population Density (person/Km^2)	Population '000	Growth rate percent per annum	Population Density
2002	1,724	--	33.27	10,479	--	170.82	11,498	--	337.94
2007	1,892	1.86	36.51	11,578	1.99	188.74	12,957	2.39	380.82
2012	2,069	1.79	39.93	12,698	1.85	206.99	14,359	2.05	422.03
2017	2,240	1.59	43.23	13,801	1.67	224.97	15,725	1.82	462.17
2022	2,402	1.40	46.36	14,816	1.42	241.52	16,965	1.52	498.62
2027	2,543	1.14	49.08	15,712	1.17	256.13	18,024	1.21	529.74

Table 2.3: Major Demographic Parameters		
Crude Birth Rate (CBR), 2011		21.8
Crude Death Rate (CDR), 2011		7.3
Infant Mortality Rate (IMR), 2011		40.5
Mortality Rate under Five, 2011		52.5
Total Fertility Rate (TFR), 2011		2.5
Average Life Expectancy (years) at birth, 2011	Total	66.6
	Male	65.5
	Female	67.9

Source: CBS (2015): Statistical Pocket Book of Nepal, 2014

Nepal is predominantly rural, where one-fifth of the country's population lives in the urban areas. According to CBS (2011), Nepal's population growth rate is 1.35 percent and about 6.7, 43.6 and 50.3 percent of the population lives in the Mountains, the Hills and the Terai, respectively (**Table 2.1**), but this was 7.29, 44.28 and 48.43 per cent, respectively in the previous census (CBS 2001) showing a declining population in mountain and hills but an increase in the Terai, possibly due to inland migration. The demographic parameters (**Table 2.3**) show a change in CBR (33.06 to 21.8), CDR (9.62 to 7.3), IMR (61.5 to 40.5) and TFR (4.2 to 2.5) (all per thousand) from 2001 to 2011; also, the average life expectancy has significantly increased from 59.7 to 66.6 years during the same period (CBS 2011). These changes are due to increasing literacy and medical facilities.

2.1.2 Form of Government

As per the Constitution of Nepal, the country is going to replace the central and unitary form of the state by an inclusive democratic federal governance system with progressive restructuring consisting of seven federal provinces, with **744 local units** (479 Rural Municipalities and 265 Municipalities) (MUAN 2017). Among the municipalities, there are 4 Metropolitan Cities, 13 Sub-Metropolitan Cities and 248 Municipalities. There is also provision for setting up local governance bodies to ensure the people's exercise of their sovereignty by creating congenial atmosphere and thereby ensuring maximum people's participation in the country's governance based on principle of decentralization and devolution of power. The existing administrative structure of the country is going to be changed based on the modality of federal system and local self-governance bodies in the near future.

2.1.3 Language(s)

Nepali is the official language. There are more than 100 mother tongues, spoken locally in different parts of the country, but many of these languages, especially practiced by small ethnic or marginalized groups, are threatened to be lost, probably due to fast changing education pattern and job opportunities.

2.1.4 Climate

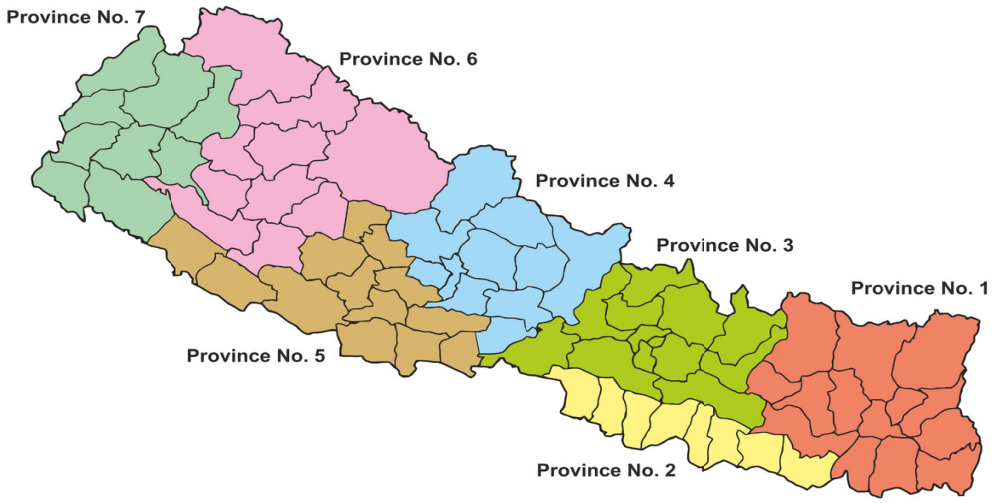
Nepal has a wide variety of climate ranging from sub-tropical in the south to alpine in the north due to its varied topography. The variation of topography is responsible for a wide range of climatic conditions of Nepal. The temperature in Nepal generally decreases from the south to the north with some 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 18ºC in January even in the lowland plains. In terms of temperature, the country records a range of 44.1ºC in summer in the south whereas up to –17.9ºC in winter in the north.

Nepal lies in the Monsoon climatic region with an average area-weighted annual precipitation of about 1630 mm. The average annual rainfall in Nepal is about 1600 mm, but the actual amount differs in different climatic zones. Both temporal and spatial variations in precipitation are pronounced. The land towards the south of the high Himalayas gets most of the rain whereas its northern part receives very little or no rain and exhibits the rain shadow effect. Nearly 80% of the total annual precipitation occurs during the Monsoon season between June and September. Orographic effects are strong on the spatial variation in precipitation. 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 5,200 mm. 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.

2.1.5 Politics and Administrative Divisions

For administrative purposes, Nepal is divided into a total of 75 districts in 14 zones grouped under 5 development regions: Eastern, Central, Western, Mid-Western and Far-Western, but according to recent changes made in the process of entering into the Federal system, there will be 7 Provinces (**Fig 2.2**) with 744 Local Levels/units, which will replace the existing Village Development Committees (VDC) and municipalities. There will be 479 Rural Municipalities and 265 Municipalities (with 4 Metropolitan cities, 13 sub-Metropolitan cities and 248 Municipalities), each of which will be further divided into wards, the smallest administrative units. Rural Municipalities will have nine wards each, but it can be as high as 32 in unicipalities/metropolitan cities depending on the population.



Political Map of Nepal with 75 districts and seven provinces; Province names will be given once the province level bodies are formed.

Figure 2.2: Political Map of Nepal

In addition to geographic challenges due to the bizarre topography, Nepal also must contend with extensive poverty (**Table 2.4**). According to the Human development report of UNDP, Nepal's HDI value is 0.548 and is placed in rank 145, though the poverty is decreasing.

Table 2.4: Nepal's Poverty Measurement (Head Count Index): Percent below poverty line			
Particulars	1994/95	2003/04	2010/11
Urban	21.6	9.6	15.46
Rural	43.3	34.6	27.43
Whole country	41.8	30.8	25.16

Source: MOAD, 2015

2.1.6 Socio-economic status

Among the South Asian countries, seconomies of all member states, except that of Bangladesh and Afghanistan, recorded higher economic growth in 2014 as compared to 2013. As per revised estimate, Nepal's real Gross Domestic Product (GDP) was estimated to grow by 5.0 percent in FY 2014/15 (MOF 2014/15). Such growth rate, however, is estimated to stagnate at 3.0 percent at basic prices against the growth rate of 5.1 percent in the previous fiscal year. Unfavorable climate for agriculture sector and adverse impact on non-agriculture sector's activities due to earthquake of April 25, 2015 are attributable for such low economic growth rate in fiscal year 2014/15.

Table 2.5: Major macroeconomic Indicators (2014/15)

GDP at basic prices (current) in million Rs.	1893994
GDP at basic prices (constant) in million Rs.	690349
Annual GDP growth rate at constant price %	3.04
Per Capita GDP, current price (NPR) (2013/14)	69919
Per Capita GDP, constant prices (NPR) (2013/14)	26619
Annual changes in real per capita GDP (%) (2013/14)	5.45
Nominal Per Capita GDP (USD) (2013/14)	703
Nominal Per Capita GNI (USD) (2013/14)	717
Gross Domestic Saving /GDP % (2013/14)	8.92
Gross National Saving/GDP % (2013/14)	46.44
Gross fixed capital formation/GDP %(2013/14)	23.13
Export of goods and services/GDP % (2013/14)	12.14
Import of goods and services/GDP % (2013/14)	40.30
Implicit GDP Deflator	227.13
Exchange rate (USD:NPR) (2013/14)	99.43

Source: CBS (2011): Statistical Pocket Book of Nepal, 2014

2.1.6.1 Agriculture

Agriculture is the mainstay of economic activity in Nepal. Contribution of agriculture sector to the Nepalese economy has been noteworthy. The agriculture sector occupies almost one third of GDP, while about two third of country's population is dependent in this sector for subsistence living. Production in agriculture sector is estimated to grow by 1.9 percent in fiscal year 2014/15 against the previous fiscal year's growth of 2.9%. Contribution of this sector to GDP was 33.12 percent in fiscal year 2013/14, which is expected to come down to 32.12 percent in FY 2014/15 (MOF 2014/15). The growth rate in the agricultural sector over the same period is even smaller, around 4.5%, which has shown inconsistent behavior over the years, probably reflecting overwhelming dependence on the monsoon. Additionally, the geographic challenges have intensified the poverty in this mountainous country. The slower rate of agricultural growth is largely responsible for the existing higher poverty incidence and severity of it in the rural areas.

Agricultural land is also affected by the uneven use of agro-chemicals such as chemical fertilizers and pesticides. The consumption of chemical fertilizer is increasing (**Table 2.6**) 2005/06 to 2013/14. A total of total of 232,879 mton of chemical fertilizer was sold in FY 2013/14 which is higher than the sale of 180140 mton of its preceding year. During the first eight months of fiscal year 2014/15, chemical fertilizer totaling 188,122 mton sold. Usage of chemical fertilizer per hectare, which stood at about 57 Kg in fiscal year 2012/13, has gone up to 75 Kg in fiscal year 2013/14 (MOF 2014/15).

Table 2.6: Import and Sales of Chemical Fertilizer (mtons)

Particulars	2005/06	2006/07	2012/13	2013/14	2014/15*
Urea	19099	30842	108552.55	146117	118093
DAP	29131	19074	65722.4	81738	58105
Potash	686	2	2688.25	5024	3924
Ammonium sulphate	8119	4170			
S.S.P	3393	1005			
A.P.S	17324	30212			
N.P.	1040	333			
Complex Nepali	12568	5212	3177.425		
Total	91360	90850	180140.62	232879	188122

Source: MOAD, 2015 (first eight months)*

Contribution of the agriculture sector to GDP has remained notable mainly due to creation of employment opportunities and overall food security it provides to the country's gross food production (rice, wheat, maize, millet, barley and buckwheat) is estimated at 9.26 million metric tons with a decline of 3 percent in current fiscal year 2014/15 as compared to previous fiscal year. Production and productivity growth achieved in food crops i.e., paddy (rice), maize, wheat, and potato has supported in Nepal's food security. Likewise, vegetable production has been increasing along with the growth in production of seasonal and off-season vegetables, as well.

Nepal remains one of the very low income countries in the world in spite of half a century of development efforts. According to the Economic Survey 2011/12, per capita GDP of Nepal in 2011 was USD 712 which was lowest among the South Asian countries. Although agriculture remains the most important source of livelihood of more than two third Nepalese people, its share in national income has declined over the years. In mid-1970s, agricultural sector contributed nearly two-thirds (64.2%) of the GDP but the share declined to only two-fifth (39.0%) by the turn of the 21st century (**Table 2.7**). Such contribution still declined to nearly 35% in the year 2011/12 (Economic Survey 2011/12).

Nepal's overall economic development policies have left behind those who depend on agriculture for their livelihood. This is further depicted by the long-term growth rates of agricultural and non-agricultural sectors. The failure of Nepal's economic policies to accelerate growth of agricultural sector is reflected in the disparity of per capita GDP between rural and urban areas. The low rural per capita GDP is one of the indicators of the concentration of poverty in the rural areas. Poorer areas are also associated with poorer social services resulting in low human development index (**Table 2.7**).

Table 2.7: Change in the Composition of Nepalese GDP (Average of Period)			
Sector	1975-1977[1] (%)	1999-2001[1] (%)	2011[2](%)
Agriculture, fisheries, forestry	64.2	39.0	38.0
Industry	10.6	20.4	15.0
Services	25.2	40.6	47.0
Total	100.0	100.0	100.0

[1]World Bank, 2005 and [2]World Development Indicators: Structures of Output, World Economy, 2013, World Bank

United Nation has set three indicators including Gross National Income (GNI) Per Capita, Human Asset Index (HAI) and Economic Vulnerability Index (EVI) and their standards to graduate from LDC status. It is necessary to surpass at least two of those three indicators to graduate to the status of developing countries. While comparing the criteria set by UNDESA, CDP in 2015 for countries to graduate to developing status and the current status of Nepal (**Table 2.8**), though GNI per capita is below the set threshold, HAI and EVI indicators have remained positive.

Table 2.8: Status of Criteria set for graduation to Developing Countries			
Indicators	**Year 2015**		
	Threshold	**Status of Nepal**	**Difference**
Gross National Income (GNI) per capita (US$)	1242	659.5	582.5
Human Assets Index – HAI	>66	68.7	Achieved
Economic Vulnerability Index-EVI	<32	26.8	Achieved

Source: UN-DESA, CDP; Quoted in Final Economic Survey (MOF 2014/15)

The incidence of poverty varies substantially, reflecting the wide variation in living costs and based on the basic calorie intake, housing and various non-food items. Poverty is in decreasing trend, 41.8 5 in 1991/95, 30.8 in 2003/04 to 25.16 in 2010/11 (**Table 2.9**) and it was 23.8 percent in 2014 (MOF 2014/15). The Tenth Plan (2002-07), also known as Poverty Reduction Strategy Paper (PRSP), had identified poverty to be the biggest challenge for the development of the country. As per the Millennium Development Goal Progress Report 2013, poverty reduction rate of 1.5 percent between 1996 and 2004 rose to 2.5 percent between 2004 and 2013 (MOF 2014/15). The ratio of population with access to food below the minimum daily requirement stood at 15.7 percent in 2013. Likewise, underweight children of 6 months - 59 months age group, and those with stunted growth remained at 37.0 percent and 30.0 percent, respectively. The Human Development Report (UNDP, 2015) ranked Nepal 145 out of 187 countries in human development. 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.

Table 2.9: Poverty Measurement (Head Count Index): Percent below poverty line			
Particulars	1994/95	2003/04	2010/11
Urban	21.6	9.6	15.46
Rural	43.3	34.6	27.43
Nepal	41.8	30.8	25.16

Source: MOAD, 2015 (based on CBS data)

2.1.6.2 Employment

Economically active population between 15-59 years of age is 57.0 percent, but the people younger or older than this age group and not properly skilled ones are also actively involved in agriculture. Women in the rural areas are bound to stay in and around houses, mainly for regular household activities and to look after children, whereas males move out for employment. This has led to higher number of female population engaged in agriculture but less in services (**Table 2.10**). In the SAARC countries, Nepal seems to engage more people in agriculture than in other sectors. Because, the country has failed to generate better employment opportunities at home, about 1,500 workers are leaving the country everyday in search of foreign employment. About 3.6 million people have left the country for foreign employment through both formal and informal mediums. Of this, 74.0 percent are unskilled, 25 percent semiskilled, and with mere one percent skilled workers (MOF 2014/15).

Table 2.10: Employment by Economic Activity in SAARC Countries

Countries	Agriculture		Industry		Services	
	Male	Female	Male	Female	Male	Female
Nepal[#]	53.6	67.7	NA	NA	17.1	9.0
Afghanistan	NA	NA	NA	NA	NA	NA
Bangladesh	41.80	68.10	15.10	12.50	43.00	19.40
Bhutan	48.70	75.10	10.20	7.20	41.10	17.70
India	43.00	59.80	26.00	20.70	31.00	19.50
Pakistan	36.90	75.00	22.10	12.20	40.90	12.90
Maldives	14.00	7.10	19.90	31.80	62.20	56.10
Sri Lanka	41.60	34.70	14.10	25.10	28.20	29.40

Source: CBS 2013: Statistical Year Book of Nepal; [#]Nepal Living Standard Survey Report, 2010/11, which gives employment data only for agriculture and non-agriculture sector, without differentiating between industry and service sectors.

2.1.6.3 Energy Consumption

About 80.08% of total energy consumption is derived from traditional sources (fuel wood, agricultural wastes, animal dung) followed by 16.67% from commercial sources (coal, petroleum and electricity) and 3.25% from other (renewable) sources. On the natural energy side, share of fuel wood consumption is 71.45% followed by animal residue (5.10%) and agricultural residues (3.53%) in the year 2013/14. Similarly on the commercial side petroleum, coal and electricity covered 10.78%, 3.64% and 2.25%, respectively (CBS 2014) (**Table 2.11**). Household consumption shares about 90% of the total energy consumption (MOF, 2013/14) and such energy consumption is mainly for cooking purpose and largely influenced by the ecology of the country (**Table 2.12**). Mountain households are found dependent more on fuel wood, which indicates a pressure on forest resources. Households in the hills are increasingly using LPG, but cattle-dung and bio-gas are the main sources of cooking fuels.

According to government owned Nepal Oil Corporation, the consumption of fossil fuel is ever increasing, except for kerosene, whose decrease in recent years can be related to increasing use of LPG in cooking purpose (**Table 2.13**). With a steep increase in vehicles import, consumption of petrol and diesel is also increasing very fast.

Table 2.11: Sectoral Energy Consumption (in '000' GJ) during 2010/11 to 2013/2014				
Fuel Type	2010/11	2011/12	2012/13	2013/14
Traditional	8500	7033	8017	6093 (80.08%)
Fuel wood	7606	6274	7153	5436
Agricultural waste	331	310	353	269
Animal dung	563	448	511	388
Commercial	1580	1678	1855	1268 (16.67%)
Coal	293	348	415	277
Petroleum	1058	1083	1182	820
Electricity	229	248	257	171
Others	75	109	166	247 (3.25%)
Total	10155	8820	10038	7608

Source: CBS (2014): Statistical Pocket Book of Nepal

Table 2.12: Households using different types of Fuel for cooking								
Ecological Belt	Household using different types of fuel for cooking							
	Firewood	Kerosene	LP gas	Cow dung	Bio gas	Electricity	Others	Not stated
Mountain	344843	1990	11143	1517	792	1169	335	1909
Hill	1696376	27554	744086	2810	41147	2174	4332	13562
Terai	1429005	26066	385433	558799	89657	1180	17916	19502
Total	3470224	55610	1140662	563126	131596	4523	22583	34973

Source: CBS (2014): Statistical Pocket Book of Nepal

Table 2.13: Fuel Consumption by type during 2010/11 to 2013/14, according to Nepal Oil Corporation				
Fuel type	2010/11	2011/12	2012/13	2013/14
Petrol (KL)	187,641	199,749	221,676	251,451
Diesel (KL)	655,128	648,513	716,747	811,100
Kerosene (KL)	49,495	41,808	24,721	19,064
ATF (KL)	101,314	109808	115,786	123,527
LDO (KL)	227	NA	258	NA
FO (KL)	1,415	435	2,450	2,172
LPG (Mton)	159286	181411	207038	232660
ATF- Aircraft turbine fuel; LDO- light diesel oil; FO – Furnace oil; LPG – Liquefied petroleum gas				

Source: CBS (2014): Statistical Pocket Book of Nepal

2.1.6.4 Education Sector

Gradual improvements have been witnessed in education sector since last few decades. During academic calendar year 2014, the net enrollment rate at primary education level reached 96.2 percent against 95.6 percent in the previous year, while that at basic education 87.6 percent against 86.3 percent and at secondary level 34.7 percent against 33.2 percent of previous year. Very positive indication in education could be found in higher number of girls than boys at all levels (**Table 2.14**). During academic year 2014, the number of primary level school students stood at 4,335,355, while that at lower secondary schools was 1,835,313 and secondary school was 900,585. In addition, the number of schools also increased to 34,335 primary level schools,

14,952 lower secondary level schools, and 8,825 secondary level schools (MOF 2014/15). The students in university education is also increasing in recent year, however the low graduation (14.3%) than enrollment (**Table 2.15**) might be due to counting of students of all years at all levels as enrollment.

Table 2.14: Students Enrollment Status by Levels (Academic Year 2014)			
Level	Number of Students		
	Girls students	Boys Students	Total
Basic (1-8)	3132262	3038406	6170668
Secondary(9-12)	458949	441636	900585
Total of Grade 1-10	3591211	3480042	7071253
Total of Grade 1-12	3807192	3717658	7524850

Source: MOF (2014/15): Final Economic Survey

Table 2.15: Students enrolled and graduated at different levels (Academic Year 2014)		
Level	Enrollment	Graduation
Bachelor	401863	52668
Masters	67693	14915
PGD	97	18
M.Phil.	653	197
Ph.D.	2291	96
Others including medicine	6193	488
Total	478790	68382 (14.3%)

Source: MOF (2015): Final Economic Survey 2014/15

2.1.6.5 Health Sector

Of the Nepal MDG targets, infant and maternal mortality rates have registered significant progress. The maternal mortality rate (per 100,000 live births) had stood at 170 in 2013 while infant mortality rate (per 1000) was 46 during the same year against 54 per 1000 for children below 5 years. Likewise, HIV infection rate (from 15 to 24 years of age) accounts for 0.03 percent, TB prevalence rate (per 100,000) is 211 while annual malaria infected number has remained at 0.15 (per 1000) individual by the end of 2014. Nepal has been awarded Polio Free Verification Certificate by World Health Organization in 2014. Similarly, it has been conferred Global Bloomberg Award 2015 for increasing the size of awareness message up to 90 percent in the packages of tobacco products (MOF, 2015).

Nepal is making considerable progress in expanding health services (**Table 2.16**). By mid-March of fiscal year 2014/15, a total of 4,505 health institutions have been offering health services including 116 hospitals, 3,790 health posts, 384 Ayurvedic hospitals and dispensaries and 215 primary health centers. A total of 87,290 individuals have been employed at such institutions comprising 35,290 technical and non-technical staff and about 52,000 women health volunteers.

Table 2.16: Extension of Health Services during 2010/11 to 2013/14				
Particulars	2010/11	2011/12	2012/13	2013/14
Hospitals	95	102	102	102
Hospital Beds *	7049	7501	8084	8156
Health Posts	676	822	1689	1559
Sub Health Posts	3129	2987	2127	2247
Primary Health Centers	209	205	207	208
Doctors (Govt. employed only)	1654	1654	1954	2154
Doctors+	11431	12571	13525	15671
Health Assistants (HA & AHW)	8013	8013	8500	9500
Nurses +	12681	19098	23000	24264
Kaviraj (Ayurvedic physicians)	407	394	340	340
Vaidya (Ayurvedic assistants)#	360	365	364	364
Ayurvedic Services Centers	NA	291	305	305
Health Workers (MCHW)	3190	3190	3190	3190
Village Level Health Workers	3985	3985	3985	3985
Other Members (trained Sudeni as Women Health Volunteers)	52560	633296**	50007**	51470
* Including Health Centers; + Registered with NMC; # Nepal Swasthya Byabasayee Parishad ** FCHV only				

Source: CBS (2014): Statistical Pocket Book of Nepal

A total of 3,566,396 patients have availed OPD service while 327,801 have received emergency service by the end of the fiscal year 2014/15. The number of OPD service recipients is found increasing annually. Safe Motherhood program which is regarded as one of the integral parts of reproductive health services has been providing pregnancies, maternity and post natal services to women through a total of 1,802 maternity centers. Round the clock maternity emergency services have been rendered through district level hospitals and those above district level in 64 districts. This service was provided through 56 districts last year.

By the first eight months of the FY2014/15, the number of health institutions totaled to 4,505 including 116 hospitals, 3,790 health posts, 384 Ayurvedic hospitals and dispensaries and 215 primary health centers. A total of 87,300 human resource employees including 35,300 technical as well as non-technical staff and about 52,000 women volunteer health workers are working in these institutions.

Basic Drinking Water Service has benefited 83.59 percent of the population till the fiscal year 2014/15. Of this, 15.3 percent populations were availing high quality drinking water. Likewise, 70.28 percent population had access to basic sanitation facilities.

2.1.6.6 Industry sector

Prime necessity at present is to provide momentum to industrial development since there is no substitute to raising standard through enhancement of competitive capacity in the world market, and raising the level of consumption of domestic products. Despite growth in Nepal's gross trade upon accession to the World Trade Organization (WTO), trade deficit has continued to grow further. The industry sector of Nepal has not been able to gain the desired momentum owing to its failure to raise its competitive capacity to cope with increased demand for products brought by growth in the size of its economy resulting from increased market size led by the impact of foreign employment and establishment of organizations.

Table 2.17: Licensed Industries for Operation				
Types of industries	Number		No of Employment Generated	
	Till 2013/14	FY 2013/14	Till 2013/14	FY 2013/14
Production Oriented	2,472	56	278,062	3425
Service	1,629	79	102,305	3,248
Tourism	1,121	79	47,206	4,320
Construction	46	5	3062	244
Energy	248	21	25,258	1249
Agro-based	354	37	32115	1335
Mining	61	7	6399	680
Total	5,931	284	49,4407	14,501

Source: MOF (2014/15)

By the end of fiscal year 2013/14, a total of 5,931 industries, including 284 in this FY alone, of different types were granted license to operate (**Table 2.17**). Of the major industries so licensed, 2,472 (44.0 percent) are production oriented, 1,629 (27.5 percent) service oriented and 1,121 (18.2 percent) tourism industries. The total licensed industries were generating 494,407 employments.

Among the 284 industries granted operating permits on project cost basis in fiscal year 2013/14, 66 were large industries, 53 medium scale, and 165 small scale industries.

2.1.6.7 Natural Resources

Nepal is rich in natural resources such as forest, water and biodiversity. Forest covers approximately 39.6% land of total area.

- **Land**

According to an estimate, nearly one fifth area of the country is under cultivation (**Table 2.18**). Common forms of cultivated land are Tarai/valley cultivation (58%), hill slope cultivation with level terraces (25%) and sloping terraces (17%). The forest cover has reduced from 37.8 % (LRMP 1986) to 29.0%, but the shrub land has increased from 4.6% (LRMP, 1986) to 10.60% (MOAD, 2015).

Out of the total cultivable area, only 66% of the total irrigable area is irrigated. Surface irrigation represents about 55.4% of the total irrigated land.

Table 2.18: Land Use Patten		
Land Use Type	Area (*1000 ha)	Percentage
Agricultural land cultivated	3091	21.00%
Agricultural land uncultivated	1030	7.00%
Forest	4268	29.00%
Shrubland	1560	10.60%
Grassland and pasture	1766	12.00%
water	383	2.60%
Others	2620	17.80%

Source: MOAD, 2015 (quoted in MoFSC, Nepal Biodiversity Action Plan)

Average size of landholding has been decreasing (1.11 ha in 1961/62 to 0.80 ha in 2001/02). Highly skewed distribution of land and increasing fragmentation are other characteristics of landholdings in Nepal. Though the proportion of cropping intensity and percent of farmers using agricultural inputs (agro-chemicals) and equipment is still very low, it is in increasing trend. The area under principal food crops has slightly increased.

Table 2.19: Population Pressure on Natural Resources									
Particulars	1991	1996	2001	2006	2011	2016	2021	2026	2031
Total Land Area (person/ha)	1.26	1.42	1.57	1.76	1.94	2.12	2.29	2.44	2.58
Mountain	0.28	0.31	0.33	0.36	0.39	0.43	0.46	0.49	0.51
Hill	1.37	1.53	1.67	1.85	2.03	2.21	2.38	2.53	2.68
Tarai	2.54	2.90	3.30	3.72	4.14	4.54	4.91	5.25	5.55
Total Cultivated Area (person/ha)	7.12	8.02	8.72	9.75	10.77	11.78	12.71	13.51	14.30
Mountain	6.60	7.25	7.72	8.49	9.29	10.09	10.83	11.50	12.19
Hill	8.11	9.04	9.87	10.93	12.00	13.07	14.07	14.95	15.85
Tarai	6.18	7.06	8.03	9.06	10.07	11.06	11.97	12.75	13.52
Total Forest Area (person/ha)	3.65	4.48	5.43	6.61	8.00	9.47	11.14	12.90	14.87
Total Renewable Water (cu.m/person)	12,114	10,753	9,675	8,653	7,836	7,167	6,641	6,248	5,905

Source: New ERA projections; assumes no increase in cultivated area after 2001 and annual 1.7 percent deforestation rate in forest area for the projection period as per the historical trend

- **Water**

Water resource is the most important natural resource of the country. Nepal is a second richest country in the world possessing about 2.27 percent of the world natural resource. The major sources of the water are glaciers, snowmelt from Himalayas, rainfall and ground water. Nepal is a country of over 6,000 rivers including rivulets and tributaries. Annual renewable water in the country amounts to about 224 billion cu.m (UNEP/MOPE/NORAD/SACEP/ ICIMOD, 2001). This works out to be about 7,167 cu.m/person/annum in 2016 (**Table 2.19**). In this sense, Nepal certainly is a very water rich country. Per capita water availability in 2027 will be about 6,000 cu.m/person/annum which is still quite a high amount. In overall terms, Nepal will still remain a water rich country but harnessing available water supply will remain an expensive proposition. Public taps (43.3%), private taps (12.5%), public tub-wells (12.7%), private tub-wells (27.4%), springs (2.3%) and dug wells (1.9%) cover the water supply sources (CBS, 2011).

Water is increasingly getting polluted due to the disposal of industrial effluent, hazardous wastes in the river systems, mixing of agrochemicals (fertilizers and different types of 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 very high contamination in drinking water. The Bagmati River system, which drains the Kathmandu valley, is highly polluted due to discharge and/or disposal of organic and inorganic wastes. The water is unfit for human consumption as well as for aquatic life and the river quality parameters exceed the given standards. Despite the presence of water quality standards for different industries, 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.

- **Forest**

Forest occupies 40.35 percent while 4.39 percent of the land is under other wooded land including tree-crown and shrubs; other land (all land that is not classified as Forest or Other Wooded Land) includes 55.26 percent of Nepal's total land surface (**Table 2.20**). The forest area has increased in the mountains in recent years.

Table 2.20: Land cover (ha) by physiographic regions						
Physiographic regions	Forest	Other Wooded Land (OWL)			Other Land	Total[1]
		Tree crown cover 5-10%	Shrub	Total OWL		
Terai	411,580	5,573	3,930	9,502	1,595,916	2,016,998
Churia	1,373,743	22,336	336	22,672	501,848	1,898,263
Middle Mountains	2,253,807	29,308	32,979	62,287	1,993,302	4,309,396
High Mountains and High Himal	1,922,909	473,850	79,581	553,431	4,072,426	6,548,766
National Total	5,962,038 **(40.35%)**	531,066	116,826	647,892 **(4.39%)**	8,163,492 **(55.26)**	14,773,423
Note: For inventory calculation, the area of OWL and OL was considered as the area below 4,000 m altitude in High Mountains and High Himal i.e. 484,357 ha and 1,197,005 ha, respectively. In total, OWL and OL were calculated as 578,818 ha and 5,288,071 ha, respectively.						
[1]Due to rounding-off of area figures, there are slight differences in their total. This area indicates the total mapped area based on the generalized international boundary data from the Department of Survey. The official area of Nepal is 147,181 sq. km						

Source: DFRS (2015) : State of Nepal's Forests

Encroached forest areas of 648 hectares by the end of FY 2013/14 and 177.72 hectares up to mid-March of FY 2014/15 have been evacuated and managed in order to maintain minimum 40 percent of country's total land surface under forests. A total of 341 86 Km^2 is covered by the conservation area under the National Park and Wildlife Conservation Act 1972 comprising 10 national parks, 3 wildlife reserves, one hunting reserve, and 6 protected areas. This is 23.23 percent of total land area. Of this, 433 buffer zone community forests covering 125,350 hectares have benefited 40,191 households. Similarly, 257.16 hectares of land is under management of 63 leasehold forests (MOF 2014/15).

- **Biodiversity**

Species Conservation Plan has been prepared to maintain or conserve the rich biodiversity of Nepal (**Table 2.21**). Wildlife population of important, rare and endangered animals including those of elephant, tiger, rhino, snow leopard, crocodile and spotted-deer has been gradually rising as these species of wildlife are being protected as per the plan prepared for their conservation (MOF 2014/15).

Table 2.21: Number of Plant and Animal Species in Nepal					
S.N.	Group	No. of known species in the World	No. of known species in Nepal	Percentage of share in Nepal	Reference
Flora					
1	Angiosperms	22313	6973	3.2	UNEP- WCMC (2004)
2	Gymnosperms	133	26	5.1	Bista (2006)
3	Pteridophytes	10369	534	5.1	Kunwar *et al*. (2010)
4	Bryophytes	>1400	1150	8.2	
5	Lichens	>17000	771	4.5	
6	Fungi	>70000	2025	2.9	
7	Algae	>40000	1001	2.5	Prasad (2013)
	Flora Total		12480		
Fauna					
1	Mammals	4675	208	5.2	Jnyawali *et al*. (2011)

2	Birds	9799	867	9.5	BCN and DNPWC (2011)
3	Reptiles	7870	123	1.9	Schleich and Kastle (2002)
4	Amphibians	4780	118	2.5	ICIMOD and MOEST (2007)
5	Fishes	10000	230	1.9	Rajbansi (2013)
6	Molluscs		79	NA	Nesemann and Sharma (2005)
7	Moths	160000	3958	3.6	Haruta (2006)
8	Butterflies	17500	651	3.7	Bhuju *et al*. (2007)
9	Spiders	39490	175	0.4	
10	Rotifers		61	NA	Deams and Dumont (1974)
11	Crustaceans		59	NA	Swar (1997); Surana *et al*. (2005)
12	Other Insects		5052	0.7	Thapa (1997)
13	Platyhelminthes		168	1.4	Gupta (1997)
	Fauna Total		11706	1.1	

Source: CBS (2014): Environment Statistics of Nepal

- **Mineral resources**

According to Nepal Geological Society, minerals and mine contribute about 0.5% to national GDP. Industries based on mineral resources constitute just around 2.4%, which is not encouraging. It could go above 10%, when existing mineral resources could be appropriately exploited and utilized.

2.1.6.8 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 populations, 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, especially air, water and solid waste, of varying magnitudes.

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

2.1.7 Membership to International and Regional Organizations

Nepal has committed to comply with international legal instruments regarding pollution control. This has been done through national strategies and action plans at various levels and by becoming party/member to various international conventions (**Table 2.22**). Nepal's commitment at regional level can be seen also through its involvement in SAARC, where Nepal is working on the trans-boundary pollution control and reduction of atmospheric brown cloud (ABC).

Table 2.22: List of International Conventions ratified or signed by Nepal		
S. No.	**Title of the International Conventions**	**Ratification/ Signing Date**
Conventions to which Nepal is a Party		
1.	Convention on High Seas, 1958	Dec. 28, 1962
2.	Treaty Banning Nuclear Weapon Test in the Atmosphere, in Outer Space and Under Water, 1963	October 7, 1964
3.	Plant Protection Agreement for Asia and Pacific Region, 1956	August 12, 1965
4.	Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and Other Celestial Bodies,1967	October 10, 1967
5.	Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction on the Sea Bed and the Ocean floor and in the Subsoil thereof, 1971	July 6, 1971
6.	Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter, 1972 (London Convention)	January 1, 1973
7.	Convention on the International Trade in Endangered Species of Wild Fauna and Flora, 1973	June 18, 1975
8.	Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972 11	June 20, 1978
9.	Convention on Wetland of International Importance Especially as Water fowl Habitat (Ramsar Convention), 1971	December 17, 1987
10.	Agreement on the Network of Aquaculture Centres in Asia and the Pacific, 1988	January 4, 1990
11.	International Tropical Timber Agreement (ITTA), 1983	July 3, 1990
12.	Convention on Biological Diversity (CBD), 1992	November 23, 1993
13	United Nations Framework Convention on Climate Change (UNFCCC), 1992	May 2, 1994
14.	a. Vienna Convention for the Protection of the Ozone Layer, 1985	July 6, 1994
	b. Montreal Protocol on Substance that Deplete the Ozone Layer,1987	July 6, 1994
	c. London Amendment to the Montreal Protocol on Substance that Deplete Ozone Layer, 1990	July 6, 1994
15.	Basel Convention on Control of Trans-boundary Movement of Hazardous Waste and their Disposal, 1989	October 15, 1996
16.	United Nations Convention to Combat Desertification in those Counties Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD), 1994	October 15, 1996
17.	Kyoto Protocol to the United Nations framework Convention on Climate change, 1997	September16, 2005
18.	Plant Protection Convention, 1951	August 5, 2006
19.	United Nations Convention on the Law of the Sea, 1982	November 2, 1998
20.	Stockholm Conventions on Persistent Organic Pollutants, 2001	October 13, 2006
21.	Rotterdan Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade, 1998	October 13, 2006
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	Dec 10, 1982
5.	Minamata Convention on Mercury	October 2013
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
Nepal, as member of the SAARC countries, is working under Male Declaration on Trans-boundary Movement of Air Pollution.		

2.2 Institutional, policy and regulatory framework

2.2.1 Environmental policy, sustainable development policy and general legislative framework

Formulation of an integrated national policy on environment and chemical management is felt, in the absence of which environment and human health protection activities are not carried out to the desired level. Government of Nepal is taking steps towards sustainable development with policies in place regarding environmental management. Among the major policies related to the environment sectors mentioned in TYP (FY 2013/14 – 2015/16), the following are related to pollution:

- Make environmental management an integral component of development programmes,
- Make drafts for new laws pertaining to environmental conservation, and the environmental policy, existing laws, rules and mechanisms will be strengthened and updated and institutional capacities will be enhanced.

Likewise, the 14th Plan (2016/17 - 2019/20) has also given emphasis to pollution control as follows:

- Minimize arsenic pollution in ground in the Terai
- Solve the sound and air pollution due to vehicles
- Establish self monitoring technology in major cities to monitor vehicle pollution
- Revisit the age and pollution standards set for the vehicles
- Manage wastes sustainably
- Establish one waste processing centre per municipality
- Minimize pollution of water bodies and control air and noise pollution in Kathmandu and major cities

Environmental pollution control seemed included in Sixth plan onwards, though there were no concrete strategies and action plans on pollution control due to chemicals, like POPs. However, to achieve the goals 2, 3, 6, 7, 9, 11, 12, 13, 14 and 15 among the 17 sustainable development goals (SDG) Nepal has recently undertaken, pollution control is very necessary.

Most of the legal provisions on environmental management are very new and yet some are in the process of development to address the changing national and international contexts. Some require setting up of environmental standards and others require extended rules and regulations for enforcement and necessary institutional setting.

2.2.2 Roles and responsibilities of government agencies involved in POPs

Different stakeholder ministries and organizations have shared responsibility of the management of chemicals including POPs during different stages (**Table 2.23**). But as directed by the GON (Business Allocation) Regulation 2016, pollution control is under the jurisdiction of Ministry of Population and Environment (MOPE) and major responsibility is due to this Ministry being the focal ministry for environment related international agreements, although many institutions are directly or indirectly involved in addressing the issue of environmental pollution.

Table 2.23: Inter-Ministerial responsibilities on POPs

Ministries	**Trade**	**Production**	**Use**	**Transport**	**Unintentional production**	**Waste import / Export**	**Waste Disposal**	**Policies**
Population and Environment		√	√	√	√	√	√	√
Science and Technology								√
Agricultural Development	√	√	√				√	√
Industry		√	√		√	√	√	√
Commerce	√		√	√	√	√		√
Supplies			√	√	√	√	√	√
Health	√		√				√	√
Energy – NEA	√	√	√	√		√	√	√
Labor and Employment			√	√	√		√	√
Physical Infrastructure and Transport	√		√	√		√	√	√
Federal Affairs and Local Development (Municipalities & SWMTSC)		√	√	√	√	√	√	√
Finance-Custom Office	√	√		√	√	√		√
National Organizations								
National Planning Commission								√
Environment Protection Council								√

Table 2.24: Responsibilities of different Divisions/Sections of the Ministry of Population and Environment and their roles in the Implementation of the Stockholm Convention		
Divisions & Sections	Roles – Main responsibilities	Foreseen contribution to POPs Management
Environment & Population Management Division (Focal Point to Basel, Rotterdam, Stockholm and Minamata Conventions)		
Environmental Standards & Monitoring Section	• Determine 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 related to pollution control • Act as Focal Point for ministry on policy, legal and technical aspects of pollution control and mitigation • Form policy on technology transfer • Coordinate with foreign institutions and implement the program on technology transfer	• Information on POPs • Enforcement of legislation on POPs (including bans, restriction of production and use of POPs and emission limits from unintentional sources) • Waste disposal • BAT and BEP technology • Import, Export, transport of waste POPs • POPs Unit acting as POPs Desk
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
Population Management Section	• Formulation, Implementation and Monitoring of migration related program. • Formulation, Implementation, Monitoring and Evaluation of short term and long term programs on reproduction, migration, mortality, birth etc. • Formulation and Implementation of policy/plans for teenagers / youths. • Formulation and Implementation of programs against sexual harassment. • Formulation and Implementation of programs on gender equality and social inclusion.	
Environment Protection Fund Section	• Act as Secretariat of Environment Protection Fund (EPF) • Develop EPF with support of the government, national and international organization for environmental protection 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

Climate Change Management Division		
Climate change section	• Formulation and mainstreaming of policy/programs related to climate change. • Conduct Research activities on climate change. • Organize workshops, trainings related to climate change.	
Sustainable development and Adaptation Section	• Formulation, Implementation, Monitoring and Evaluation of Policy/programs on sustainable Development • Formulate Sustainable development strategy and mainstreaming it in sectoral policies. • Research, publication and promotional activities on sustainable development. • Activities related to mitigation of effect of climate change. • Formulation and Implementation of programs on National Adaptation. • Conduct research activities on sustainable consumption and production.	
Clean Development Mechanism Section	• Formulation and implementation of policy to attract private sector to carbon trade. • Organose workshop, training to develop capacity building of people on carbon trade. • Promotion, monitoring and evaluation of activities related to carbon trade.	
Climate Finance Management Section	• Develop proposal for financial support to address challenges of climate change. • Mobilization of financial resources to organization working on climate change sector. • Assessment of Need and Gaps to address challenges due to climate change.	
Planning, Monitoring and Administration Division		
Administration and Capacity development Section	• Administrative facilitation and correspondence with other agencies Capacity building	• Capacity development, also for POPs implementation
Planning, monitoring and budget coordination section	• Policy formation Monitoring and evaluation • Coordination within the ministry Promote contact, maintain relationship and coordination with international organizations	
Law and Decree implementation 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	• Seek fund from international organizations for POPs disposal Formulate new rules and regulation and assist in harmonizing sector legislations on hazardous wastes and POPs chemicals
Financial administration Section	• Identify new technology suitable for the country • Support research institutions/ organizations	• Human resource development

2.2.3 Relevant International Commitments and Obligations

As given in **Table 2.22**, Nepal has become party to or member of environment related international agreements and organizations and has shown the commitments to fulfill the obligations.

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

Government of Nepal has enacted series of laws which have incorporated issues of environment and public health protection. Some of such legal instruments have clauses to address the issues of hazardous substances and chemicals, as well.

Constitution of Nepal

Article 30 of the Constitution provides right to clean and healthy environment as the Fundamental Right as:

(1) Every citizen shall have the right to live in a clean and healthy environment.

(2) The victim shall have the right to obtain compensation, in accordance with law, for any injury caused from environmental pollution or degradation.

(3) This Article shall not be deemed to prevent the making of necessary legal provisions for a proper balance between the environment and development, in development works of the nation.

The constitution too provides that the policy of the state shall be

- to protect, promote, and make environmental friendly and sustainable use of, natural resources available in the country, in consonance with national interest and adopting the concept of inter-generational equity, and make equitable distribution of fruits, according priority and preferential right to the local communities,
- to adopt appropriate measures to abolish or mitigate existing or possible adverse environmental impacts on the nature, environment or biological diversity,
- to pursue the principles of environmentally sustainable development such as the principles of polluter pays, of precaution in environmental protection and of prior informed consent.
- to make advance warning, preparedness, rescue, relief and rehabilitation in order to mitigate risks from natural disasters.

The Environment Protection Act (EPA), 2053 (1997) and Environment Protection Rules (EPR), 2054 (1997) have broadly defined the environmental issue but there are limitations to their definition, scope and specification. The Act has defined Environment, Pollution, Waste and Disposal. Section 7 (1) of the Act prescribes “Nobody shall create pollution in such a manner as to cause significant adverse impacts on the environment or likely to be hazardous to public life and people’s health or dispose or cause to be disposed sound, heat, radioactive rays and wastes from any mechanical devices, industrials enterprises or other places contrary to the prescribed standards”. The sub sections (2) and (3) mention "If it appears that anyone has carried out any act contrary to Subsection (1) and caused significant adverse impacts on the environment, the concerned agency may prescribe necessary terms in regard thereto or may prohibit the carrying

out of such an act" and "if it appears that the use of any types of substance, fuel, tools or device has caused or is likely to cause significant adverse impacts on the environment, the Ministry may, by a notification in the Nepal Gazette, forbid the use of such substance, fuel, tools or device, respectively."

The EPA and EPR empower the authorities to control the management of the waste in very broad terms, but lack of itemized provisions for the wastes related to Basel and Stockholm and Rotterdam Conventions. Government has authority to regulate the waste and waste management but in the absence of itemized details of the provisions in rules and backup guidelines, the EPA and EPR are not very effective. To address the specific standards, authorization for management and handling and requirements of environmentally sound management of hazardous chemicals and wastes, GON has drafted Hazardous Substances Management Regulations (it is under discussion within the ministries).

The Solid Waste Management Act, 2068 (2011) was formulated to replace the previous Solid Waste (Management & Resource Mobilization) Act, 1987 to address the recent issues of management of solid waste, including the categorization and management of hazardous waste in the country. The Act defines Industrial Waste and solid waste and has provisions relating to solid waste generation, collection and discharge, Transfer center and landfill site, Involvement of private and community sector in the management of solid waste management works, solid waste management technical cooperation center.

The Industrial Enterprises Act, 2073 (2016) has envisaged to facilitate the industrial environment, generate more employment opportunities through maximum utilization of available natural and artificial sources, emphasize more on export for industrial development by making required arrangements for fostering and developing the industrial enterprises and making the environment of industrial investment more congenial, straightforward and encouraging from multidimensional aspects. Section 6 of this Act has clearly has mentioned that the concerned industry will be responsible for mitigating any environmental impact caused by this industry. The Act (section 18) further has the provision of Industrial Promotion Board (IPB) to decide on the industrial pollution control policy and also to monitor the industrial activities and section 22 explains about the rebate in tax on investment for environmental protection equipment or technology/ process.

Labor Act, 2048 (1991) mainly focuses on labor issues by making provisions for the rights, interests, facilities and safety of workers and employee working in enterprise of various sectors. Section 27 has provisions related to occupational health and safety, focusing on the removal of waste accumulated during production process and prevention from accumulated dust, fume, vapour, and other impure materials in the workplace as well as to provide clothing and devices to workers handling chemical substances and other hazardous and explosive substances.

According to **Pesticides Act, 2048 (1991) and Pesticides Regulations, 2050 (1994)** all pesticides should be registered and regulated under these laws. 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 GON 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, 2055 (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.

2.2.5 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 Population and Environment
- Ministry of Science and Technology
- Ministry of Agricultural Development
- Sectoral Ministries and Departments
- National Resources Conservation Commission 1980s
- Environment & Resource Conservation Division in the National Planning Commission
- Council for Conservation of Natural and Cultural Resources
- Environment Protection Council, chaired by the Prime Minister
- Municipalities
- Nepal Electricity Authority

- **Private sector**

Federation of Nepal Chamber of Commerce and Industries (FNCCI) and Confederation of Nepalese Industries (CNI) are the bodies representing the private sector of the business and entrepreneurs in Nepal. These are strong forces 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 Pesticide Entrepreneurs' Association of Nepal (PAN), which has been providing training to the farmers and pesticide retailers on the proper use of pesticides.

- **NGOs**

Some NGOs like Nepal Forum of Environmental Journalists (NEFEJ), also represented in the Steering Committee for the implementation of Stockholm Convention, and other NGOs are involved in disseminating and raising awareness about the hazardous chemicals for the general public.

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

Based on the GON (Allocation of Business) Rules 2016, protection of environment and health with respect to POPs and other hazardous chemicals falls under the activities of Ministry of Population and Environment (MOPE), Ministry of Agricultural Development (MOAD), Ministry of Industry MOI), Ministry of Energy (MOEn), Ministry of Health (MOH), Ministry of Federal Affairs and Local development (MOFALD), Ministry of Finance (MOF) and Ministry of Science and Technology (MOST). The management of toxic chemicals, such as plant protection chemicals and their residues, dielectric 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.

MOPE formulates and enforces the rules, regulations and sets standards on environmental issues, especially for the protection of the environment through control and compliance monitoring. The MOPE 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 MOPE and GON has established Department of Environment (DOEnv) to support the MOPE in the implementation of environment related activities.

Department of Custom (DOC) under the MOF is in charge of control and enforcement of the regulation related to trade, export and import of goods including chemicals.

MOAD has Quarantine Offices established at border points for the control and /or import/export of food, pesticides and plant material. The MOAD forms policy and legislation for the management of pesticides. The Plant Protection Directorate (PPD) under this ministry is responsible for controlling plant protection materials and Pesticide Registration and Management Division (PRMD) is supporting the PPD with focus on pesticides registration and management. District Agriculture Development Offices throughout the country supervise and monitor the use of agrochemicals, fertilizers and pesticides. Also, Department of Food Technology and Quality Control (DFTQC) under MOAD is monitoring the quality of food item in the market, especially with reference to the MRL (**Annex I**) set by it, is focusing on the residues of some POPs (like DDT) in some food items.

MOI is responsible for the industrial activities and through regulations and standards promotes the cleaner production. Nepal Bureau of Standard and Metrology (NBSM) monitors the accredited laboratories, which undertake the environmental monitoring.

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

MOH regulates the import and use of pharmaceuticals and vector control pesticides and formulates regulations and guidelines for the control of health care (hazardous) wastes through the Health Care Waste Management. Department of Drug Administration (DDA) is a health technology product regulatory authority of Nepal, mainly responsible for enforcing pharmaceutical sector related objectives and strategies of National Health Policy, 2015 and National Drug Policy, 1995, which is related to related to drug production, import, export, storage, supply, sales, distribution, quality assessment, regulatory control, rational use and information flow.

MOFALD is the line ministry for the solid waste management. It brought new Solid Waste Management Act 2011 into action to address the emerging issues of solid waste management, also by establishing Solid Waste Management and Technical Support Centre.

2.3 Assessment of POPs issue in the country

2.3.1 Assessment with respect to Annex A (POPs pesticides): historical, current and projected future production, use, import and export; existing policy and regulatory framework; summary of available monitoring data (environment, food, humans) and health impacts

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

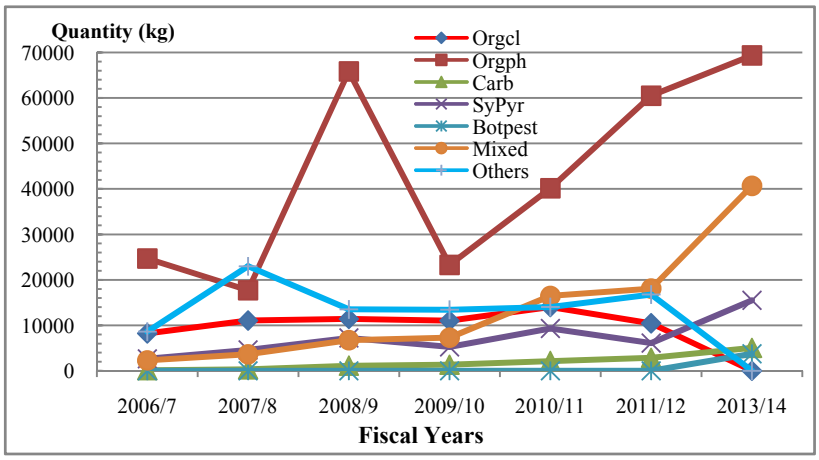
The stock of POPs pesticides, mentioned in the Inventory (2005) and initial NIP (2007) was 33.668 mtons. Out of this, 32.558 mtons was POPs and 1.11 mtons was mixed and POPs contaminated. The whole stock obsolete pesticides including the POPs made a stock of 74.515 mtons, which were stored in different sites of the country till 2011. The stock of obsolete pesticides (74.515 mtons), which included both POPs 33.668 mtons (45.2%) and non-POPs 40.847 mtons (54.8%), was disposed off in an environmentally sound manner through a joint project between the MOEST/ GON and GIZ/Germany in 2011. Disposal of all obsolete pesticides, as mentioned in the initial NIP, was the first priority and MOSTE / GON could secure the support, both technical and financial, from GIZ to manage this. As to the contract between MOSTE/GON and GIZ, the GIZ contracted an international company SAVA to undertake this job. This company repackaged all pesticides in UN approved packages / containers before shipping them to Germany for final disposal in an incinerator. Also, the notification and other processes in line with Basel Convention, for which GON also issued required documents needed in this process, were carried out by this company. The obsolete stock of pesticide included mercurial fungicides, too, which is safe-stored permanently deep below in an old mine near Frankfurt/Main in Germany. But the stores of these obsolete pesticides (including POPs), mainly Amlekhgunj, NARC Khumaltar and Nepalgunj identified as POPs contaminated sites, are till now not remediated.

Among the new POPs pesticides, only endosulfan and lindane were of concern to Nepal as no other POPs pesticides were imported to or produced in Nepal. Endosulfan was imported till the year 2011/12, but due to regular information sharing among MOSTE (now MOPE), MOAD and PRMD and also between PRMD and importers/retailers or farmers during trainings or counseling programmes endosulfan and other pesticides under IA, IB and II of WHO category were increasingly replaced (but POPs and IA & IB totally banned) by other pesticides like pyrethroids and carbamates in the recent years. The effort of gobvernment in banning organochlorines seemed to be successful with the complete stop of organochlorine pestricides by 2013/14 (**Table 2.25 & Fig. 2.3**). Still, some pesticides under the Rotterdam Convention (PIC chemicals) like methyl parathion, monocrotophos and phosphamidon are not given the import license any more (**Table 2.25**).

Government of Nepal banned lindane for agricultural purpose already in 2001 (**Table 2.26**, *S No.10: Government of Nepal has decided and published it in the Gazette Section 50, Number 51, Part 3, Dated 09/04/2001 in Nepal*), but according to the information provided by the Department of Drug Administration (DDA), it is still in use against the ectoparasites (lice and scabies).

Table 2.25: Pesticide Imported and Formulated (a.i. in Kg) in Nepal (Pesticide Registration and Management Section, 2013, mentioned in Environmental Statistics of Nepal 2013)								
		Period of import and production						
SN	Kinds of Pesticides	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2013/14
1	Insecticides	46553.25	60282.42	105814.60	61615.80	96115.33	114717.70	162326.00
	i. **Organochlorines**	**8214.50**	**11046.00**	**11403.90**	**11019.80**	**14031.85**	**10437.00**	**0**
	ii. Organophosphates	24682.60	17709.05	65838.20	23280.30	40148.42	60497.48	69352.7
	iii. Carbamates	115.40	321.05	1100.34	1344.15	2127.95	2847.97	5036.95
	iv. Synth. Pyrethroids	2640.43	4592.66	7228.88	5255.65	9313.62	6101.78	15499.41
	v. Botanical Products	4.31	2.15	0	0	0	0	3746.65
	vi. Mixed insecticides	2290.35	3625.25	6736.68	7284.3	16463.24	18069.04	40677.89
	vii. Others	8605.66	22986.26	13506.60	13431.6	14030.25	16764.45	0
2	Herbicides	5701.70	6574.05	11124.30	15683.10	46696.00	53476.66	90127.00
3	Fungicides	74368.45	237372.2	203392	129567	183893	166815.4	192204.60
4	Rodenticides	1808	37297.75	31086.9	2468	5528.07	8183.107	9836.36
5	Bio-pesticides	57.58	57.12	30.08	82.08	78.26	121.687	71.74
6	Acaricides	238.65	2458.06	2080.4	38	1085.25	1424.1	181.25
7	Bactericides	0	750	6.64	25	1.6	0	31.25
8	Others	0	0	0	0	0	120	
Agri- Pesticides (1-8)		128727.6	344791.6	353556.9	209479	333397.5	344858.7	454778.20
9	Public health-Pesticides	2556.8	2703	2811	1600	2276	174	0
Grand Total (Agri. &Pub. health)		131284.40	347494.60	356367.90	211079.00	335673.50	345032.70	454778.20

The information provided by DDA (**Annex II**: Letter issued by DDA to MOPE on January 4, 2016) could reveal only the importing companies and in different dates, but the exact quantity was beyond the limit of institutional system, as the importing and producing companies were not submitting such data. During inventory, no stock of lindane was thus identified; however, DDA is now taking step to inform the importing and producing companies to go for the alternatives of lindane. A notification to the Secretariat of SC is sent on 16 April 2017 about the pesticides banned in agriculture in Nepal. However, a notification with the request to the exemption on the use lindane as a human health pharmaceutical for control of head lice and scabies as a second line treatment is required.



Orgcl- organochlorines; **Orgph**- Organophosphates; **Carb**- Carbamates; **Sypyr**- Synthetic pyrethroides; **Botpest** – Botanical pesticides

Figure 2.3: Trend of insecticides import and production (Kg a.i.) during 2006/7 to 2013/14, during which organochlorines were completely banned

Table 2.26: List of banned pesticides in Nepal

S. No	Name of Pesticides	Banned Date & Gazette section	Relevant CAS numbers
1	Chlordane	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	57-74-9
2	DDT	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	50-29-3
3	Dieldrin	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	60-57-1
4	Endrin	Decision of Government of Nepal published in the Gazette Section 50, No.51, Part 3, Date 09/04/2001 in Nepal.	72-20-8
5	Aldrin	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	309-00-2
6	Hepatchlor	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	76-44-8
7	Mirex	Decision of Government of Nepal published in the Gazette Section 50, No.51, Part 3, Date 09/04/2001 in Nepal.	2385-85-5
8	Toxaphene	Decision of Government of Nepal published in the Gazette Section 50, No.51, Part 3, Date 09/04/2001 in Nepal.	8001-35-2
9	BHC	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	
10	Lindane	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	58-89-9
11	Phosphamidon	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	13171-21-6
12	Methyl parathion	Decision of Government of Nepal published in the Gazette Section 57, No. 37, Part 3, Date 31/12/2007 in Nepal.	56-38-2
13	Monocrotophos	Decision of Government of Nepal published in the Gazette Section 57, No. 37, Part 3, Date 31/12/2007 in Nepal.	6923-22-4
14	Endosulfan	Decision of Government of Nepal published in the Gazette Section 62, No.31, Part 3, Date 05/11/2012 in Nepal.	115-29-7

Source: PRMD, 2016

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 2.27**):

Table 2.27: Institutions and different legal provisions related to POPs	
Institutions	Legal Provisions
MOPE	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) Guidelines for Environmentally Sound Management of PCBs
MOAD	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, Maximum Residual Limit for certain food commodities
MOI	Industrial Enterprises Act 2017 (Provision related with permission for establishing industries and mitigation of environmental pollution).
MOH	Health Care Waste Management Guideline (NHRC, KMC, MOHP) etc. Environmental Health Impact Assessment Guidelines
MOFALD (SWMTSC)	Solid Waste Management Act 2011 (Hazardous wastes defined with provisions of waste management)
MOEn (NEA)	Import related provisions in relation to PCBs free transformer oil in NEA

2.3.1.3 Summary of available environmental data and health impacts

A study done during 2008 showed that the ground soil on the north and south sides of Amlekhgunj storehouse had considerable amount of POPs, like DDT, its derivatives and HCH (Shah and Devkota, 2009) (**Table 2.28**). Sangroula (2013) also detected (detection limit 2µg/Kg) two POPs pesticides endrin and heptachlor exo epoxide in two summer vegetables bitter-guard and egg plant in vegetable growing pocket, 40 km east of Kathmandu, though the retailers claimed that such organochlorines were not sold there since they were banned in 2001. A practice of returning the unsold pesticide (20% of the farmers were found to do so) to the retailers indicated an elevated awareness among the farmers.

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

With the environmentally sound disposal of old stock of obsolete pesticides, including POPs pesticides, in 2011, and active steps taken by PRMD in banning the registration of new POPs pesticides, e.g. endosulfan since 2012 (**Table 2.25**), there was no stock of this pesticide found during inventory survey. But some of the sites of old storehouses, namely Amlekhgunj, Nepalgunj and Pokhara, where obsolete pesticides were stored until they were collected for repackaging prior to transport to Germany for final disposal, need proper remediation. This decontamination can be one project for the future.

Table 2.28: Pesticides and heavy metal concentration (mg/Kg) in soil samples from the school-playground adjacent to the pesticide store house at Amlekhgunj (2008)								
Pesticides	Class	North			South			
		Om	1m	2m	1m	2m	3m	4m
α-HCH	OC	0.0013	0.0009	0.3617	0.0007	ND	ND	ND
β.HCH	OC	0.0014	ND	1.2566	0.0018	ND	ND	ND
γ.CHC		0.0412	0.0135	0.7684	ND	0.0080	0.0252	ND
Heptachlor	OC	0.0029	0.0016	0.3925	ND	0.0036	0.0048	0.0034
Aldrin	OC	ND	ND	0.3613	ND	ND	ND	ND
Phosphamidon	OP	ND	ND	1.0728	ND	ND	ND	0.0094
α.Endosulfan	OC	0.0158	0.0044	0.7537	0.0011	ND	ND	ND
Cis chlordane	OC	ND	ND	ND	0.0502	0.0440	0.0565	ND
Trans chlordane	OC	0.0137	0.0020	0.3885	ND	ND	ND	ND
DDE	OC	0.0300	0.0175	0.3378	0.0013	0.0119	0.0145	0.0139
Dieldrin	OC	0.0407	0.0111	1.0076	ND	ND	ND	0.0016
DDD	OC	0.0328	0.0161	0.2460	ND	0.0155	0.0125	0.0128
Heavy Metal								
Mercury	Heavy Metal	3.4600	1.8700	1.6090	ND	ND	3.4250	2.4110
OC – Organochlorine., OP. – Organophosphorus ; ND – Not detected								

Source: Shah & Devkota, 2009 (Study conducted with the support of MOEST in 2008)

With reference to waste management, there are few sanitary landfill sites developed and used by some municipalities in Nepal, but none is used for pesticides disposal. GON has made a policy that every municipality develops a landfill site or several municipalities jointly develop one site depending on the quantity of the wastes to be managed. This is targeted to change the mode of management through dumping the wastes along the banks of rivers or in isolated open/public places or in forest areas. Some Health Care Institutions are still burying their wastes including the hazardous wastes in the so-called incinerators, which 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 Agricultural Development (MOAD). Due to its very good network and infrastructures in terms of Pesticide Inspectors, Laboratories, Quarantine, the import and sale of POPs pesticides are well controlled and by 2013 all POPs pesticides were banned in Nepal (**Table 2.26**).

During the inventory survey conducted in the process of NIP Update and Review, no POPs pesticide was found with the importers and the retailers. This was due to the regular interactions between the MOPE, SC Focal point ministry and MOAD, pesticides regulating government agency.

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

For the preparation of POPs pesticides Inventory for the NIP Update and Review, a Working Group represented by stakeholder organizations MOAD, FNCCI, PAN as well as MOPE Project Team was formed and the members of this group were mobilized to collect the data and

information on the basis of a structured checklist from the field. Additionally, the participants of different workshops (Inception workshop, Inventory training workshop, Prioritization workshop and Validation workshop) representing different stakeholder organizations also contributed in the inventory process either directly or indirectly from their corresponding positions.

2.3.2 Assessment with respect to Annex A, Industrial Chemicals (PCBs, PBDE, HBCD)

Summary

With the declorination and decontamination of all available PCB oil and equipment by March 2014, Nepal has met the target of PCBs management well before the given time of 2025 and 2028. Regarding the new POPs industrial chemicals PBDE and HBCD, they were neither produced nor imported for industrial purpose in Nepal and no stock of these chemicals were found; however, there were some imported items, in which these POPs might be present or during the production (process) of which these POPs might have been used.

2.3.2.1 Introduction

PCBs contaminated dielectric fluids and electrical equipments mentioned in the initial NIP 2007 were dechlorinated and decontaminated during the post-NIP MSP on "Environmentally sound management of POPs pesticides and PCBs in Nepal" during 2011 -2014. During this project, detail inventory of transformers was prepared focusing on power transformers under NEA from all parts of the country (generating stations, grid stations, sub-stations and maintenance workshops) and distribution transformers from the Kathmandu Valley. Level of PCBs in the collected oil samples was quantified using an UN recommended Dexsil Analyzer LX 2000 in a temporarily established laboratory within the NEA. The decontamination of all available PCB oils (54 mton) and equipment (155 mtons) was completed by March 2014. To confirm that the decontamination was successful, SetCar the contracted company to carry out dechlorination and decontamination, sent 99 oil samples to an independent accredited laboratory in Romania for analysis and found that the PCBs level was at < 50 ppm level in these samples.

COP4 of Stockholm Convention listed certain congeners from c-PentaBDE and c-OctaBDE as POPs in Annex A; c- PentaBDE contains Tetra- , Penta-, Hexa-, HeptaBDEs (about 100 % POPs) and c-OctaBDE contains Hexa-, Hepta, Octa-, NonaBDEs (about 54 % POPs). The Convention prohibits their production and use but allows a time-limited exemption for the recycling and use/reuse of articles that may contain POP-PBDEs.

Although the commercial OctaBDE seems to be no longer produced, releases during the service life of articles containing the commercial mixtures and at the end of article service life during disposal operations are still relevant. c-OctaBDE has been used as an additive flame retardant, mainly in the plastic industry for polymers used for housings of equipment containing electronics.

2.3.2.2 Manufacture of products containing PentaBDE and OctaBDE, during their use and after they are discarded as waste

Even though production of c-PentaBDE is phased out or being phased out worldwide, different products containing it will still be in use for several years to come, resulting in continued releases to the environment. The products will in the end of their lifetime become wastes with the potential of additional releases.

The main source in North America and Western Europe has been the c-PentaBDE incorporated in polyurethane foam, used in domestic and public furniture. This use is now mainly phased out. It

is considered that between 90% and 95% of the use of c-PentaBDE was for the treatment of polyurethane (PUR) foam. These foams were mainly used in automotive and upholstery applications. The information is too limited to draw conclusions on the importance of other uses, like textiles, electrical and electronic products, building materials, vehicles, trains and aeroplanes, packaging, drilling oil fluid and rubber products. While some representative examples are covered, detailed information on use is lacking for many regions of the world. Major releases to air are emissions from products during use, through volatilization of PentaBDE and dust-borne PentaBDE.

2.3.2.3 POP-BDEs in EEE and WEEE (commercial OctaBDE) in Nepal

There was a steady increase in the import of different types of electrical and electronic equipment (EEE) in Nepal as presented in **Table 2.29.** When import information is matched with average life of EEE presented by Amatya (2013), it can be easily assumed that substantial quantity of wastes (WEEE) is generated at different installations of scrappers (called ***Kawadis*** locally), but actual data is not available, as there is no system of recording such information. There is a practice of breaking old EEEs to recover the usable components, which are ultimately sold at cheaper price by the scrappers; the unusable broken parts, which very probably contain PBDEs, are thrown with municipal wastes. This is thus a strong indication that the installations of scrappers and the wastes they generate may be POPs contaminated.

Table 2.29: Import of EEE (including CRT & polystyrene) during 2012/13 to 2014/15)

Items	2012/13	2013/14	2014/15	Total
Refrigerator, freezer and similar kind	160189	170821	254560	585570
Computers	2069	1936	13422	17427
Microovens	0	9363	12529	21892
Electric ovens, cookers, cooking plates	0	448122	48970	497092
CRT Monitors, TV and CRT Tubes	210550	347689	267390	825629
Polystyrene (Expansible in primary form) Kg	83295	601885	465566	1150746

Source: DOC, Nepal Foreign Trade Statistics (from 2012/13, 2013/14, 2014/15).

The inventory indicated that POP-PBDEs might be present mainly in CRT casings of TVs and monitors as given below, however TV CRT casings and monitor CRT casings cannot be distinguished at this stage.

- Imported (new and second-hand) EEE and WEEE
- EEE stocks (in use and stored)
- EEE entering the waste stream (WEEE).
- Recycling of WEEE polymers (own/imported polymer)

The number CRT casings in use and stored is estimated to be at least 825628. This crude estimate does not allow going to a tier II Preliminary Inventory. The number of CRT casings entering the waste stream each year is also not clearly known, as there is no updated and reliable information about the recycling of the plastic material in the CRT casings in the country.

A Tier I Initial Assessment was done during the inventory, which showed the following results:

Once the per capita data was estimated, the POP-PBDEs content in CRT casings (TVs and computer monitors) was calculated taking into consideration the following additional data:

Population of Nepal: **26494504** (CBS, 2014)

Weight of the CRTs: **25 Kg per device** (estimated average weight of a CRT monitor, either TV or PC monitor; see also table 4-5 Guidance Document);

Polymer content of CRT casings: **30%** (estimated average, see table 4-9 Guidance Document);

Considering the countries penetration rate (number of appliances per capita) in analogy to other countries with similar economic development and consumer behavior, as given in Table 4-4 of the Guidance document, the value 0.17 was taken for Nepal to calculate the range of c-OctaBDE in CRT devices as follows.

$M_{PBDE(i)}$ = [Number of CRTs/capita$_{Region}$] x population x 25 Kg x 0.3 x [0.00087 to 0.00254]

= [**0.17*26494504*25*0.3*0.00087 to 0.00254] = 29389 Kg to 85802 Kg**

Where:

- $M_{PBDE(i)}$ is the amount of POP-PBDEs (i) in [Kg]

(in Polymer (k) of electrical and electronic equipment (EEE) (j))

The POP-PBDEs (heptaBDE and hexaBDE) in the c-OctaBDE can be calculated according to the homologue content shown in table 4-12 (of c-OctaBDE, the heptaBDE homologue is estimated as 43% and the hexaBDE as 11%). The amount of POPBDE is M_{PBDE} *0,54.

POPBDE = (**29389 Kg to 85802 Kg)*0.54= 15870 Kg to 46333 Kg**

It is necessary to notify the Secretariat of the Convention that CRT casings of TVs and computer monitors containing HexaBDE and HeptaBDE (c- OctaBDE) remain in use within the country. Another follow up action could be a project supported by the GEF for the waste management of hazardous (including POPs) waste from cars and electronic equipment.

2.3.2.4 POP-PBDEs (commercial PentaBDE) in Transportation Sector in Nepal

The total vehicles registered across the country till the fiscal year 2014/15 stood at 1924434, but 70970 vehicles of different types (**Table 2.30**) are not plying on the roads (i.e. missing), indicating that they are either dumped or destroyed and their non-usable non-metallic body part are thrown as wastes. According to a vehicle importer (communication with Mr. S. Shrestha during inventory preparation), approximately 250 vehicles from American and British manufacturers were imported to Nepal before 2005, indicating the possible presence of POP-PBDEs.

The inventory of POP-PBDEs in the transport sector is expected to address the following:

- Vehicles (second-hand) imported (for the inventory year and for the years with relevant vehicle imports as a base for estimating stocks);
- Vehicles in use;
- End-of-life vehicles in the inventory year and those having already reached end-of-life;
- Polymers from end-of-life vehicles.

Table 2.30 gives information on registered vehicles and missing vehicles. The total present vehicles give information about the vehicles in use and the missing vehicles could be vehicles exported or end of life vehicles. There is no additional information on the number of end-of-life vehicles in the inventory year and those that have already reached end-of-life and about the recycling of polymers from end-of-life vehicles.

Table 2.30: Number of Transport Vehicles Registered and missing (as given by Department of Transport Management)								
	Fiscal Years[1]							Difference
Vehicle Types	Total till 2010/11	2011/12	2012/13	2013/14	2014/15	Total Registered	Total as of present[2]	(Missing)
Bus	24790	2085	3263	2776	3737	36651	**35289**	1362
Minibus/ Mini truck	10908	1170	1328	1412	2270	16989	**16007**	982
Crane/Dozer/ Excavator/Truck	45527	1333	3332	2789	4236	57217	**54448**	2769
Car/Jeep/Van	120429	8711	9595	11372	13560	163667	**159161**	4506
Pickup	9768	2981	5422	5668	6057	29896	**27542**	2324
Microbus	2323	155	158	178	932	3746	**3425**	321
Tempo	7443	10	57	17	1541	9068	**8441**	627
Motorcycle	886745	145135	175381	163945	196383	1567589	**1513447**	54142
Tractor/ Power tiller	64893	8413	9795	10070	10524	103695	**100082**	3613
Others	6184	91	152	116	343	6886	**6592**	294
Total	1178911	170084	208483	198343	239583	1995404	**1924434**	70970

Source:[1]DOTM (2072): Transport vehicles registration Information (till 2015/16); [2]MOF/GON (2072): Final Economic Survey 2071/72 (2014/15)

The amount of c-PentaBDE can be calculated according to the **Tier I Initial Assessment** in the Guidance document chapter 5.2.1 together with chapter 5.3 using the following additional assumptions.

The cars imported are all from the Asian region with a regional factor of 0.05. Some 80 % of the cars in use were produced in 2004 and later.

Different types of vehicles in use at present are as follows:

- Buses: **35289**
- Minibuses, trucks, cars, pick-ups and microbuses: **260583**

The formula for C-PentaBDE content in buses is:

Number of buses *0.8 *1 Kg*0.05= **35289*0.8*1*0.05 Kg = 1411.6 Kg**

The formula for C-PentaBDE content in cars and trucks is:

Number of cars/trucks*0.8*0.16 Kg*0.05= **260583*0.8*0.16*0.05 Kg= 1667.7 Kg**

By adding the above two numbers, the Tier I assessment gives an amount of **3079.3Kg (1411.6 +1667.7 Kg) POPBDE** in Nepal.

It is necessary to notify the Secretariat of the Convention that cars with TetraBDE and PentaBDE (c- PentaBDE) containing PUR foam in car seats remain in use within the country. Another follow up action could be a project supported by the development partners including GEF for the waste management of hazardous (including POPs) waste from cars and electronic equipment.

2.3.2.5 Production and Use of HBCD

Commercially available hexabromocyclododecane is a white solid substance. HBCD is used a flame retardant additive, providing fire protection during the service life of vehicles, buildings or

articles, as well as protection while stored. The main uses of HBCD globally are in expanded and extruded polystyrene foam insulation while the use in textile applications and electric and electronic appliances is smaller. The production of hexabromocyclododecane is a batch-process. Elemental bromine is added to cyclododecatriene at 20 to 70°C in the presence of a solvent in a closed system.

HBCD has a strong potential to bioaccumulate and biomagnify. It is persistent in the environment, and has a potential for long-range environmental transport. It is very toxic to aquatic organisms. Though information on the human toxicity of HBCD is to a great extent lacking, vulnerable groups could be at risk, particularly to the observed neuro-endocrine and developmental toxicity of HBCD. Hexabromocyclododecane is listed in Annex A with production only allowed for registered use and a specific exemption for expanded polystyrene EPS and extruded polystyrene XPS in insulation material in buildings. Production for all other uses and these other uses are not allowed. Trade for the other uses is not allowed.

The goal is to identify the need to develop legal frameworks/measures and effective enforcement of HBCD, to build capacity of officials and the public and promote awareness and to strengthen the management of HBCD in insulation material for buildings.

As presented in **Table 2.29**, DOC of Nepal has recorded the import of 1150746 Kg polystyrene during the last three fiscal years (2012/13 to 2014/15).

The import of potentially HBCD containing commodities such as Refrigerator/ freezers and similar kinds, Computers, Micro ovens, Electric ovens, cookers, cooking plates, CRT monitors, television and similar kinds including Polystyrene are shown in **Table 2.29**. HBCD as flame retardant is relevant mainly in countries with flammability standards requirements for all EPS/XPS applications in construction.

In Nepal, there exist no flammability standards for polystyrene EPS/XPS applications in construction and the buildings in Nepal by virtue of the climate or due to economic conditions of the users are rarely insulated. Therefore it can be assumed that the imported polystyrene for EPS/XPS applications in construction does not contain HBCD; however HBCD that might be present in imported electric equipment needs to be properly addressed. A follow-up action could be a project for the management of hazardous materials and wastes containing HBCD.

2.3.3 Assessment with respect to Annex B chemicals (DDT and PFOS)

Summary

Nepal has already disposed off old stock of DDT and new inventory could not reveal any stock of this Annex B POP pesticide, however there might be some PFOS in Nepal in some product, although no stock of it was found.

2.3.3.1 Introduction

With the disposal of 3.305 mtons of DDT, identified in previous inventory 2005 and mentioned in the initial NIP, along with other obsolete pesticides in 2011 Nepal is now DDT free. MOH is using pyrethroid preparations as safer alternatives to this organochlorine, which was used for malaria control in the past.

With the addition of PFOS in Annex B, its inventory has to be prepared. Nepal having no industry producing or using PFOS, its salts, PFOSF and PFOS related chemicals, no stock of it was found during the inventory preparation.

2.3.3.2 PFOS, its salts, PFOSF and PFOS related chemicals

The goal is to minimize the use of PFOS and take counter measure to manage waste contaminated PFOS based on environmental sound principles. This may include inter alia to to identify whether the current situation meets the requirements of the Stockholm Convention and identify areas where it does not, to give valuable inputs for developing a strategy on new POPs management, developing of actions plans and prioritization of sectors and actions that need special attention and to provide a basis for the reporting obligations under the Stockholm Convention for PFOS.

PFOS is a fully fluorinated anion, which is commonly used as a salt in some applications or incorporated in larger polymers. Due to its surface-active properties, it has historically been used in a wide variety of applications, typically including fire fighting foams and surface resistance / repellence to oil, water, grease or soil. PFOS and PFOS-related substances can be released to the environment during their manufacture, use in industrial and consumer applications, and from disposal of the chemicals or of products containing them after their use.

Other uses: carpets, leather/apparel, textiles/upholstery, paper and packaging, coatings and coating additives, industrial and household cleaning, products, pesticides and insecticides, use of existing fire fighting foam stock, photographic industry, photolithography and semiconductor, hydraulic fluids, metal plating, termite and ant bait insecticide products (e.g. in Brazil).

2.3.3.3 Status of PFOS in Nepal

There are indications that Nepal might have imported PFOS, PFOS salts, PFOSF or PFOS related chemicals, though during inventory the import record of these chemicals could not be found with the Custom and with the importers. But their presence cannot be excluded as these compounds are under use in certain processes or in some materials, during production of which these chemicals might have been used or may be present in ***Production product/mixture or Production article/matrix.***

As of now, there is no legal instrument specific to PFOS, PFOS salts, PFOSF or PFOS related chemicals in Nepal, but it can be addressed by new Hazardous Substances Management Regulations, draft of which is under discussion within the ministries.

Though no information pertaining to import and use of PFOS, PFOS salts, PFOSF or PFOS related chemicals could be found during inventory preparation, it cannot be excluded that PFOS containing mixtures are still imported to Nepal for certain use. It is therefore necessary for Nepal, as a Party to SC, to notify about the acceptable purposes and specific exemptions for relevant uses in fire fighting purpose to the SC Secretariat, as Nepal may have been using this and to go for the other alternative it may require several years

The inventory was largely based on the information that could be retrieved from the records of custom, industries and relevant documents, and also through personal contacts, though analytical determination of the POPs (including HBCD and PFOS) was highly desirable. Establishment of required laboratory facilities would help to generate such data, and thus support Nepal in its international commitments.

2.3.4 Assessment of releases from unintentional production of Annex C chemicals (PCDD/PCDDF, HCB, PCBs)

2.3.4.1 Emission sources in Nepal

Inventory of PCDD/PCDF for the base year 2003 was reviewed using the UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases, 2012 and similar inventory was updated for 2014/15. The annual dioxin and furan releases was found to be 237.7 gTEQ/year for the 2003 calculated using Toolkit 2012 and this release was reduced to 175.2 gTEQ in 2014/15. This lower value was due to new emission factor prescribed for some source categories in Toolkit 2012 and also due to reduction of PCDD/F from heat and power generation as well as from open burning process as mentioned in the Inventory. The Toolkit addresses direct releases and transfers of PCDD/PCDF in the following five compartments and/or media.

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

2.3.4.2 Summary of PCDD/F release inventory in Nepal

The PCDD/F inventory prepared for the base year 2003 for different source categories (Table 2.31) needed to be updated using the new tool kit (UNEP-POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs.En2013) for the activity data from 2003 under different Source Groups with new emission factors (EF).

Table 2.31: Nepal National PCDD/PCDF Inventories, for the base year 2003, according to UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases, 2005

		Annual release g TEQ/y)					
No.	Source category	Air	Water	Land	Product	Residue	Total/Sector (g TEQ/y)
1	Waste Incineration	12.0	0.0	0.0	0.0	0.0	12.0
2	Ferrous and Non Ferrous Metal Production	5.8	0.0	0.0	0.0	23.7	29.5
3	Power Generation and Cooking	38.0	0.0	7.5	0.0	0.0	45.5
4	Production of Mineral Products	19.7	0.0	0.0	0.0	0.0	19.7
5	Transportation	0.4	0.0	0.0	0.0	0.0	0.4
6	Uncontrolled Combustion Processes	108.7	0.0	35.2	0.0	13.0	156.9
7	Production of Chemicals and Consumer Goods	0.2	0.0	0.0	2.6	43.0	45.8
8	Miscellaneous	20.7	0.0	0.2	0.0	0.4	21.3
9	Disposal and Land filling	0.0	0.1	0.5	4.3	0.0	4.9
10	Potential Hot- Spots	-	-	-	-	-	-
Total		205.5	0.01	43.4	6.9	80.1	**336.0**

Source: MOEST/POPs (2006): PCDD/F Inventory, 2005

The annual PCDD/F emission (336.0gTEQ/y) calculated in 2005 was found to be 237.7 gTEQ/y (**Table 2.32**) (**Annex III**), when calculated on the basis of emission factors given in ToolKit 2013. This change in the value thus seemed to be due to new emission factors (EF) set for some source groups.

Table 2.32: Updated National PCDD/PCDF Inventories recalculated for the base year 2003, according to UNEP-POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs. En 2013

Group	Source Groups	Annual Releases (g TEQ/y)					Total/Sector (g TEQ/y)
		Air	Water	Land	Product	Residue	
		12.0	0.0	0.0	0.0	0.1	12.1
2	Ferrous and Non-Ferrous Metal Production	2.9	0.0	0.0	0.0	23.0	25.8
3	Heat and Power Generation	17.0	0.0	0.0	0.0	0.3	17.4
4	Production of Mineral Products	19.7	0.0	0.0	2.1	0.7	22.5
5	Transportation	0.4	0.0	0.0	0.0	0.0	0.4
6	Open Burning Processes	101.6	0.0	33.9	0.0	0.0	135.5
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	1.3	0.2	1.5
8	Miscellaneous	20.0	0.0	0.0	0.0	0.2	20.2
9	Disposal	0.0	0.0	0.0	2.2	0.0	2.2
10	Identification of Potential Hot-Spots				0.0	0.0	0.0
1-10	Total	173.6	0.0	33.9	5.5	24.7	**237.7**

Source: MOPE (2016): Inventory of Old and New POPs

2.3.4.3 PCDD/F inventory for 2014/15

Based on Annex 6 of Guidance for Developing, a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants the annual emission of PCDD/F for the base year 2014/15 (2071 BS Nepali calendar year) was calculated on the basis of Excel worksheet developed by UNEP (POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs.En) with new EFs and the status of PCDD/F was found lower (174.7 gTEQ/y) than in 2005 (**Table 2.33**).

Table 2.33: National PCDD/PCDF Inventories prepared for the base year 2014/15, according to UNEP-POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs. En 2013

Group	Source Groups	Annual Releases (g TEQ/y)					Group Total gTEQ/y
		Air	Water	Land	Product	Residue	
1	Waste Incineration	25.1	0.0	0.0	0.0	0.8	25.9
2	Ferrous and Non-Ferrous Metal Production	4.7	0.0	0.0	0.0	27.7	32.4
3	Heat and Power Generation	0.2	0.0	0.0	0.0	0.0	0.2
4	Production of Mineral Products	19.9	0.0	0.0	2.2	0.7	22.8
5	Transportation	0.1	0.0	0.0	0.0	0.0	0.1
6	Open Burning Processes	41.2	0.0	32.6	0.0	0.0	73.8
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	1.3	0.0	1.3
8	Miscellaneous	15.2	0.0	0.0	0.0	0.4	15.6
9	Disposal	0.0	0.1	0.0	1.7	1.2	3.0
10	Identification of Potential Hot-Spots				0.0	0.0	0.0
1-10	Total	106.5	0.1	32.6	5.2	30.9	**175.2**

Inventory of uPOPs for the base year 2014/15 (**Annex IV**) is based on the information that could be acquired from Economic Survey (MOF 2013/14), Import data (DOC 2013/14), fuel import (NOC 2015) (**Annex V**) and different industries during inventory field visit. In some instances, however, the required activity data for 2014/15 could not be acquired because of weak information updating or weak institutional memory; in such case the data of old inventory 2005 were used with the view that the emissions from these source categories are at least included in the present inventory. A comparison of total PCDD/F releases from each group for the inventory years 2003 and 2014/2015 is presented in **Figure 2.4 & Annex VI** to see the changes in releases between the two periods, and thus a change during the implementation of Stockholm Convention.

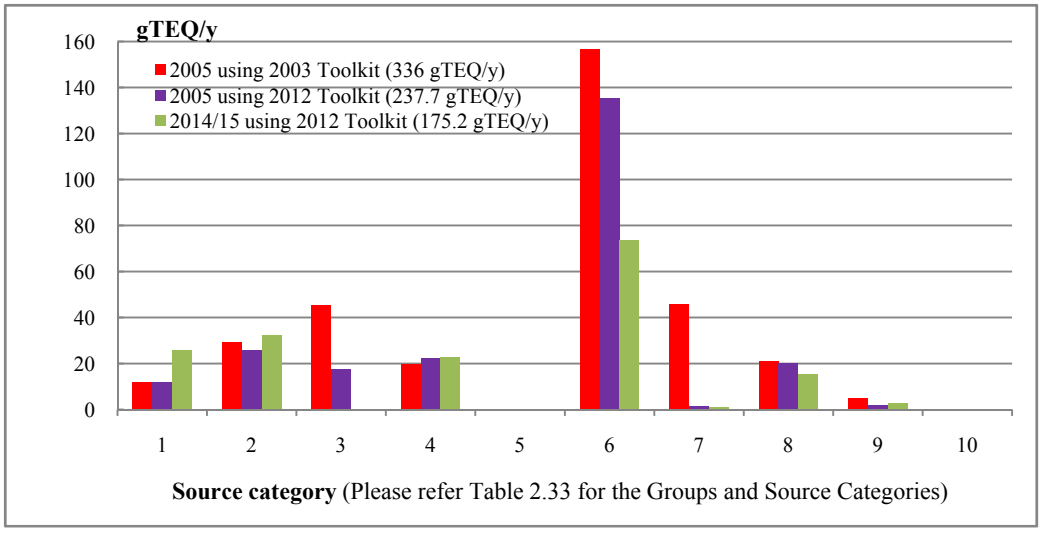


Figure 2.4: Comparison of total PCDD/F releases from each group and source category for the inventory years 2003 and 2014/2015

2.3.4.4 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, 2012:

- Waste management and incineration
- Industrial process of certain types of industries, such as metal and mineral industries.
- Open burning processes including agricultural waste burning and forest fires

As the amount of waste is steadily increasing with increasing development and industrial activities, changing consumption pattern and rapid but unplanned urbanization, waste management will be a major problem and thus a significant source of PCDD/F releases. The government of Nepal should therefore plan for a state-of-art incinerator in the future considering the volume of the wastes from different sources, scarcity of landfill site and necessary management of such sites.

2.3.4.5 Identification of data gaps

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.

2.3.5 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

Old pesticides stores, transformer maintenance workshops, temporary landfill sites, are the sites which may be contaminated by different types of POPs, namely pesticides, PCBs and PCDD/F. There is as such no remediation measure taken for the POPs contamination sites in Nepal, though initial NIP had identified several sites and included their remediation as the national priority.

2.3.5.1 Introduction

Government of Nepal's policy of allowing pesticides producers, importers and retailers to import and sale the pesticides has changed the trend of importing huge amount at a time and keeping their stock, which used to be obsolete. During the inventory survey for NIP Review and Update, no obsolete stock of POPs chemicals was identified. Also, with the dechlorination / decontamination of PCBs oil and transformer during the MSP period all PCBs contaminated wastes were treated and after this period no new stock of PCBs contaminated oil and transformers was in the record of NEA.

2.3.5.2 Information on POPs stockpiles

No stock of POPs chemicals was found during the inventory preparation for NIP Review and Update.

2.3.5.3 Institutional and Regulatory Framework

Pesticide Registration and Management Division and Protection Directorate under MOAD are the government institutions which regulate the pesticide through Pesticide Act, 1991 and Pesticide Regulation, 1994. Role of Pesticide Entrepreneurs' Association (PAN) is very important in the management of pesticides by identifying the required type and quantity of pesticides to be produced, imported and sold.

Solid Waste Management Act, 2011 and SWM Rule, 2013 are new legal instruments promulgated to replace the older instruments to address the recent issues on solid waste management, including hazardous wastes. They are further complemented by the EPA 1997 and EPR 1997, and Industrial Enterprise Act, 2016. SWMA 2011 has defined hazardous wastes and MOPE is in the final stage of enacting Hazardous Substances Management Regulations. "Guidelines for Environmentally Sound Management of PCBs" is the specific guidelines prepared in the course of implementation of NIP during the execution of a MSP on PCBs management.

2.3.5.4 Sites contaminated with POPs

As presented in sub-section 2.3.1.3 and **Table 2.28**, the pesticide storehouses and the soils around such facilities are the contminated sites known so far. Similar sites in Nepalgunj, Biratnagar, Lumle and Birgunj, which may very probably be POPs contaminated.

In additon to the ground of NEA Transformer Maintenence Workshops, about 209.52 sq.m. of the surace was found contaminated by PCBs contaminated leaking tansformers in different parts of the Kathmandu Valley (Kunwar 2013). Sites where old elecrical and elecronic equipments are demolished and such WEEE dumped as well as landfill sites should be considered contanianted by old and new POPs. The detail inventory of such sites should be prepared, and this can be part of the PRTR project, which is given high priority (please refer section 3.2.5 & **Table 3.2**) in this Updated NIP.

Cremation sites and brick kilns are also considered as PCDD/F hotshopts, as the estimates done by some studies using UNEP Toolkit 2012 justify this (**Table 2.34**).

Table 2.34: PCDD/F release (µgTEQ/y) from different activities groups

S.No.	Activity Group	PCDD/F	Source
1	Wood used in pyre cremation	137.85	Maharjan R (2010)
2	FCBT Kilns in Kathmandu	2.2 0	Maharjan R (2015)
3	Pyre cremation in 4 districts in and around Kathmandu	0.141	Maharjan, J (2016)

2.3.5.5 Current capacity and experiences

There are number of governmental and non-governmental organizations having capacity and experiences in the assessment of contaminated sites and samples (detail in subsection 2.3.10). In the government sector, NARC, NAST, Forensic Laboratory, 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 Nepal Environmental and Scientific Services (NESS), Water Engineering and Training Center (WETC), Soil Test Laboratory, and some academic institutions have the assessment capacity for some POPs.

2.3.5.6 Overview of international experiences and practice

There is as such no remediation measure adopted for the contamination sites, however, Nepal has started to create awareness and take initial steps through academic institution by including it in the academic curriculum and research activities. International experiences of phyto-remediation practiced abroad can be taken as references. Identification and application of suitable endemic plants can be an option for cost-effective environment friendly measure.

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

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. 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 does not produce any chemical, but imports the chemicals it requires for different purposes. It has never produced POP- chemicals. The present legal regulations also prohibit the import and use of POP chemicals; MOPE has not issued any approval to the import of POPs chemicals and MOAD has not registered the POPs pesticides. This has led to a total ban on the import and use of POPs pesticides.

Since 1990 PCBs are also not imported to Nepal, as shown by the procurement process at the NEA. The PCDD/F release given in **Table 2.32 and 2.33** are the baseline releases estimated for the base year 2003 and 2014/15, respectively. As per the requirement of the Convention (article 5) the inventory needs to be periodically updated.

2.3.6.2 Detailed information on export of Annex A and B chemicals

This is 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 was no export in the past nor will be in the future.

2.3.6.3 Detailed information on import and use of Annex B chemicals

No DDT is imported and used in Nepal since the implementation of SC in Nepal. But in case of PFOS, there might be some products, during the production of which PFOS might have been used. The inventory of PFOS however did not show any stock of PFOS in Nepal.

2.3.6.4 Requirements for exemptions

Nepal has not filed any exemptions till today at Stockholm Convention, but needs some exemptions for the use of products, during the production of which PFOS might have been used.

Though no information pertaining to import and use of PFOS, PFOS salts, PFOSF or PFOS related chemicals could be found during inventory preparation, it cannot be excluded that PFOS containing mixtures are still imported to Nepal for certain use. It is therefore necessary for Nepal, as a Party to SC, to notify about the acceptable purposes and specific exemptions for relevant uses in fire fighting purpose to the SC Secretariat, as Nepal may have been using this and to go for the other alternative it may require several years.

It is necessary to notify the Secretariat of the Convention that CRT casings of TVs and computer monitors containing HexaBDE and HeptaBDE (c-OctaBDE) remain in use within the country. Another follow up action could be a project supported by the GEF for the waste management of hazardous (including POPs) waste from cars and electronic equipment.

It is necessary to notify the Secretariat of the Convention that cars with TetraBDE and PentaBDE (c-PentaBDE) containing PUR foam in car seats may remain in use within the country.

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

Summary

MOPE in 2009 supported a study on residue analysis of POPs in soil near the storehouse of date expired pesticides. Research done by some academic institutions showed the presence of POPs in the Nepalese environment, especially in some hot spots like previous sites of POPs stockpiles, even years after the POPs pesticides were banned.

2.3.7.1 Introduction

There is no program/system of regular monitoring of POPs releases into the environment in Nepal. Government of Nepal has however started pesticide residue analysis in the fresh vegetables in vegetable stock market of Kathmandu as a joint activity of MOPE and MOAD, but this is not focused on POPs pesticides, as they are among the banned chemicals. Department of Food Technology and Quality Control (DFTQC) monitors the pesticide residues in food items

based on maximum residual limits (MRL) guidelines set by it. It is necessary to establish monitoring station/s for the measurement, research, control and assessment of releases of all POPs to meet the provisions of Stockholm Convention as well as of EPA 1997 through international cooperation. There is no significance development in monitoring of POPs releases since the time of previous NIP preparation and this is largely due to the inadequate facilities in terms of human resources and laboratory support.

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 at present is not possible. Department of Food Technology and Quality Control has developed the MRL for some pesticide residues in legumes, pulses and mineral water (**Annex I**) and regularly monitors the food samples in densely populated areas. However, the DFTQC needs to expand its monitoring program for the whole country and the capacity at the Department of Environment also needs to be built to undertake the monitoring of environmental samples. Private laboratories have provided consultancy services in monitoring pesticide residues in vegetable and soil samples. There are very few studies conducted on environmental contamination with pesticides and POPs, and it shows the contamination of different components of environment such as soil and vegetables.

There is an urgent need to upgrade most of the existing laboratories for the monitoring of release of pesticides and POPs. Their capacity should be strengthened also 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 findings of some studies give clear indication of POPs presence in the Nepalese environment even after they were banned in Nepal (**Table 2.28**).

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

There is the evidence of presence of some POPs in the environment, namely the studies done by Shah & Devkota (Please refer Sub-section 2.3.1.3 & **Table 2.28**, sub-sections 2.3.5.4 & 2.3.7.3). There is no information on the presence of POPs in humans, but it is desperately needed to relate the food chain bioaccumulation in Nepalese context. Study done by Sangroula (2013) is just an indication that POPs used in the past is still present in the soil and measurable in the fresh vegetables growing in such contaminated soil.

2.3.8 Current level of information, awareness and education among target groups: existing systems to communicate such information to various groups; mechanism for information exchange with other Parties to the Convention

Summary

With increasing participation in the international fora on environment, Nepal is making progress within the limits of its resources in information sharing, raising public awareness and education among the target groups. Specially, general public is getting increasingly cautious about the pesticides in food and other products they consume.

2.3.8.1 Introduction

Implementation of initial NIP led to successful ban on import and use of POPs chemicals during the last decade. The authorities of stakeholder organizations became aware of the adverse effects of pesticides, PCBs and PCDD/F and to address this they banned the import and use of hazardous chemicals, including POPs (**Table 2.26**). Successful execution of MSP on environmentally sound dechlorination / decontamination of PCBs and disposal of obsolete pesticides were the results of good information sharing among the government bodies and also with development partners. The academic institutions have also developed the courses and research programmes to disseminate the knowledge.

2.3.8.2 Overview of public information policy and practice related to environment

Constitution of Nepal has made the provision of access to information and GON has already enforced Right to Information Act 2007 to regualte and facilirate this. Every government organization has spokesperson or information officer to provide the relevant information. MOAD, MOPE, DOEnv, PRMD and District Aricultural Offices have been providing whatever information they have, also through their annual bulltetins. EPR has made it manadtory that public should be informed of every proect activty, thus appicable also to chemical and pesticide industries. The Pesticides Act and the Rules were formulated for the purpose of regulating the import, export, production, distribution and use of pesticides. EPA 1997 and EPR 1997 have made the provisions that government authorities should make environmental information available to everybody.

MOPE has been providing information on hazardous chemicals through its Environmental Standard and Monitoring Section, whereas DOEnv is providing such information though its Information Officer and different sections.

In the MOAD, 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.

2.3.8.3 Present public information tools and mechanisms

The relevant information on misuse and overuse of pesticides has been provided by the MOAD to the public. Likewise NEA, based on the knowledge gained during the preparation of previous NIP and implementation of MSP on PCBs, has been making aware its employees and general public on the environmental and human health impacts of unregulated use of PCBs. But, there is no effective communication system for the dissemination of information on the sources and impacts of unintentionally produced POPs.

NGOs working in the environmental sector are also 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 academic institutions have also included this topic in their curricula and are thus contributing in the protection of environment and human health from hazardous and toxic chemicals, including POPs. Government has 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 university students are also encouraged to actively participate in environment clubs and environment camps to save the environment from adversely affecting substances and activities. In recent years university students are undertaking research on pollution and pollutants, including POPs and other hazardous chemicals. Details about the information acquisition and dissemination regarding the environmental issues using different media and materials by government organizations and other stakeholders is same as in the previous NIP.

2.3.8.5 Chemical contaminant and pollutant release public information programs

Nepalese public is becoming more and more aware of the pollutants and their effects on the environment and human health. Though the country does not have any specific public information programs on chemical contaminants and pollutant release as yet, the communities around the industries and pesticides warehouses (e.g. Amlekhgunj, in the past), dumping site of municipalities are demanding the environment friendly management practices.

2.3.8.6 Mechanism for information exchange

As guided by the Constitution, Nepal is developing policy and guidelines regarding the information exchange system. However, the mechanism for information exchange among various stakeholders and target 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 COP and SAARC member countries, is in practice. In 2004, the meeting of the Governing Board (GB) of SAARC Agricultural Information Centre (SAIC) recommended the following specific policy for the use of Information Communication Technology (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 public-private-partnerships in all ICT efforts especially at the grass root levels.

2.3.8.7 Recommendations on strengthening in support of NIP implementation

Legal harmonization and raising public awareness for the effective implementation of MEAs including the Stockholm Convention were given emphasis in all interactions, also such during inventory preparation. Increased awareness on hazardous chemicals and deep concerns shown by government organizations like DOEnv/MOPE, DDA/MOH, PRMD/MOAD, NEA/MOEn and some NGOs were the positive results of implementation of previous NIP 2007. The PCBs Guidelines prepared in the course of MSP (2011-2014) is expected to support NIP implementation in the future. Coordination among the government organizations and between government and other organizations working in this field and development of joint activities are highly desirable.

2.3.9 Relevant activities of non-governmental stakeholders

Summary

Most of the NGOs registered in Nepal have included environment conservation as one of their main objectives and have focused on advocacy and awareness raising. However, very few of them have included research program on POPs chemicals.

2.3.9.1 Non-governmental organizations (NGOs) in Nepal

There are over 42000 NGOs registered across the country, but as of April 12, 2016 only 6115 organizations (oral communication – Office of NGO Federation,) were affiliated to NGO Federation of Nepal, an umbrella organization of NGOs (www.ngofederation.org*)*. They are contributing in the socioeconomic development, advocacy and awareness raising in the country. About one fourth of all NGOs registered in the country have at least environment protection and conservation as one of their main objectives.

The POPs Enabling Activities Project in 2004-07 had supported various NGOs working in public awareness. An NGO is also represented in the Steering Committee of the NIP Review and Update project. NGOs representatives were often invited during the interactions programmes focused on the management of hazardous chemicals, including obsolete pesticides and POPs chemicals, or/and during developing previous NIP and during its Review and Update. Also, INGOs working in Nepal are invited or involved in such 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

No significant development has been made in this sector during the last decade, i.e. from previous NIP period to till date for the analysis of PCDD/F samples. There are however few analytical laboratories in the country having the capacity to analyze organo-chlorine residues in water, soil, sediment and vegetable samples both in private and public laboratories.

2.3.10.1 Introduction

No significant development has been made in this sector during the last decade regarding technical capacity (human resources and technical infrastructure) for POPs assessment, measurement, analysis, research and development. There are several government or private laboratories, which are partially capable of determining pesticide residues including organo-chlorines in the environmental and food samples. Not a single laboratory can assess, determine or analyze the presence of any congeners of PCDD/F in any of the environmental samples. There is no dedicated laboratory for this particular analysis.

The Health Care Institutes (HCI) are still burning their wastes in drums or in low quality locally built furnaces, which they call *incinerators*. Only few hospitals have relatively good quality incinerators to deal with hazardous medical wastes. In the past, upgrading of some cement kilns were considered for the incineration, but none of them could be adequately equipped with air pollution control devices. Also, being located in the proximity of the densely populated areas, these kilns were 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, sites of stockpiles of obsolete pesticides were cleaned after such stocks were repackaged and exported for final disposal abroad in 2011/12. PCBs contaminated sites were cleaned during the execution of dechlorination / decontamination of electrical transformers and oil, but such sites are waiting for final and proper remediation. There are some waste water treatment facilities in Kathmandu and in some industrial areas to treat the municipal and industrial waste water, respectively.

2.3.10.3 Environmental monitoring

Except some studies done by some academic institutions on the residue analysis of few POPs in soil and vegetables, there is no monitoring of POPs in the country. Regular monitoring of air, water and soil regarding the level of POPs in the environment with adequate human resources and infrastructures is desperately needed. There were Air Pollution Monitoring Stations in six different parts of the Kathmandu Valley in the past, but all are now non-functional. However, MOPE has recently started with the installation of real time air pollution monitoring stations in 57 locations of the country, out of which 10 will be in the Kathmandu Valley.

2.3.10.4 Health monitoring capability

Health assessment done by the MOH is focused mainly on communicable and non-communicable diseases, but not on diseases caused by chemicals. There are some annual health reports on pesticide poisonings and death cases. Forensic laboratory under the MOST however assists in identifying the health impacts or death cases due to pesticides poisoning as requested by the concerned bodies (court or police). Police Hospital has its own Forensic laboratory. 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 with GC-MS and HPLC, but they analyze POPs chemicals only on special case. Thus there is no adequate data to reflect the level of contamination of POPs in the environment. With the creation of Department of Environment with a Laboratory under MOPE in 2014, the GON has taken the step in establishing the analytical laboratory, which will be gradually equipped as decided by the available resources.

Among the following government laboratories, none have the POPs analysis in their routine work:

- 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
- Nepal Academy of Science and Technology
- Department of Custom Laboratory
- Department of Forest Research Services
- National Research Laboratory under MOH

However, Department of Food Technology and Quality Control had been involved in the analysis of pesticide residue (MRL) including POPs pesticides in different food samples.

Among the accredited private laboratories for different analysis under the Nepal Laboratory Accreditation Scheme (NEPLAS), followings had carried out POPs analysis:

- Nepal Environmental and Scientific Services (NESS)
- Environment and Public Health Organization (ENPHO)
- Soil Test (P.) Ltd., material testing laboratory
- CEMAT laboratory
- Water Engineering and Training Center (WETC)
- ENSC, Biratnagar

Very few laboratories in Nepal though have mass and fluorescence detectors in either GC or HPLC, cannot run in desired capacity due to resource limitations. Also, the laboratories cannot afford to have ICP and thermo-desorption facilities. The laboratories under different universities/departments, which are working with limited resources, are also not capable of undertaking POPs analysis.

2.3.10.6 Research capacity in POPs management

Feeling the severity of POPs issues and realizing the need of basic information, the then MOEST (now MOPE) in 2008 supported a study on residue analysis in the soil around the old pesticide store house in Amlekhgunj (**Table 2.28**), where 50 mton of obsolete pesticides including POPs were stored for several decades. Except this not much has improved in research capacities in POPs management since the time of previous NIP preparation, but some academic institutions have carried out some research on POPs, either determining their levels in environmental samples in the laboratories (for DDT and 'drins') or calculating them using Toolkits (for PCDD/F). There is no established system of providing government grant to academic institutions for focused scientific researches intended for policy formulation on POPs assessment.

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 not yet developed the reporting systems of POPs release. The POPs inventories of 2004 and 2016 provided 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

On being the Party to Stockholm Convention Nepal has been able to get rid of the old stock of POPs chemicals and this has helped reduce the adverse impacts on the public health, environmental quality, local communities and occupational health. Still, 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.

2.3.11.2 Declaration and reporting of priority pollutant releases

Except for Ambient Air Quality Standard for particulate matter, benzene, SO_2 Nepal has no declaration and reporting systems of POPs release. There are recommended MRL values of DDT for certain food items, and guideline values for PCBs in environmental compartments (air, water, soil) as given in PCBs Guidelines. In case of pesticides however, there is a system of declaration and reporting to the concerned authorities about the demand and supply of pesticides and stockpiles of obsolete pesticides.

2.3.11.3 Background on potential sources of POPs impacts

By disposing obsolete pesticides, which included 45% of POPs pesticides, and dechlorinating / decontaminating PCBs contaminated electrical transformers and oils, Nepal substantially reduced the potential impacts of POPs. This addressed the decade long demand of the public residing in the surrounding of the pesticide store houses. Also, the NEA personnel, who were unknowingly exposed to PCBs contaminated old transformers and oils, were occupationally protected. During the inventory update in 2015/16 no stockpiles of POPs were detected.

Nepal seemed yet to put significant effort in making the people aware of unintentionally produced PCDD/F. Though the annual release of PCDD/F was found reduced (from 237.7 gTEQ/yr in 2003 to 175.2 gTEQ/yr in 2014/15), it is still quite high for a country like Nepal, where the industrial development is still in infancy. Moreover, it is very difficult to predict the impacts on the social part as the human health impacts due to PCDD/F could not be pin pointedly identified and the overall effect of Dioxin/Furan on the society could not be studied.

2.3.11.4 Recommended current occupational safety measures

The following safety measures are recommended for pesticides handling:-

- prohibit open burning, combustion of wastes
- select effective pesticides and do not use the pesticides unnecessarily.
- read and follow the instructions written in the label of pesticides to be careful about possible hazards.
- 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

With the dechlorination / decontamination of PCBs, NEA workforce has been protected from PCBs and thus the specific safety measures for PCBs are addressed in favour of such NEA personnel.

2.3.11.6 Potential risk groups

With ever increasing list of POPs chemicals or convention bringing more chemicals as POPs into the notice, still a large population might be exposed to such hazardous chemicals. As Nepal has disposed off previously identified POPs stocks, the size of potential risk group has been reduced. Still, during the inventory field study for Updated NIP no stocks of new POPs was identified in Nepal; it was perhaps due to the fact that Nepal has no chemical manufacturing industry and it import the final products only for defined uses.

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

There is no specific law that governs the assessment and listing of chemicals. Nepal does not have the capacity to assess the chemicals and suggest for including in the new list of POPs. Pesticide Act, 1991and Pesticide Regulation 1994 govern the import, production and use of pesticides, that are not included in Annex I of Stockholm Convention or do not fall under WHO Hazard Category I and II.

2.3.12.1 Introduction

The existing acts (Pesticide Act 1991 and EPA 1997) and regulations Pesticide Regulations 1994 and EPR 1997) are not enough to address the overall chemicals being imported and used in the country. But there are some regulatory mechanisms/systems in place to assess and list pesticides. 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. There are ministerial decisions of different ministries that prohibit the import of certain chemicals, but before taking such decisions, they have started taking the opinion of MOPE, since this ministry became the focal point of Stockholm, Basel and Rotterdam Conventions and member of SAICM policy framework.

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

Import, production and use of pesticides is governed by different articles of Pesticide Act 1991 and Pesticides Regulations 1994.

Pesticide Act, 1991

- Article 5: Functions, Duties and Responsibilities of the Committee
- Article 7: Establishment of pesticide Registration Agencies
- Article 8: Function, Duties and Responsibilities of the pesticide Registration Agencies
- Article 9: Certificate to be obtained after getting the pesticides registered
- Article 10: Listed Pesticides
- Article 11: Restriction to use the pesticide other than the one listed
- Article 12: License to be obtained
- Article 13: Appointment of Pesticide Inspector

Pesticide Rules, 1994

- Rule 3: Submission of application for pesticide registration
- Rule 4: Registration of the pesticides
- Rule 5: Denial of registering the pesticide
- Rule 6: Cancellation or suspension of Pesticide
- Rule 7: Furnishing the particulars of pesticides to be imported
- Rule 8: Approval of container and label
- Rule 10: Obtaining a license
- Rule 11: Submission of an application for the license
- Rule 12: Granting a license to Pesticides retailer
- Rule 13: Granting license to pesticide Spraying entrepreneurs
- Rule 14: Granting license to pesticides formulator
- Rule 15: The validity period of license and its
- Rule 16: Withdrawal of License
- Rule 17: Pesticide Inspectors to be provided with identity cards
- Rule 18: Right, duty and function of the inspector
- Rule 19: Right, duties and functions, and procedures of the meeting of sub-committee constituted under sub-Section (1) of section 6 of the Act
- Rule 20: Making and implementation of the directives

MOAD/GON is at present working to bring new act and regulations to harmonize with other legal mechanisms and also to address obligations of different international environmental agreements.

The EPA, 1997 and EPR, 1997 also have some provisions relevant to POPs chemicals.

Any activity or project depending upon its capacity or extent of adverse impacts requires carrying out Initial Environmental Examination or Environmental Impact Assessment as per Section 3 of the EPA 1997 and Rule 3 of the EPR 1997. The IEE requiring chemical industries are listed under Schedule I, whereas those of larger capacity requiring EIA are listed under Schedule II of the EPR.

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 1997 and EPR 1997 have made the provision of EIA for projects dealing with recycling and recovery of hazardous substances listed in Annex II and IEE for smaller ones and pesticides industries listed in Annex I of EPR. Department of Food Technology and Quality Control (under MOAD) has the mandate to analyze the pesticides residues as well as set the standards for the same in certain food items. Regarding POPs management there is no specific regulation, but the MOPE has drafted Hazardous Substances Management Regulation, which is expected to come into effect after getting approval from the cabinet.

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. **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[2] 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 Defense has issued the list of chemicals that are forbidden for import that have potential to be used in formulation of explosives.

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

Ministry of Agricultural Development is regulating the import of pesticides by requiring their registration and permission for commercial import from Pesticide Registration Management Division (PRMD).

Department of Customs has listed 761[3] different chemicals as hazardous chemicals. Based on the environmental and adverse impact on export there are 118[4] 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 Pesticide Act, 1991 besides defining the terminology of pesticides and registered pesticides, it has also made the provision of constituting a pesticide committee with MOAD Secretary as Chair at national level to provide policy feed back to the government. MOAD is also exercising to bring new Pesticide Act and Regulations to harmonize with other laws in the present context. MOPE has also drafted Hazardous Substances Management Regulation, which is expected to come into effect after getting approval from the cabinet. The import specification issued by Nepal Electricity Authority on transformer oil mentions that the oil to be delivered to NEA should be PCB free and this is now included in the Guidelines for the Management of PCBs.

As shown in **Table 2.26** (Section 2.3.1.1), GON has banned POPs as well as other pesticides considered very hazardous.

EPA 1997 and EPR 1997 have made the provision of EIA for projects dealing with recycling and recovery of hazardous substances listed in Annex II and IEE for smaller ones and pesticides industries listed in Annex I of EPR.

Being a party to Basel Convention, Nepal forbids the import of the wastes that are defined hazardous by the convention. The Treaty Act 1990 (2047 BS) 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. Regarding POPs management there is no specific regulation, but the MOPE has drafted Hazardous Substances Management Regulation as allowed by Environment Protection Act, 1997, and this new regulation is expected to come into effect after getting approval from the cabinet.

[2] circular compendium 2006 (updated), Department of Customs
[3] List of Hazardous Chemicals, Department of Customs, Laboratory Section 2004
[4] Circular Compendium (updated), Department of Customs 2006

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

3.1 Policy statement

The Constitution of Nepal has guaranteed the right to clean environment as a fundamental right (Article 30). The state policy of the constitution has also highlighted the role of the state in pollution control. Formulation of an integrated national policy on environmental pollution is felt, in the absence of which environment and human health protection activities are not carried out effectively. Still, after promulgation of the new Constitution in 2015, Nepal has yet to revise or amend pollution control related legal and policy instruments to comply with this fundamental right. The constitutional provisions on state policies have committed to conserve environment and control pollution. The policy also pays special attention to environment friendly development.

Realizing the persistence, bioaccumulation, toxicity and long range transport of POPs compounds and reaffirming the commitment made as a Party to implement the provision of Stockholm Convention to safeguard human health and environment from the adverse effects of POPs in Nepal, particularly to fulfill the obligation as per the article 7 of the Convention, POPs management involves wider participation of all 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. Although nationally and global economic situation are not very conducive, Nepal is committed to identify the modalities on how to secure the required financial and other resources needed for the implementation of Stockholm convention. Nepal will continue to work actively to raise the level of protection and minimize the environmental and health impacts of POPs, nationally as well as in international forums.

For the coordination and implementation of the provisions of the Stockholm Convention, Nepal has formed a high level steering committee as a policy guidance body which is functional since 2004 and it is also guiding the Review and Update of National Implementation Plan.

3.1.1 Objective

Review and update an effective Management System for old and new POPs 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

- Help in achieving the constitutional right to clean and healthy environment
- Update detailed information on old and new POPs chemicals and their risks to the human and environment ;
- Protect human health and the environment from the harmful impacts of POPs by reducing and decreasing POPs emissions and leakages, as well as gradually stopping the use of POPs or POP-containing equipment;
- Make all stakeholders aware of the seriousness of POPs and their management
- 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 management

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

Develop and implement preventative measures to prevent the formation of new POPs sources and to restrict or ban the import of POPs chemicals.

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 and will continue with the reduction and/or elimination of POPs by undertaking activities mentioned in the previous NIP and this NIP Update. 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.

3.2 Implementation strategy

3.2.1 Overview

In order to set the appropriate national framework for the implementation of the previous National Implementation Plan, developed in 2006/07, Ministry of Population and Environment had endorsed it on 2063/12/7 BS (March 21, 2007) and had:

- established coordination between national authorities for the NIP implementation;
- identified authorities responsible for the implementation in line with the 10 national priorities identified in the previous NIP; and
- proposed timeframes for implementation of actions plans and for reporting on the status of implementation.

3.2.2 Enabling environment

It is anticipated that on the basis of the updated NIP and action plans in it, the Government of Nepal will create an enabling environment by taking appropriate decisions for the effective implementation of the measures for “new POPs” and by making appropriate institutional arrangement and securing the required resources.

3.2.2 Identification of information barriers, implementation and data gaps

The barriers identified during the previous NIP are still to be faced, but GON could still complete the action plans related to the first priorities mentioned in previous NIP. Some barriers that may affect the NIP implementation are:

Policy Barrier

i. 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. Legal regime (Act, Regulation, Standards, guidelines, etc)

GON has set environmental standards for air, water, food quality, but such parameters do not include POPs, except MRL in certain food items. There are no adequate legal provisions for controlling POPs release neither from industrial and commercial sectors nor from agriculture sectors. PCBs Guidelines prepared during the implementation of MSP has however addressed this issue in case of electrical transformers and dielectric fluid used in them. Likewise, MOPE has developed the standards for Chimney height and Emission for Incinerator, with PCDD/F emission value (**Annex VII**).

iii. Harmonization among the legal arrangements for different sectors

The legal arrangements made to achieve the sector mandate sometime conflict to each other. Some of such arrangements were harmonized by replacing the older laws by the new ones, e.g by bringing Solid Waste Management Act 2011 and Regulations 2013. Efforts are underway to bring new Pesticide Act and Regulation, and Hazardous Substances Management Regulations under the existing EPA 1997.

Institutional Barrier

Disjointed sector mandates and inadequate interagency coordination: There are committees made in Acts, Regulations or some are only in institutional memory. These committees remain largely unrepresentative and the sector mandates often overlap or contradict. This has adversely affected the formulation of required policies, laws and directives/guidelines.

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 are financial barriers, too.

Socio-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

Adequate knowledge and awareness on POPs is felt at every level, from the highest echelon such as policy level to the lowest echelon like general public of the rural area. Frequent transfer of the government employees, once trained on POPs/pollution issues, has led to knowledge gap, thus affecting the implementation of specific activities.

Financial barrier

Financial barrier comes while opting to any alternative technology which has low POPs release potential or disposal of POPs. For example, the establishment of state of the art incinerator for the disposal of hazardous wastes from HCI and industries or opting for non elemental chlorine bleaching in pulp industry, etc. incur large financial burden.

Despite the above barriers, Nepal could dispose off obsolete pesticides and PCBs by optimizing its knowledge and financial and technical resources made available by its development partners.

3.2.3 NIP Policy basis and implementation objectives

Both the initial NIP and present NIP Update are GEF funded MOPE/UNIDO projects implemented in accordance with 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 (old and new) 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 Updated NIP will be based on the following principles as in the initial NIP:

- Ensuring compliance with the “National Environmental Policy and Action Plan (NEPAP) 1993” and the “Long-term Strategy for sustainable development” agenda.
- Development and adoption of the specific rules and guidelines to ensure the implementation of Stockholm Convention.
- Integration with overall environmental management and sustainable development policies.
- Develop synergy in the implementation of MEAs (Base, Rotterdam, Stockholm and Minamata Convention, including SAICM policy framework) by ensuring the participation of concerned ministries.
- Adherence to and use of technologies for BEP/BAT 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, including NGO and other social groups.
- Providing information to the stakeholders and general public about the POPs.
- Fair and equal protection of public and occupationally exposed population and consideration of individual vulnerability.

3.2.5 Priorities and conditionality

Based on the updated inventory of old and new POPs, following new priorities have been listed to address the issues identified during inventory preparation.

- Institutional strengthening, legislation/policy formulation on POPs and harmonization of sector legislation
- Establish research and laboratory facilities with focus on chemicals (developing the PRTR) under MOPE & DOEnv
- Capacity building at Custom (under MOF), Quarantine offices (under MOAD) and Armed Police (under MOHA), especially in maintaining the records of imported commodities and control at custom points
- Establishment of network for inter-institutional information sharing (focusing on Coordination, Responsibilities and Authorities)

Also, the priorities of previous NIP that were partially completed or yet to be addressed (**Table 3.1**) were discussed during the Inventory Validation and Priorities Setting workshop organized on April 12, 2016.

Table 3.1: Final Priorities as in initial NIP and status of their implementation

Activities	Final Priority	Status
Pesticides (Safe packaging, safe storage, and disposal of obsolete pesticide; Remediation and site stabilization)	1	Completed
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	Completed
POPs (Public awareness raising, information and education)	2	Partially completed
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	No significant development
Legislative framework/ Capacity building (Institutional strengthening, legislation/policy formulation on POPs; Harmonization of sector legislation; Human resource development, research and development)	4	Partially completed
Environmental monitoring (pre and post disposal)	5	Partially completed
BAT/BEP (Alternative energy program for household energy need)	6	Partially completed
Promotion of intermediate technological solution on hazardous waste disposal	7	No significant development
Release reduction from industrial process/establishment with the utilization of CP/EE/EM technology	8	No significant development
Establishment of electrical crematoria	9	Partially

Despite the limitation in qualified experts and technical as well as financial resources, Nepal successfully completed the first two priorities, which remained as significant environmental issues since several decades. With the disposal of obsolete pesticides including the POPs listed in Annex A of the convention after exporting them to Germany through the bilateral support and dechlorination / decontamination of PCBs (Annex A) with the support of GEF and UNIDO, Nepal reduced the total global burden of these two categories of POPs well before the timeline set by the convention.

During the Inventory Validation and Priority Setting workshop both the new and older ones either partially completed or not addressed were assessed and new priorities were set (**Table 3.2**).

Table 3.2: New priorities for the management of old and new POP chemicals	
Activities	Final Priority
Legislative framework: Institutional strengthening, legislation/policy formulation on POPs; Harmonization of sector legislation	1
POPs in general : Public awareness raising, information and education & training	2
Establish research and laboratory facilities with focus on chemicals and developing PRTR	3
Environmental monitoring (pre and post disposal)	4
Capacity building at Custom, Quarantine offices and Armed Police	5
Establishment of network for inter-institutional information sharing (focusing on Coordination, Responsibilities and Authorities)	6
PCDD/F emission control	7
BAT/BEP : Renewable energy program for household energy need	8
CP/EE/EM technology : Release reduction from industrial process/establishment	9
Promotion of intermediate technological solution on hazardous waste disposal	10
Decontamination and site remediation for POPs contaminated sites	11
Promotion of electrical crematoria	12

3.2.6 Major Milestones

Specific milestones laid for two priorities of the previous NIP were addressed by disposing the obsolete pesticides in 2011/12 and managing PCBs during 2012-2014, before the period targeted by the convention. As there were no stock of old and new POPs found during the inventory review and update, specific milestones may not be planned for disposal, but Nepal will propose the action plans for proper management of potential sources of new POPs within the limits of its resources and institutional capacity.

Likewise, 2022 is laid as milestones for the implementation of activities to address the major priorities such as legislative harmonization and institutional strengthening, awareness raising on POPs, capacity building and developing PRTR considering the fact that NIP will be updated every five years.

3.2.7 Institutional/Organisational Arrangements and Assignment of Responsibility

The MOPE, as focal point to the Stockholm Convention on POPs, is responsible for the review and update of NIP, coordination and implementation of different activities and regular reporting to the Secretariat. Roles and responsible of other implementing agencies and stakeholder ministries and organizations will be as follows (**Table 3.3**).

Table 3.3: Institutional involvement and responsibilities in NIP implementation			
Action plans on	Institutions	Roles & Responsibilities	Remarks
POPs	MOPE	Focal point; Coordination; Env. Rules & Regulations; Monitoring; Guidelines and standards	
Pesticides	MOAD	Implementation agency; Pesticide Act & Regulations; Import & use	
	NARC	Residue analysis, Research, Alternative Technology, awareness programs	
	MOH	Import & use of vector control insecticides	
PCBs	MOEn	Legislation, Regulations	
	NEA	Import, use and management of contaminated transformer oil & equipment	
	Industry (FNCCI)	Transformer manufacture; import and use of dielectric fluid	
PCDD/F, PFOS, PBDE	MOI	Legislations; Monitoring	
	NBSM	Accreditation	
	MOFALD	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	
	Private. Labs	Research	
Legislative frameworks	MOLJPA	Acts, Rules in relevant sectors	
	Line ministries	Work in collaboration with MOLJPA for necessary rules & regulations	

3.2.7.1 Institutional / Organizational Arrangements

The MOPE has a POPs Desk Officer in its Environmental Standard and Monitoring Section under Population and Environment Management Division headed by Joint Secretary, who is also the Focal Point of SC and NPD for NIP Review and Update (**Figure 3.1**) and responsible for reporting to the Convention Secretariat on a periodic basis. This Division will coordinate with concerned government agencies /ministries and Department of Environment and monitor the NIP implementation. NPD will also have the financial control over the process.

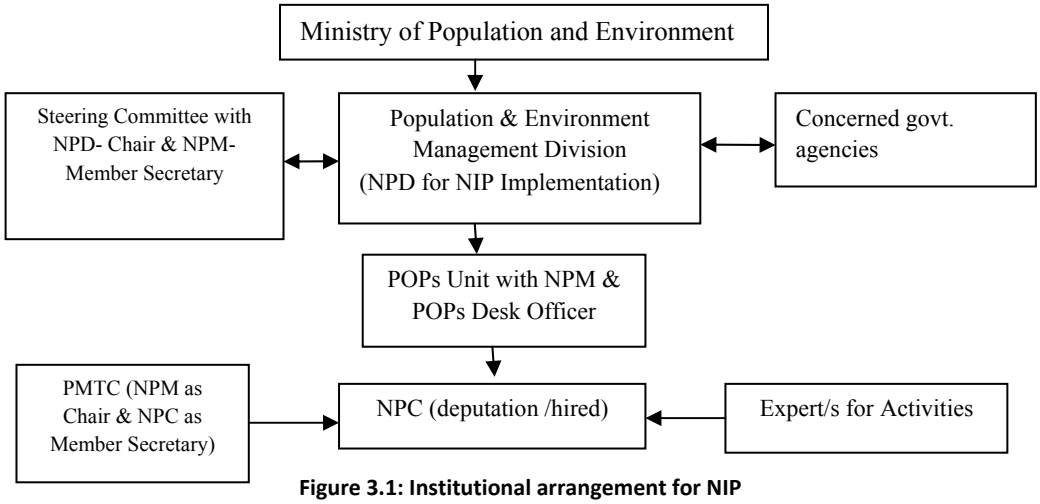


Figure 3.1: Institutional arrangement for NIP

3.2.7.2 Steering Committee (StC)

A Steering Committee (StC), which was coordinating the NIP Review and Update, will coordinate the implementation process of the Action Plans. This 13-member Committee has the Under-Secretary level representations from various ministries, representatives from stakeholder organizations, university and NGOs. The StC will review, comment on and approve the work plan. The composition of the StC will be as follows:

Joint Secretary, Ministry of Population and Environment	Chairman
Director General, Department of Environment	Member
Representative, Ministry of Agricultural Development	Member
Representative, Ministry of Finance	Member
Representative, Ministry of Women, Children and Social Welfare	Member
Representative, Ministry of Health	Member
Representative, Ministry of Industry	Member
Representatives, National Planning Commission	Member
Representative, Central Department of Chemistry	Member
Representative, Department of Custom	Member
Representative, FNCCI	Member
NGO Representative (from NEFEJ)	Member
National Project Manager, NIP Update and Review Project	Member–Secretary

3.2.7.3 Project Management Technical Committee (PMTC)

There will be a 9-member POPs Management Technical Committee (PMTC) under the StC for day to day execution of the implementation plan. The Committee with NPM as its Chair will have POPs Desk Officer as Member Secretary. The composition of PMTC will be as follows:

National Project Manager for NIP	Chairman
Environmental Standards and Monitoring Section Chief	Member
Law and Verdict Implementation Section Chief	Member
Representative of MOLJPA	Member
Technical representative from MOI	Member
Technical representative from MOAD	Member
Representative of FNCCI/CNI	Member
Representative of Nepal Chamber of Commerce	Member
Representative of NGO	Member
POPs Desk Officer, POPs Unit	Member Secretary

The PMTC will hold its regular meetings throughout the implementation but additional meetings can be held, as required. The StC will oversee the project-related work of the PMTC and the implementation team. The StC 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.

The POPs Unit will have a National Project Manager (NPM), who will work as the coordinator of the NIP activities and report to the NPD. The NPM, appointed by the Ministry for the NIP implementation will be a technical person. The POPs unit as required can take the service of the experts on contract basis during the NIP implementation.

The POPs Desk Officer (PO) will report to the NPM 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 and monitoring of NIP execution.

Due to the complexity of the NIP coordination, the POPs Unit may appoint a technical expert as National Project Coordinator (NPC) and other sector experts to assist in the implementation activities. The expert/s will work on a contract basis and will report to the NPD and NPM.

3.2.8 Implementation approach and work plan summary

3.2.8.1 Implementation approach

The implementation approach is detailed in the previous section 3.2.7 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

3.2.8.2 Work plan of the coordination activities

The StC will control overall technical and financial aspects of the NIP realization. The Joint Secretary at MOPE will hold the chair of the Committee. The StC is the primary decision making body. Depending on meeting schedules and the action plans POPs Desk Officer and NPC can participate at the meetings. The work plan for the coordination activities will depend on the action plans under implementation.

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 NPM will submit these reports to the StC through PMTC and take corrective actions based on the comments and evaluations of StC.

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 initial NIP, priority 4 was related to “Institutional and regulatory strengthening measures”, but this priority was only partially addressed/completed (**Table 3.1**) during the implementation of initial NIP. As this activity 3.3.1 will have a major role in the implementation Stockholm Convention through future NIPs, it is taken as the priority 1 for the Reviewed and Updated NIP (**Table 3.2**).

3.3.1.1 Objectives and priorities of the Action Plan

Nepal has given this action as the first priority in its Reviewd and Updated NIP; 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 alternative energy programs

According to GON (Allocation of Business) Rules, 2016 (2072 BS) implementation of different sub-activities to be taken to fulfill the objectives of the action plan fall under the jurisdiction of different ministires and organizations. As still much needs to be done to carry out this acitvity, the sub-activities of the initial NIP are still quite relvant for the next period of NIP implementation.

A. Institutional Strengthening

In the course of the implementation of initial NIP, Old POPs of Annex A and Annex B were managed in an environmentally sound and internationally accepted manner with the institutional capacity Nepal had and GON could also harness the technical support to supplement its institutional capacity. With the changing priorities leading to change in the nature of the future activities/projects, the institutions need to be strengthened. Since release reduction of new POP under Annex B (i.e. PFOS) and unintended production of Annex C POPs will require not only establishing a coordinating mechanism among different public and private stakeholders, institutional capacity need to be strengthened or enhanced, also to make the implementation task more streamlined.

The current GON (Allocation of Business) Rules, 2008 (2064 BS) has stipulated tasks of Ministry of Population and Environment as follows:

- Formulate 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 non-governmental agencies on environment
- Preparing human resources on environment management

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

Activity 1. Establishment of an enforcement agency for environmental requirements under MOPE.

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

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

GON has established Department of Environment (DOEnv) under MOPE to effectively prevent and control pollution, also to implement the provision of NIP of the Stockholm Convention. The updated inventory shows no change in the industrial waste that constitutes the second biggest sources of unintended POPs release in the country. Thus the establishment of a focused institution such as Pollution Control Board to support DOEnv for urban and industrial pollution control will certainly have the synergetic benefit on POPs release reduction efforts. Such provision is also proposed in the National Pollution Control Strategy and Action Plan (NPCSAP), prepared by DOEnv/MOPE, the draft of which is at the final stage of inter-ministerial discussion.

Coordinator/Responsible for Action: Ministry of Population and Environment

Cost: USD 500,000 (lump sum) for infrastructures excluding salaries

Source of Funding: Development Partners

Deadline: 2018

Activity 2: Establishment of interagency coordination mechanism

With the environmentally sound management of old stocks of Annex A and B POPs mentioned in the initial NIP, and no stock of new POPs chemicals could be identified during the inventory update, Nepal has no stock of POPs that would need immediate disposal. However, some of the new POPs of Annex A (HBCD, PBDE) and Annex B (PFOS) were suspected to be present in some product, which is calculated using the UNEP Toolkit. For an exact inventory preparation and management of such POPs, interagency coordination is desperately needed, also to support in the good recording information exchange and reporting.

The existing Steering Committee on POPs Management can effectively coordinate among the varied stakeholders to achieve the goal of release reduction of POPs into environment. For this purpose the committee already in existence (sub-section 3.2.7.2) can coordinate with other committees like Committee on Environmental Standards at MOPE and Pesticide Management Committee at MOAD for the task of POPs management.

As SC Focal Point, the MOPE will establish interagency coordination and carry out the required activities.

Responsible for Action: Focal point of SC at MOPE

Cost: USD 2000

Source of Funding: National Budget

Deadline: 2018

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 continue with this activity, for which substantial external resources would be required, because Nepal, due to the size of its national budget and the huge amount that would be necessary for the implementation of SC, it cannot allocate the required budget. The activities, otherwise, may receive little attention due to other priorities of the government. Also, for the effective implementation of action plans, MOPE may need to appoint a experts with technical qualification suitable to the job. Such technical experts will be given TOR for the job and he/she will be responsible for implementing the activities of the action plan under auspices of the MOPE under the guidance of the StC and PMTC, and also in close collaboration with POPs Unit of the MOPE.

Responsible for action: Focal point of SC at MOPE

Cost: USD 10,342,000 (This is the total estimated amount that will be required for the implementation of all action plans mentioned in the updated NIP).

Source: GEF/Bilateral

Deadline: 2022

Activity 4: Enhancement of synergy between Basel, Rotterdam, Stockholm Conventions in Nepal

Since Nepal is a party to Basel, Rotterdam and Stockholm (BRS) Conventions and participating, 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 and PIC chemical 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.

POPs Unit will coordinate the projects relating to management of hazardous chemicals including POPs management project and report to the SC Focal Point.

Responsible for Action: Focal point of SC at MOPE

Cost: USD 4000

Source of Funding: National Budget (to be covered within the annual programme of the ministry)

Deadline: 2020

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 and its subsidiary bodies may be relevant agencies to issue BAT for different industrial processes, while the Ministry of Agricultural Development 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 Federal Affairs and Local Development (MOFALD) 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 is related with regulating pharmaceutical POPs (e.g. Lindane) and 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 StC to finalize them. The StC will eventually recommend the MOPE for adoption of these technologies.

Responsible for Action: Focal Point of SC at MOPE

Cost: USD 4000

Source of Funding: National Budget (to be covered within the annual programme of the ministry)

Deadline: 2020

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.

Activity 6: 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 MOPE 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 POPs chemicals and hazardous wastes 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 has been banning the import and use of POPs pesticides, but GON/MOAD is preparing new Pesticide Act and Regulations to replace the older ones to address the issues of changing context (particularly for new POPs).

Responsible for Action: Focal Point of SC at MOPE and DNA for RC at MOAD

Cost: USD 10,000

Source of Funding: State Budget (to be covered within the annual programme of the ministries)

Deadline: 2020

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: Focal Point of SC at MOPE

Cost: USD 4000

Funding source: National Budget (to be covered within the annual programme of the ministries)

Deadline: 2020

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 one of the sources of PCDD/F generation, the issue needs to be addressed.

Responsible for action: Focal Point of SC at MOPE

Cost: USD 4000

Source of funding: National Budget (to be covered within the annual programme of the ministries)

Deadline: 2020

C. Bringing New Legislation

Similar to Solid Waste Management Act 2011 and Regulations 2013 that were formulated and enforced to address the changing environmental and human health issues, Rules on the Management of Persistent Organic Pollutants could be framed. However, GON/MOPE is in the process of drafting Hazardous Substances Management Regulations, which is expected to address POPs and other hazardous wastes.

Activity 9: Formulation of Hazardous Substances Management Rules

Since there was no hazardous chemicals management legislation in the country, it was necessary to prepare one. These rules will not only incorporate the management of POPs chemicals but also chemicals relating to PIC and Basel conventions. This will help ensure compliance with the commitments made during international multilateral agreements.

Responsible for Action: MOPE in collaboration with Ministry of Law, Justice and Parliamentary Affairs (MOLJPA)

Cost: USD 5000

Funding Source: National Budget (to be covered within the annual programme of the ministries)

Dead line: 2018

Activity 10: 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. Laws already formulated and enforced (SWMA 2011) and those in draft forms, under formulation and discussion (Pesticide laws, Hazardous Wastes Management Regulations) are some efforts towards harmonization.

Responsible for action: MOPE, MOAD and MOLJPA

Cost: USD 10000

Funding source: National Budget (to be covered within the annual programme of the ministries)

Deadline: 2018

Activity 11: Establishment of Information Education and Communication (IEC) System with POPs Issues incorporated

Environment management task needs a wider public participation and support. Government needs to establish an IEC system involving different public agencies, private organizations and NGOs to prepare and communicate on the environment protection issues.

A separate IEC section needs to be established in MOPE or in DOEnv to prepare different materials 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: MOPE and or DOEnv

Cost: USD 10,000

Funding sources: National budget plus Development partner's assistance

Deadline: 2020

Activity 12: Further strengthening and expanding the scope of renewable energy program for household and industrial use

Nepal has been promoting the renewable energy mainly through solar home system, bio-gas, micro-hydro to 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 Alternative Energy Promotion Center (AEPC) under the MOPE 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: Ministry of Population and Environment

Cost: USD 500,000/year till 2022 (Total 3,000,000)

Funding sources: Bilateral and multilateral agencies

Deadline: 2022

Table 3.4: Work plan for different activities under Action plan 3.3.1

Action Plan 3.3.1: Institutional and Regulatory Strengthening Measures	Implementation Schedule till 2022						
	2017	2018	2019	2020	2021	2022	2030
Activity 1: Establishment of an enforcement agency for environmental requirements under MOPE.	√	√					
Activity 2: Establishment of interagency coordination mechanism	√	√					
Activity 3: Implementation of Action Plan on Stockholm Convention	√	√	√	√	√	√	√
Activity 4: Enhancement of synergy between Basel, Rotterdam, Stockholm Conventions in Nepal	√	√	√	√	√	√	√
Activity 5: Cooperation and Coordination of Activities Concerning Promotion of BAT and BEP	√	√	√	√			
Activity 6: Amending current legislation	√	√	√	√			
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 of Hazardous Chemicals Management Rules	√	√	√				
Activity 10: Harmonization of sector legislations	√	√	√				
Activity 11: Establishment of Information Education and Communication (IEC) System	√	√	√	√			
Activity 12: 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 National Project Manager (NPM), who reports to the NPD and Steering Committee (StC). The NPM will work in close cooperation with the POPs Unit of the Ministry. StC 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 Joint-Secretary and SC Focal Point, who will be NPD. The StC 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 StC 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 NPM;
- evaluate the efficiency of the project management, including outcomes, and timelines;
- provide technical support to the NPM and working teams;
- approve the work plan with timelines and budget of the implementation of this Action Plan prior to submission to StC;
- agree on working arrangements and implementation plans with the NPM 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 National 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 reporting to the PMTC and the StC;
- appoint national experts (NPC and other experts) as necessary to undertake the various actions required during the course of the work, using terms of reference agreed by the StC and ensure the quality of their work;
- provide a secretariat function to the StC and PMTC;
- report regularly to the PMTC, and to the StC, 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 PMTC

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

Reporting to the Steering Committee on Implementation of Stockholm Convention (StC)

Technical and financial reports will also be requested by the StC to evaluate the efficiency of project implementation, including outcomes, the budget and timelines. Payment distribution will also depend on these reports. The NPM 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

In initial NIP, priorities 1, 2 were mainly related to "Measures to reduce or eliminate releases from intentional production and use" and both were completely addressed (**Table 3.1**) showing highest level of implementation of SC well before the targeted period, but priorities 6, 7 and 8 related to this activity were not addressed, thus they are taken as Priorities 2, 10 and 11 in the Reviewed and Updated NIP (**Tabe 3.2**).

3.3.2.1 Present situation in Nepal

With the disposal of old stock of obsolete pesticides and dechlorination of industrial chemical (PCBs), Nepal has no stock of intentionally produced POPs chemicals. As far as new POPs are concerned, endosulfan was banned in 2012 and Lindane is used for pharmaceutical propose only.

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

Nepal does not have any chemical industry but it imports the chemicals not listed under Stockholm and Rotterdam Conventions. As the government of Nepal has already banned the import and use of POPs pesticides and those listed under PIC procedure, there is legally no chance of production, import and use of any POPs and PIC pesticides. Moreover, the MOAD has banned some more non-POP pesticides such as phosphamidon, methyl parathion, monocrotophos, organomercury fungicides, which exhibit somewhat similar persistent characteristics.

3.3.2.3 Summaries of the result of POPs inventories

POPs pesticides and other obsolete pesticides amounting 74.51 mtons mentioned in the initial NIP were disposed off in an environmentally sound manner in 2011/12. During the implementation of Medium size project (MSP) for the management of PCB, a total of 532 mtons (385 mtons of transformer and 147 mtons of oil) of PCB contaminated equipment and oil was found, out of which only a total of 209 mtons of PCB equipment (155 mtons) and oil (54 tons) was treated by the mobile unit. It was due to the fact that the other PCB contaminated transformers and oil were not made available by the NEA for decontamination as they were not easily accessible or could not be removed from the grid or had already gone for repairing and maintenance or old oil was changed by NEA.

Endosulfan was imported till the year 2011/12, but due to regular information sharing among MOPE, MOAD and PRMD and also between PRMD and importers/retailers or farmers during trainings or counseling programmes, endosulfan and other pesticides under IA, IB and II of WHO category were already replaced (POPs and WHO IA & IB totally banned) by other pesticides like pyrethroids and carbamates in the recent years. Still, some pesticides under the Rotterdam Convention (PIC chemicals) like methyl parathion, monocrotophos and phosphamidon were not given the import license any more.

Government of Nepal has banned lindane for agricultural purpose already in 2001. According to the information provided by the Department of Drug Administration (DDA), it is still in use against the ectoparasites (lice and scabies), but the exact quantity was beyond the limit of institutional system, as the importing and producing companies were not submitting such data tot he DDA. During inventory, no stock of lindane was thus identified; however, DDA has now informed the importing and producing companies to go for the alternatives of lindane.

The amount of the POP-PBDEs in EEE/WEEE was calculated to be 15870 Kg to 46333 Kg, whereas in the transport sector it was 3139 Kg. Nepal may need to notify the convention secretariat that the TetraBDE and PentaBDE (c- PentaBDE) containing PUR foam may still be in seats of cars imported before 2005.

No HBCD was found as stock in Nepal, but it might be present in some products such as imported electric equipment. Though no information pertaining to import and use of PFOS, PFOS salts, PFOSF or PFOS related chemicals could be found during inventory preparation, it cannot be excluded that PFOS containing mixtures might still be imported to Nepal for certain use. It is therefore necessary for Nepal to notify about the acceptable purposes and specific exemptions for relevant uses in fire fighting purpose to the SC Secretariat.

The annual PCDD/F emission (336.0 gTEQ/y) calculated in 2005 was found to be 237.7 gTEQ/y when calculated on the basis of emission factors given in ToolKit 2013. This change in the value seemed to be due to new emission factors (EF) set for some source groups. The annual emission of PCDD/F for the base year 2014/15, calculated on the basis of Excel worksheet developed by UNEP (POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs.En) with new EFs, was found to be lower (174.7 gTEQ/y) than in 2005.

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

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 (Pesticide Act and EPA) as well as institutions (MOAD and MOEST) for effective implementation and monitoring of the regulatory provisions. At the same time these laws need to be amended, also in line 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).

3.3.2.5 Objectives and priorities of Action Plan

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

- Harmonization and amendment of relevant laws
- Establishment and strengthening of relevant institution (MOPE and MOAD)

3.3.2.6 Proposed Action Plan implementation process

Same as in sub-section 3.2.1.2

3.3.2.7 Implementation of Action Plan

Action Plan- 3.3.2 Activity: Measures to reduce or eliminate releases from intentional production and use		
Objectives	Harmonization and amendment of relevant laws	Establishment and strengthening of relevant institution (MOPE and MOAD)
Activities	Harmonization of sectoral laws and amendment with respect to time requirement and in line with Stockholm Convention	• Establishing and strengthening of institutional aspect of both line ministries (MOAD and MOPE) 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	MOPE and MOAD	MOPE and MOAD
Time Period	2018	2020
Estimated budget	USD 60,000	USD 50,000
Sources of Financing	National budget	National budget and development partners
Indicators of Success	• Amended laws	• Monitoring mechanism in place
Monitoring frequency	Yearly	Yearly

3.3.2.8 Implementation Performance Monitoring and Periodic Review Mechanisms

Same as in sub-section 3.2.1.3

3.3.3 Activity: Production, import and export, use, stockpiles and wastes of Annex A POPs pesticides

In initial NIP, priorities 1, 2 were related to "Production, import and export, use, stockpiles and wastes of Annex A POPs pesticides" and both were completely addressed (**Table 3.1**) showing highest level of implementation of SC. As the stock of old and new POPs belonging to Annex A was not found during inventory, this activity has not won high priority. However, priorities 10 and 11 in the Reviewed and Updated NIP (**Table 3.2**) are related to this activity. Regarding PBDE and HBCD, there was neither the production nor import, but these chemicals might be in some product and thus land ultimately in the waste.

3.3.3.1 Present situation in Nepal

With the environment friendly disposal of old stock of POPs pesticides and total ban on import of POPs pesticides, Nepal has no stockpile of such chemicals. Moreover, Nepal has neither developed nor ever produced old and new POPs pesticides. Some of the POPs contaminated sites however need remediation.

3.3.3.2 Objective and priorities of the Action Plan

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

- Contaminated sites remediated and stabilized
- Further accumulation of pesticides prevented

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

The initiation of MOAD to balance the supply-import/production and demand of pesticides, other than those listed under Stockholm and Rotterdam Convention has helped avoid further stockpiling. As given in **Table 2.28** (subsection 2.3.1.3) and **Table 2.35** (subsection 2.3.5.4 the sites where pesticides were stockpiled in the past are still contaminated and thus need remediation.

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

No stockpile of old and new POPs pesticides was identified during inventory preparation.

3.3.2.6 Proposed Action Plan implementation process

Same as in sub-section 3.2.1.2.

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		
Objectives	Contaminated sites remediated and stabilized	Further accumulation of pesticides prevented
Activities	• Site stabilization and remediation	• Establishment of a system for control of illegal import, application and balance between import and demand of pesticides
Expected Results	• Contaminated sites remediated and stabilized	• Illegal import stopped • Stockpiling controlled by importing only required quantities of pesticides
Responsible Institution	MOPE and MOAD	MOAD
Time Period	2020	2020
Estimated budget	USD 50,000	USD 20,000
Sources of Financing	National budget and development partners	National budget
Indicators of Success	• Area remediated and stabilized	• Number of illegal imports and pesticides import-use balance sheet
Monitoring frequency	Once a year	Once a year

3.3.3.7 Implementation Performance Monitoring and Periodic Review Mechanisms

Same as in sub-section 3.2.1.3

3.3.3.8 Information dissemination and Education program

The overall information on Pesticides, Chemicals and POPs are limited to a limited general public. Government agencies like MOAD through Department of Agriculture, Agriculture Information and Communication Centre, Pesticide Registration and Management Division have been disseminating 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, MOPE through its POPs Unit and NIP Implementation projects has continuously engaged various stakeholders in workshops and training programs.

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.

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 such issue is covered under Environmental Toxicology and is made part of the curriculum and research. But, the education on POPs completely depends upon the teachers acquainted with these issues, thus there is a need to widen the significance of such topics.

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

In initial NIP, priority 2 was related to this activity. With the decontamination and dechlorination of PCBs contaminated equipment and oil at Nepal Electricity Authority (NEA) during a medium size project on "Environmentally sound management of PCBs in Nepal", the known/identified stock of PCBs were disposed off. As new stock of PCBs at and above 50 ppm level was not found during the inventory preparation for Review and Update of NIP, this activity need not be carried out.

3.3.5 Activity: Production, import and export, use, stockpiles and wastes of Annex B chemicals (DDT and PFOS)

In initial NIP, priority 1 was mainly related to "Production, import and export, use, stockpiles and wastes of Annex B chemicals" and with the disposal of DDT this was completely addressed. But still some sites contaminated by POPs pesticides, including DDT, need to the decontaminated and remediated, which is categorized under 10 and 11 in the Reviewed and Updated NIP (**Table 3.2**).

3.3.5.1 Present situation in Nepal

With the environment friendly disposal of old stock of POPs pesticides including DDT and total ban on import of POPs pesticides, Nepal has no more DDT. No industry in Nepal was found to use PFOS, nor was there any import record of it. But their presence cannot be excluded as these compounds are under use in certain processes or in some materials, during production of which these chemicals might have been used.

3.3.5.2 Objective and priorities of the Action Plan

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

- Preparation of a countrywide PFOS inventory
- Further accumulation of PFOS containing product prevented

3.3.5.3 Summary of Annex B production, use, stockpiles, waste and contaminated sites

Regarding PFOS, there are indications that Nepal might have imported PFOS, PFOS salts, PFOSF or PFOS related chemicals, though during inventory the import record of these chemicals could not be found with the Custom and with the importers. But their presence cannot be excluded as these compounds are under use in certain processes or in some materials, during production of

which these chemicals might have been used or may be present in Production product/mixture or Production article/matrix.

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

No stockpile of PFOS and related chemicals were identified during inventory preparation, but there indications that some materials, during the production of which these chemicals might have been used.

3.3.5.5 Proposed Action Plan implementation process

Same as in sub-section 3.2.1.2

3.3.5.6 Implementation of Action Plan

Action Plan - 3.3.3 Activity: production, import and export, use, stockpiles and wastes of Annex B POPs		
Objectives	Preparation of a countrywide PFOS inventory	Further accumulation of PFOS prevented
Activities	• Preparation and adoption of strategy for PFOS inventory	• Establishment of a system for control of import, application and balance between import and demand of PFOS
Expected Results	• PFOS inventory prepared	• Import reduced
Responsible Institution	MOPE and MOI	MOI
Time Period	2018	2018
Estimated budget	USD 20,000	USD 20,000
Sources of Financing	National budget and development partners	National budget
Indicators of Success	• Inventory in place	• Quantity of imported items reduced
Monitoring frequency	Once a year	Once a year

3.3.5.7 Implementation Performance Monitoring and Periodic Review Mechanisms

Same as in sub-section 3.2.1.3.

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 chemicals. As the PFOS containing mixtures might still be imported to Nepal for certain use, it is necessary to notify about the acceptable purposes and specific exemptions for relevant uses in fire fighting purposes to the SC secretariat until Nepal goes for other affordable alternatives.

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

In initial NIP, priorities 3, 6 and 8 were mainly related to "Measures to reduce releases from unintentional production", but there was no significant development in this sector (**Table 3.1**). This activity is now included in the Updated NIP under priorities 7, 8 and 9 (**Table 3.2**).

3.3.7.1 Present situation of unintended POPs release in Nepal

The PCDD/F inventory prepared for the base year 2003 for different source categories had shown the annual release of 336.0gTEQ/y, which was found to be lower 237.7gTEQ/y when updated using new emission factors given in the new tool kit (UNEP-POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs.En2013).

Annual emission of PCDD/F for the base year 2014/15, when calculated on the basis of Excel worksheet developed by UNEP and using the new EFs, was still lower (174.7 gTEQ/y). There was some gap in the information, because of weak information updating or weak institutional memory; in such case the data of old inventory 2005 were used with the view that the emissions from these source categories are at least included in the present inventory. But, with the participation in international fora, GON has started to undertake the steps towards good environmental practices within the limits of its resources. There are the provisions made in Industrial Policy 2011 to encourage environment friendly and energy saving technology and to establish green industries. Establishment of electrical crematoria, increasing use of LPG in urban and even in some rural areas and ever-rising installation of bio-gas plants in rural settlements, real-time registration of forest fires as a step to control it jointly (mechanism established by MOFSC and ICIMOD) are some steps which might have helped reducing the releases of UPOPs from different source categories.

3.3.7.2 Objectives and priorities

The objectives of preparing action plan for this activity is to take action pursuant to article 5 of the convention to reduce the unintended release of PCDD/F, HCB, pentachlorobenzene 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, both old and new;
- 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.

There was no significant development in this area, though Nepal had already successfully completed some other activities of the initial NIP. Being a party and having the obligations to be fulfilled, article 5 of the Convention will be binding to Nepal. It is therefore pertinent that Nepal reviews and updates the National Implementation Plan and Action Plans to achieve foreseeable development in the future.

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 and application of CP, EE, EM technologies for release reduction from industrial processes and establishment.

3.3.7.4 Proposed Action Plan implementation process

Same as in sub-section 3.2.1.2.

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	Increase 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	
Activities	• Review and update inventory of Annex C POPs in Nepal	• Household energy switch for controlling emission of PCDD/Fs	• Capacity building activities	• Control of open burning of agriculture residues and forest fires	• Expansion of Electrical Crematoria	• Establishment of hazardous waste management facility	• Establishing system for long-term permanent monitoring and reporting on Annex C POPs	• Development of egulatory framework for release limit values
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
Responsible Institution	MOPE	MOPE, MOFSC, MOEn	MOPE	MOPE, MOAD, MOFSC	MOPE	MOPE, MOI, Municipalities	MOPE, SWMTSC, MOI	MOPE
Time Period	2018	2022	2020	2020	2020	2020	2018	2019
Estimated budget	USD 20,000	USD 60000	USD 10000	USD 40000	USD 100000	USD 3 million	USD 30000	USD 15000
Sources of Financing	National budget and development partners	National budget and development partners	National budget and development partners	National budget and development partners	Development partners	National budget and development partners	National budget and development partners	National budget
Indicators of Success	• Revised inventory	• Number of biogas plants and expanded electrification at affordable tariff	• Number of trainings	• Number of fire incidences	• Number of crematoria	• Established high temperature incinerator and landfill site	• Published annual reports	• Gazette notification of limit values
Monitoring Frequency	Quarterly	Yearly	Yearly	Yearly	Yearly	Quarterly	Yearly	Quarterly

3.3.7.6 Implementation Performance Monitoring and Periodic Review Mechanisms

Same as in sub-section 3.2.1.3.

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

3.3.8.1 Present situation in Nepal

Inventory of old and new POPs could not show the stockpiles of POPs chemicals. With the disposal of obsolete pesticides including POPs pesticides and PCBs during 2011 to 2014, Nepal has significantly contributed in reducing the global POPs burden. Yet, there is a need of detail inventory of articles which may contain new POPs, namely PBDE, HBCD and PFOS or of such articles during the production of which these POPs might have been used.

3.3.8.2 Objectives

The objective of the activity will be:

- Established procedures for elimination of releases from stockpiles and wastes.

3.3.8.3 Action Plan implementation process

Same as in sub-section 3.2.1.2.

Action Plan - 3.3.8 Activity: measures to reduce releases from stockpiles and wastes (article 6)			
Objectives	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 in Annex A, B or C.	• 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
Expected Results	• National level Mapping will be in place	• Extent of area and contamination will be known	• Procedures for elimination of releases established
Responsible Institution	MOPE	MOPE/MOAD	MOPE/MOAD /MOI
Time Period	2018	2020	2020
Estimated budget (USD)	10000	15000	30000
Sources of Financing	Development partners	Development partners	National budget and development partners
Indicators of success	• Number of proposed actions	• Number of activity reports	• Number of initiatives undertaken to eliminate the releases
Monitoring frequency	Quarterly	Half yearly	Half yearly

3.3.8.4 Implementation of Action Plan

3.3.8.5 Implementation Performance Monitoring and Periodic Review Mechanisms

Same as in sub-section 3.2.1.3.

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

3.3.9.1 Current situation in Nepal

Inventory of old and new POPs could not identify the stockpiles, articles and wastes containing POPs chemicals. The annual release of PCDD/F from different sources, articles or wastes is still high in a country where industrial development is still in infancy.

Among the new POPs listed by SC, the inventory of PBDE, HBCD and PFOS showed that these POPs chemicals were neither produced nor imported for industrial purpose in Nepal, but there were the imported items, which might contain some of the POPs or during the production (process) of which these POPs might have been used.

Detail study may be covered under PRTR, which may be considered as the next project for Nepal.

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.

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

3.3.9.3 Action Plan implementation process

Same as in sub-section 3.2.1.2.

3.3.9.4 Implementation of the Action Plan

Action plan - 3.3.9. Activity: 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 of new POPs	• Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee stockpiles, articles in use and wastes
Expected Results	• Prepared and adopted strategy for inventory completion	• Control mechanisms established Inspections bodies cooperating
Responsible Institution	MOPE	MOPE/MOI
Time Period	2019	2019
Estimated Budget	USD 50000	USD 25000
Source of Financing	National budget and development partners	National budget
Indicator of success	• Proposed actions/content of the strategy	• Number of cases cooperation among bodies
Frequency of Monitoring	Quarterly	Quarterly

3.3.9.5 Implementation Performance Monitoring and Periodic Review Mechanisms

Same as in sub-section 3.2.1.3.

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

Priorities 1, 2 in initial NIP, were mainly related to "Manage stockpiles and appropriate measures for handling and disposal of articles in use" and with the disposal of stockpiles of obsolete pesticides including POPs pesticides and dechlorination and decontmination of PCBs containing electrical equipment and oil used by NEA, this activity was successfully completed. The updated inventory could not reveal any new stocks of old and new POPs, but found lindane still in pharmaceutical use.

Nepal developed "Guidelines for Environmentally Sound Management of polychlorinated biphenyls" during the implementation a MSP on PCBs management to support the handling and disposal of PCBs.

As there is no identified stock of POPs, Nepal should focus on other priority activities such as developing PRTR, which would address this activty, as well.

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

In initial NIP, priority 1 partially covered this activity, but among the contaminated sites identified, only one pesticide warehouse was internally cleaned and contaminated materials including the packaging steel drums were disposed off. Because of major activity on remediation of contaminated sites still remaining, Updated NIP has taken it as one of the priorities.

3.3.11.1 Situation in Nepal

Not much has been done under this activity during the implementation of initial NIP. Almost all 24 sites contaminated by POPs pesticides need to be remediated. Likewise, PCBs contaminated transformer maintenance/repairing workshops of NEA also need to be remediated. PCDD/F hotspots like landfill sites, cremation sites and industries need to be properly studied for their level of PCDD/F. 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.

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 Prioritization 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:

- Prepare environmental assessment of contaminated areas;
- Prepare strategy for contaminated areas recovery;
- Carry out decontamination activities

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.

3.3.11.5 Action Plan implementation process

Same as in sub-section 3.2.1.2.

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, based on the impact of contamination on human health or its environmental risk	• Preparation of technological and technical work procedures	• Carrying out the decontamination activities
Expected Results	• Prepared strategy	• Methodology for Assessment defined	• Priorities set	• Prepared procedures	• Decontamination activities realized
Responsible Agencies	MOPE, MOAD, NEA	MOPE and relevant ministries	MOPE, MOAD, NEA	MOPE, MOAD, NEA	MOPE, MOAD, NEA
Time Period	2019	2019	2020	2020	2022
Estimated Budget	USD 15000	USD 10000	USD 8000	USD 6000	USD 150000
Financing Source	National budget and development partners	National budget and development partners	National budget and development partners	National budget and development partners	National budget and development partners
Indicators of Success	• Proposed action. content of strategy	• Structure of the methodology	• List of priorities • Identified environmental and human health impacts	• Procedures adopted	• Number and area of remediated sites
Monitoring Frequency	Quarterly	Quarterly	Six monthly	Quarterly	Six monthly

3.3.11.7 Implementation Performance Monitoring and Periodic Review Mechanisms

Same as in sub-section 3.2.1.3.

3.3.12 Activity: facilitating or undertaking information exchange and stakeholder involvement

3.3.12.1 Present situation in Nepal

This situation has not changed since the time of preparation of initial NIP. 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:

- Enhance the capacity of National Focal Point at MOPE and update the list of stakeholders
- Establish system of information exchange (on POPs related issue) between National Focal Point and the stakeholders.

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

- Capacity building of National Focal Point for an efficient information exchange
- Prepare a list of national and international stakeholders
- Establish a network for cooperation, data and information exchange among responsible institutions
- Establish formats for exchange of information related to POPs.

3.3.12.3 Action Plan implementation process

Same as in sub-section 3.2.1.2.

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	Enhance the capacity of National Focal Point at MOPE and update the list of stakeholders		Establish system of information exchange (on POPs related issue) between National Focal Point and the stakeholders	
Activities	• Capacity building of National Focal Point for an efficient information exchange	• Preparation of stakeholders list	• Establishment of a network for cooperation, data and information exchange among responsible institutions	• 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 exchange	• Formats developed
Responsible Institution	MOPE	MOPE	MOPE, stakeholder organizations	MOPE
Time Period	2018	2018	2019	2019
Estimated budget	USD 10 000	USD 5000	USD 10000	USD 10000
Sources of Financing	National budget	National budget	National budget	National budget
Indicators of Success	• Functional National Focal point	• Stakeholders list in place	• Quantity of information provided to National Focal Point	• Structure of formats
Monitoring Frequency	Quarterly	Quarterly	Quarterly	Quarterly

3.3.12.5 Implementation Performance Monitoring and Periodic Review Mechanisms

Same as in sub-section 3.2.1.3.

3.3.13 Activity: Public awareness, information and education (article 10)

In initial NIP, priority 2 were mainly related to "Public awareness, information and education" and it was partially completed (**Table 3.1**) through different activities carried out during the disposal of obsolete pesticides and decontamination and dechlorination of PCBs. As this activity needs to be carried out throughout the implementation of SC also in the future, it is again given priority 2 in the NIP Update (**Table 3.2**).

3.3.13.1 Present situation in Nepal

Awareness programmes carried out by MOAD have helped in developing the knowledge on the pesticides. Also, the trainings and other interactions done in the course of pesticide disposal and PCBs dechlorination/decontamination during the implementation of initial NIP have created public awareness, especially on POPs pesticides and PCBs. But the awareness on PCDD/F is felt, especially in industry sector. 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 give continuity to the awareness raising and to deal with 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 potentially POPs containing products, elimination or reduction of emission or release of PCDD/F, PRTR, the alternative solutions, etc. should be developed in line with the Convention to implement through the Updated NIP. The Priority Validation Workshop organized during the Inventory preparation for Updated NIP has again given public awareness, information and education high priority (Section 3.2.5, **Table 3.1 and 3.2**). At present, very limited information on the PCDD/F and some of the new POPs (PBDE, HBCD and PFOS) is available in the Nepalese context.

Major section of the Nepalese population, including the concerned government stakeholders and NGOs conducting various activities related to environment; need to be made aware of the national and international efforts in controlling or abolishing hazardous chemicals. Though the problems due to POPs have been felt since 2004, the base for national action on introduction to the general public and to directly involve them in the decision making process need to be given priority in the strategy for raising public awareness as a main activity 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 were conducted in the recent past during the implementation of initial NIP by using various communication methods/media/tools for different target groups but the actual impacted data is still not 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 given in continuation with those started during the initial NIP and will focus 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 will be based on the following objectives:

- Educate and train government officials and business sector representatives for implementation of the Convention;
- National education system to incorporate POPs information and disseminate through education (curricula)
- Educate general public including women and least educated ones on principles and objectives of Stockholm Convention

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

- Preparation of training manuals and materials and realization of trainings for government officials and business sector at different levels and for different target groups;
- Introduction of courses on POPs at school and university level;
- Educational activities to focus on POPs, their sources, applications, uses and hazards and management of POPs wastes
- Preparation of awareness materials on POPs release, impact on human health and environment, handling of POPs contaminated materials and wastes, POPs management, etc.

3.3.13.4 Action Plan implementation process

Same as in sub-section 3.2.1.2.

3.3.13.5 Implementation of Action Plan

Action Plan – 3.3.13 Activity: public awareness, information and education (article 10)				
Objectives	Educate and train government officials and business sector representatives for implementation of the Convention	National education system to incorporate POPs information and disseminate through education		Educate general public for principles and objectives of Stockholm Convention
Activities	• Preparation and realization of training for government officials and business sector at different levels and for different target groups	• Introduction of courses on POPs at school and university level	• 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 risks of POPs
Expected Results	• Trained officials and business sector representatives	• School and university curricula incorporated POPs related 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 POPs adverse impacts • Public aware on principles of Stockholm Convention

Responsible Institution	MOPE and concerned ministries	MOPE, MOEd, Universities	MOPE, MOEd, Universities	MOPE
Time Period	2018	2018	2018	2018
Estimated budget	USD 50000	USD 25000	USD 10000	USD 10000
Sources of Financing	National budget and development partners	National budget and business sector support	National budget and development partners	National budget and development partners
Indicators of Success	• Number of trainings completed • Number of participants • Level of awareness and knowledge in officials and business sector representatives	• Curricula/Courses focused on POPs	• Level of knowledge on POPs in teachers and students • Number of studies/researches on POPs	• Number of people trained • Visible change in people's attitude on POPs
Monitoring Frequency	Six monthly	Six monthly	Six monthly	Six monthly

3.3.13.6 Implementation Performance Monitoring and Periodic Review Mechanisms

Same as in sub-section 3.2.1.3.

3.3.14 Activity: Effectiveness evaluation (article 16)

There is no significant change in Nepal in this activity since the time of initial NIP. Nepal therefore needs to establish/create a monitoring system to facilitate effectiveness evaluation of the Updated 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 old and new POPs chemicals. This activity may need USD 10000 till 2020 and will be managed by the state budget.

3.3.15 Activity: Reporting

3.3.15.1 Current reporting requirements and principles

As Nepal could not make significant progress in this activity, it would be desirable to establish a reliable information system to ensure the availability of sufficient and reliable data. Information provided by the system should cover two main areas:

- Statistical data on the POPs chemicals listed in Annexes A and B, which may be obtained from the public or from research institutes, including NGOs.
- Data on current and projected emissions and releases of Annex C POPs.

The assessment of the future emissions and releases of POPs, especially new POPs and PCDD/F 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, has been given high priority in the Updated NIP.

International requirements that can be attracted in Nepalese condition is the PRTR register (paragraph 5 of Article 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 the initial and updated NIP so far.

The implementation of an information system for individual emission sources should involve:

- Development and introduction of adequate legal regulations;
- Ensuring financing;
- Development and introduction of an electronic information management system;
- Training to the staff operating the system.

3.3.15.2 Objectives and priorities of the Action Plan

The 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.

Main activities undertaken to meet the above objective will be:

- 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 POPs, if any;
- 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	As given 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)	Included in 3.3.7	State budget and donor agencies
Article 7: Review and Update 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 to be specified in a decision to the Conference of the Parties	Transmission to the Conference of the Parties within two years of the date on which the Convention enters into force for that Party.	USD 129000 (for review and update the plan)	State budget and donor agencies

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, a 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	State budget
Article 16: Effectiveness evaluation	Requires an evaluation of effectiveness in four 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	No PCBs stock in Nepal, as the identified stock is already disposed of		
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 NPD and POPs Unit in the MOPE will be responsible for the fulfillment of these requirements. The POPs Unit will provide the required information and report 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.

3.3.16 Activity: Research, development and monitoring (article 11)

3.3.16.1 Present situation in Nepal

Due to resource limitations, Nepal has not been able to make the desired progress during the implementation of initial NIP in the field of human resources and laboratory strengthening necessary for contemporary research at par with other countries, which are generating the country specific information and data in the area of POPs. Unfortunately there is no assessment of Annex C POPs and the analysis of old and new POPs chemicals in different compartments of environment have not been realized. Most of the research has focused only on estimating the presence of POPs chemicals using UNEP Toolkits, also for new POPs. As the research, development and monitoring remain continuous process, activities proposed in the initial NIP are still evident.

3.3.16.2 Objectives for research, development and monitoring

Release of POPs into the environment has been increasing with the increasing industrialization, but the required compliance with the emission standards for Annex C POPs has not taken place. Government laboratories are not properly equipped and the private laboratory might not be interested for investing huge resources on developing PCDD/F analysis facility. Government of Nepal should make necessary arrangements for establishing state of the art laboratories for analysis of POPs and other hazardous chemicals in the environmental samples.

Also, the laboratories of academic institutions and those of private sector laboratories, which are providing limited services, should be encouraged through proper policies to upgrade their facilities, so that they can contribute in the research and development. The government can also take their services in monitoring as and when required. Thus the objectives of the research, development and monitoring should be:

- Establish a network for cooperation, data and information exchange of scientific institutions involved in POPs research activities;
- Establish and adopt an internationally accepted system of standardization of methods for residue analysis in abiotic and biotic matrices;
- Develop system of quality assurance and quality control in Nepalese laboratories.

In order to achieve the above 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.

3.3.16.3 Action Plan implementation process

Same as in sub-section 3.2.1.2.

3.3.16.4 Implementation of Action Plan

Action Plan – 3.3.16 Activity: research, development and monitoring (article 11)							
Objectives	Establish network for cooperation, data and information exchange of scientific institutions involved in POPs research activities			Establish and adopt an internationally accepted system of standardization of methods for residue analysis in abiotic and biotic matrices		Develop 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 of standardization	• 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 research 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	MOPE	Concerned organizations and NGOs	Concerned organizations and NGOs	MOPE, NBSM	MOPE, academia, concerned organizations	MOPE, NBSM	MOPE, concerned organizations
Time Period	2018	2020	2020	20220	2020	2020	2020
Estimated budget	USD 5000	USD 2500000	USD 10000	USD 100000	USD 100000	USD 60000	USD 60000
Sources of Financing	National budget	Development partners	National budget	National budget and development partners	Development partners	Development partners	Development partners
Indicators of Success	• Number of organizations listed in the inventory	• Facilities in the new and previously established labs	• Amount of information and data exchanged • Number of cases of cooperation	• Structure of the system	• Number of institutions adopting the system	• Structure of standards gazetted	• Number of institutions adopting the standards
Frequency of Monitoring	Quarterly	Once a year	Once a year	Once a year	Once a year	Once a year	Once a year

3.3.16.5 Implementation Performance Monitoring and Periodic Review Mechanisms

Same as in sub-section 3.2.1.3.

3.3.17 Activity: Technical and financial assistance (articles 12 and 13)

3.3.17.1 Eligibility

Nepal is among the least developed countries with very weak economy and low infrastructures for development, yet it has shown its commitments to fulfill the obligations of the Convention. In this regards, it has successfully carried out the disposal of obsolete pesticides including the POPs pesticides and dechlorination and decontamination of PCBs, for which it could secure the required financial and technical support from international organizations and its development partners. Implementation of the planned measures and activities mentioned in the Updated NIP demands financial resources also in the future. As Nepal alone cannot carry out such activities within the limits of its resources, it is dependent on external financial assistance, either from bilateral donor support or from international communities. By successfully carrying out the activities prioritized in the initial NIP and thus reducing the global POPs burden before the targeted period and updating the NIP, Nepal has made itself eligible to technical and financial assistance that can be anticipated in the future.

3.3.17.2 Identified areas of technical assistance needs and priorities

With the elimination of obsolete pesticides and PCB-contaminated dielectric fluid, decontamination of electrical equipment, some progress made in legal harmonization and in awareness raising and capacity building Nepal has addressed the major priorities of the initial NIP. However, some activities like remediation of contaminated sites and control of PCDD/F emissions for different source categories through BEP, BAT, CP, EMS need to be addressed; also the updated inventory of pollutants and their sources is of priority for future management of POPs and other hazardous substances/wastes. The aim of this activity is to achieve support for priority 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 implementation of action plans and the activities mentioned in the Updated NIP is relatively high. Similar to the past where Nepal could harness the required support from international organizations and its development partners in managing the POPs chemicals, technical and financial assistance will be required. Being a Party to Stockholm Convention and successfully completing the disposal of POPs chemicals before the target of 2025, Nepal has won the trust of such organizations and partners.

3.3.17.4 Assessment of the requested technical and financial Assistance

Technical assistance will be required mainly in site remediation and developing inventory and updating the status of POPs pollutants in environment (development of PRTR) by building the required capacity in terms of laboratory facilities and human resources. 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

With the support of international organizations and development partners, Nepal managed to get rid of old stocks of POPs either by exporting to Germany or disposing within the country by temporarily importing the required technology. Since the management of ever increasing POPs will not be possible by exporting or temporarily importing the technology, Nepal needs to develop its own capacity. 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, preparation of emission and release factors, and others. Then only reliable information on sources, 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-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 as Nepal cannot afford to allocate all budget required from its national budget.

Nepal needs to regularly monitor the level of POPs in different compartments of the environment including in the biota and for this a new monitoring method will be required. Establishment of required facilities in government organizations, e.g. in Department of Environment under MOPE for monitoring and research facilities in appropriate institutions and laboratories for regular data and information generation would be necessary and this also will require additional support.

Very large part of the Nepalese population is still unaware of the old and new POPs and their severe impacts on human health and environment. Efforts of the past in creating awareness on old POPs were not adequate, and addition of new POPs by the Convention has led to the need of a countrywide and massive awareness campaign in different forms and through different fronts; this also demands additional professional support and financial resources.

The most difficult and complex 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
- Introduction of BEP, BAT, CP, EMS in the industries and effective monitoring.

Substantial 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

Reviewed and Updated 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 future versions of the NIP, which will be updated in line with the Stockholm Convention.

3.5 Timetable for NIP implementation

Timetable for the Updated NIP is developed for next five years (up to 2022) (Table 3.5), as Stockholm Convention mentions that NIP should be updated every five years. Estimated budget for different activities is proposed for 5 years; however, some activities may go beyond this period for which such estimation is not done **(Table 3.6).**

Table 3.5: Activities and timeline for next 5 years (till 2022)

Activity	Schedule						
	2017	2018	2019	2020	2021	2022	2030
3.3.1: Institutional and regulatory strengthening measures							
•Establishment of an Enforcement Agency for Environmental Requirements under MOPE	+	+					
•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	+	+	+	+			
•Amen ding current legislation	+	+	+	+			
•Ban on the use of chemicals potential for generating POPs	+	+	+	+			
•Ban on open burning of kitchen and garden waste in urban areas	+	+	+	+			
•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							
•Harmonization and amendment of relevant laws	+	+					
•Establishment and strengthening of relevant institution (MOPE and MOAD)	+	+	+	+			
3.3.3: Production, import and export, use, stockpiles and wastes of Annex A POPs pesticides							

Activity	Schedule						
	2017	2018	2019	2020	2021	2022	2030
•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)							
No activity proposed as the old sock of PCBs is disposed off							
3.3.5: Production, import and export, use, stockpiles and wastes of DDT (Annex B chemicals) if used in the country							
No activity proposed for DDT as its old sock is disposed off							
•Preparation of a countrywide PFOS inventory	+	+					
•Further accumulation of PFOS prevented	+	+					
3.3.6: Register for specific exemptions and the continuing need for exemptions (article 4)							
Nepal has not registered for exemption of Annex B chemical							
3.3.7: Measures to reduce releases from unintentional production (article 5)							
•Review and Update 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	+	+	+	+			
•Expand Electrical Crematoria	+	+	+	+			
•Establish hazardous waste management facility	+	+	+	+	+	+	
•Establishing system for long-term permanent monitoring and reporting on Annex C POPs	+	+					
•Develop regulatory framework for release limit values	+	+	+				
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.	+	+					
•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	+	+	+	+			
3.3.9: Identification of stockpiles, articles in use and wastes							
•Preparation and adoption of a strategy for inventory of new POPs	+	+	+				

Activity	Schedule						
	2017	2018	2019	2020	2021	2022	2030
•Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee stockpiles, articles in use and wastes	+	+	+				
3.3.10: Manage stockpiles and appropriate measures for handling and disposal of articles in use							
No activity foreseen under this at the moment							
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							
•Capacity building of National Focal Point at MOPE	+	+					
•Preparation of stakeholders list	+	+					
•Establishment of a network for cooperation, data and information exchange among responsible institutions	+	+	+				
•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 and business sector at different levels and for different target groups	+	+					
•Introduction of courses on POPs at school and university level	+	+					
•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	+	+					

Activity	Schedule						
	2017	2018	2019	2020	2021	2022	2030
•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 of standardization	+	+	+	+			
•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 research 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)

Table 3.6: Estimated budget (in USD) for different activities for 5 years, up to 2022

Activity	2017	2018	2019	2020	2021	2022	2030	Total
3.3.1: Institutional and regulatory strengthening measures	**768500**	**768500**	**508000**	**508000**	**500000**	**500000**		**3553000**
•Establishment of an Enforcement Agency for Environmental Requirements under MOPE	250000	250000						500000
•Establishment of Interagency Coordination Mechanism	1000	1000						2000
•Implementation of Action Plan on Stockholm Convention	Estimated budget for the given year at the end of each column							
•Coordination and Cooperation between Basel, Rotterdam, Stockholm Conventions in Nepal	1000	1000	1000	1000				4000
•Cooperation and Coordination of Activities Concerning Promotion of BAT and BEP	1000	1000	1000	1000				4000
•Amendment of current legislation	3000	3000	2000	2000				10000
•Ban on the use of chemicals potential for generating POPs	1000	1000	1000	1000				4000
•Ban on open burning of kitchen and garden waste in urban areas	1000	1000	1000	1000				4000
•Formulation of Hazardous Chemicals Management Rules	2500	2500						5000

Activity	2017	2018	2019	2020	2021	2022	2030	Total
•Harmonization of sector legislation	5000	5000						10000
•Establishing Information Education and Communication (IEC) System	3000	3000	2000	2000				10000
•Further strengthening and expanding the scope of alternate energy program for household & industrial use	500000	500000	500000	500000	500000	500000	+	3000000
3.3.2: Measures to reduce or eliminate releases from intentional production and use	**30000**	**30000**	**25000**	**25000**				**110000**
•Harmonization and amendment of relevant laws	5000	5000						10000
•Establishment and strengthening of relevant institution (MOPE and MOAD)	25000	25000	25000	25000				100000
3.3.3: Production, import and export, use, stockpiles and wastes of Annex A POPs pesticides	**10000**	**20000**	**20000**	**20000**				**70000**
•Site stabilization and remediation	5000	15000	15000	15000				50000
•Establishment of a system for control of illegal import, application and balance between import and demand of pesticides	5000	5000	5000	5000				20000
3.3.4: Production, import and export, use, identification, labelling, removal, storage and disposal of PCBs and equipment containing PCBs (Annex A)								**0**
No activity proposed as the old sock of PCBs is disposed off								0
3.3.5: Production, import and export, use, stockpiles and wastes of DDT (Annex B chemicals) if used in the country	**20000**	**20000**						**40000**
No activity proposed for DDT as its old sock is disposed off								0
•Preparation of a countrywide PFOS inventory	10000	10000						20000
•Further accumulation of PFOS prevented	10000	10000						20000
3.3.6: Register for specific exemptions and the continuing need for exemptions (article 4)								**0**

Activity	2017	2018	2019	2020	2021	2022	2030	Total
3.3.7: Measures to reduce releases from unintentional production (article 5)	**578000**	**578000**	**552000**	**547000**	**510000**	**510000**		**3275000**
•Review and Update inventory of Annex C POPs in Nepal	10000	10000						20000
•Household energy switch for controlling emission of PCDD/Fs	10000	10000	10000	10000	10000	10000		60000
•Capacity building activities	3000	3000	2000	2000				10000
•Controlling open burning of agriculture residues and forest fires	10000	10000	10000	10000				40000
•Expand Electrical Crematoria	25000	25000	25000	25000				100000
•Establish hazardous waste management facility	500000	500000	500000	500000	500000	500000		3000000
•Establishing system for long-term permanent monitoring and reporting on Annex C POPs	15000	15000						30000
•Develop regulatory framework for release limit values	5000	5000	5000					15000
3.3.8: Measures to reduce releases from stockpiles and wastes (article 6)	**12500**	**20000**	**15000**	**7500**				**55000**
•Identify and Mapping of Stockpiles, Products, and articles consisting of or containing chemicals listed either in Annex A, B and C.	5000	5000						10000
•Determination of the extent of the contaminated areas and determination of the level of contamination	2500	5000	5000	2500				15000
•Establishment of procedures for elimination of releases from stockpiles and wastes	5000	10000	10000	5000				30000
3.3.9: Identification of stockpiles, articles in use and wastes	**15000**	**30000**	**30000**					**75000**
•Preparation and adoption of a strategy for inventory of new POPs	10000	20000	20000					50000
•Preparation and establishment of control mechanisms and cooperation of inspection bodies to oversee stockpiles, articles in use and wastes	5000	10000	10000					25000
3.3.10: Manage stockpiles and appropriate measures for handling and disposal of articles in use								**0**

Activity	2017	2018	2019	2020	2021	2022	2030	Total
No activity foreseen under this at the moment								
3.3.11: Identification of contaminated sites (Annex A, B and C Chemicals) and remediation in an environmentally sound manner	**22000**	**32000**	**42000**	**33000**	**30000**	**30000**		**189000**
•Preparation of an implementation strategy for these activities	5000	5000	5000					15000
•Preparation of a methodology of the assessment	3000	3000	4000					10000
•Prioritization of contaminated areas for their recovery, taking into account mainly the impact of contamination on human health or its environmental risk	2000	2000	2000	2000				8000
•Preparation of technological and technical work procedures	2000	2000	1000	1000				6000
•Carrying out the decontamination activities	10000	20000	30000	30000	30000	30000		150000
3.3.12: Facilitating or undertaking information exchange and stakeholder involvement	**15000**	**14000**	**6000**					**35000**
•Capacity building of National Focal Point at MOPE	5000	5000						10000
•Preparation of stakeholders list	3000	2000						5000
•Establishment of a network for cooperation, data and information exchange among responsible institutions	3000	4000	3000					10000
•Definition of formats for information exchange on POPs	4000	3000	3000					10000
3.3.13: Public awareness, information and education (article 10)	**40000**	**55000**						**95000**
•Preparation and realization of training for government officials and business sector at different levels and for different target groups	20000	30000						50000
•Introduction of courses on POPs at school and university level	10000	15000						25000

Activity	2017	2018	2019	2020	2021	2022	2030	Total
•Educational activities focusing on POPs, their sources, applications, uses and hazards and management of POPs wastes	5000	5000						10000
•Preparation and implementation of countrywide information and educational campaign concerning hazards of POPs	5000	5000						10000
3.3.14: Effectiveness evaluation (article 16)								**0**
3.3.15: Reporting	**0**	**0**	**0**	**0**	**0**	**10000**		**10000**
3.3.16: Research, development and monitoring (article 11)	**565000**	**605000**	**1103000**	**562000**				**2835000**
•Preparation of an inventory of institutions involved in POPs research activities	3000	2000						5000
•Establishment of new and strengthening of existing labs at national level	500000	500000	1000000	500000				2500000
•Establishment of a network for cooperation, data and information exchange among these institutions	2000	3000	3000	2000				10000
•Establishment of internationally accepted system of standardization	20000	30000	30000	20000				100000
•Development of scheme for adoption of the system by research/ scientific institutions	20000	30000	30000	20000				100000
•Development of standards for quality assurance and control	10000	20000	20000	10000				60000
•Development of scheme for adoption of the standards by research institutions	10000	20000	20000	10000				60000
3.3.17: Technical and financial assistance (articles 12 and 13)								**0**
Estimated for NIP Implementation for the given year	**2076000**	**2172500**	**2301000**	**1702500**	**1040000**	**1050000**		**10342000**

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ANNEXES

Annex I: Food Commodity and Maximum Residue Limits (MRLs) of Pesticides (DFTQC)

S.N.	Pesticide type	Food Commodity	MRL (mg/Kg)
1	Aldrin, Dieldrin	Food grains, legumes and pulses Skimmed milk powder, whole milk powder Processed drinking water	0.01 0.15 0.03
2	Benomyl	Skimmed milk powder, whole milk powder Processed drinking water	0.1 0.1
3	Carbaryl	Food grains, legumes and pulses	1.5
4	Carbendazim	Food grains, legumes and pulses Skimmed milk powder, whole milk powder	0.50 0.1
5	Carbofuran	Food grains, legumes and pulses Skimmed milk powder, whole milk powder	0.10 0.1
6	Chlordane	Food grains, legumes and pulses Skimmed milk powder, whole milk powder Processed drinking water	0.02 0.05 0.03
7	Chlorfenvinphos	Food grains, legumes and pulses Skimmed milk powder, whole milk powder	0.025 0.2
8	Chlorpyrifos	Food grains, legumes and pulses Skimmed milk powder, whole milk powder	0.05 0.01
9	Cypermethrin	Skimmed milk powder, whole milk powder	0.05
10	DDT	Food grains, legumes and pulses Skimmed milk powder, whole milk powder Processed drinking water	Absence 0.02 1.0
11	2-4D	Food grains, legumes and pulses Skimmed milk powder, whole milk powder Processed drinking water	0.01 0.05 100.00
12	Diazinon	Food grains, legumes and pulses	0.05
13	Dicamethrin / Deltamethrin	Food grains, legumes and pulses	0.50
14	Dichlorvos	Food grains, legumes and pulses	1.00
15	Dithiocarbamates	Food grains, legumes and pulses	0.20
16	Edifenphos	Skimmed milk powder, whole milk powder	0.05
17	Ethion	Skimmed milk powder, whole milk powder	0.50
18	Fenthion	Food grains, legumes and pulses Skimmed milk powder, whole milk powder	0.10 0.01
19	Fenitrothion	Food grains, legumes and pulses Skimmed milk powder, whole milk powder	0.02 0.05
20	Fenvalerate	Skimmed milk powder, whole milk powder	0.05
21	Heptachlor	Food grains, legumes and pulses Skimmed milk powder, whole milk powder Processed drinking water	0.01 0.15 0.10
22	Hexachlorobenzene	Processed drinking water	0.01
23	Hydrogen cyanide	Food grains, legumes and pulses	37.05
24	Hydrogen phosphate	Food grains, legumes and pulses	0.02
25	Inorganic bromide	Food grains, legumes and pulses	25.00
26	Lindane	Food grains, legumes and pulses Skimmed milk powder, whole milk powder	0.01 0.01

S.N.	Pesticide type	Food Commodity	MRL (mg/Kg)
		Processed drinking water	3.00
27	Malathion	Food grains, legumes and pulses	4.0
28	Monocrotophos	Food grains, legumes and pulses Skimmed milk powder, whole milk powder	0.025 0.02
29	Oxydemeton methyl	Food grains, legumes and pulses	0.02
30	Paraquat dichloride	Food grains, legumes and pulses	0.025
31	Phenthoate	Food grains, legumes and pulses Skimmed milk powder, whole milk powder	0.05 0.01
32	Phorate	Food grains, legumes and pulses Skimmed milk powder, whole milk powder	0.05 0.01
33	Phosphamidon	Food grains, legumes and pulses	0.05
34	Pirimiphos-methyl	Skimmed milk powder, whole milk powder	0.05
35	Pyrethrins	Food grains, legumes and pulses	Absence
36	Trichlorfon	Food grains, legumes and pulses	0.05

Source: Lama, J.P (2008)

Annex II: Data on Import of different formulations of Lindane (Gamma benzene hexachloride) made available by the Department of Drug Administration till January 4, 2016.

1857, GAMMA BENZENE HEXACHLORIDE — 2016/01/04

Prod Code	Name	Strength	Dosage Form	Manufacturer	Validity
497	ASCABIOL	1%W/V	INJS		/ /
136244	ASCABIOL (100 ML)	1% W/V	EMUE	ABBOTT HEALTHCARE PV	2012/01/30
46/197	G.B.LOTION(*NA)	1% W/V	LOTN	CUREX PHARMACEUTICAL	2010/04/16
137063	GAMABEN (100 ML)	1% W/V	LOTN	NOVA GENETICA PVT.LT	2011/11/15
137743	GAMABEN (100 ML)	1% W/V	LOTN	NOVA GENETICA PVT.LT	2011/11/12
137061	GAMABEN (25 GM)	1% W/W	CREA	NOVA GENETICA PVT.LT	2011/11/15
137062	GAMABEN (50 ML)	1% W/V	LOTN	NOVA GENETICA PVT.LT	2011/11/15
142557	GAMACIT CREAM	0.1 %W/W	CREA	SHIV PHARMACEUTICAL	2014/07/16
3906	GAMACIT CREAM (20 GM)	1 %W/W	CREA	SHIV PHARMACEUTICAL	2010/07/16
139373	GAMEX	1% W/V	LOTN	NOVA GENETICA PVT.LT	2012/11/11
3907	PEDISCAB	1 % W/V	LOTN	MANOJ PHARMACEUTICAL	2010/07/15
142556	PEDISCAB (60ML)	0.1 % W/V	LOTN	MANOJ PHARMACEUTICAL	2010/07/15
137410	SAICOBEX LOTION (100 ML)	1% W/V	LIQD	SHREE RAM PHARMACEUT	2010/07/25
137411	SAICOBEX LOTION (450 ML)	1% W/V	LIQD	SHREE RAM PHARMACEUT	2010/07/25
137409	SAICOBEX LOTION (50 ML)	1% W/V	LIQD	SHREE RAM PHARMACEUT	2010/07/25
4474	SARCOBEX (110ML)	1 %W/W	LOTN	LOMUS PHARMACEUTICAL	2010/01/06
114/364	SARCOBEX -C (20 GM)	1% W/W	CREA	LOMUS PHARMACEUTICAL	2010/01/06
134387	SCABCUR LOTION (1 LTR)	1% W/W	LOTN	LEBEN LABORATORIES P	2009/03/26
134386	SCABCUR LOTION (100 ML)	1% W/W	LOTN	LEBEN LABORATORIES P	2013/03/26
4477	SCABCUR LOTION (60 ml)	1% W/V	LOTN	LEBEN LABORATORIES P	2010/06/11
4479	SCABEX	1%W/V	LOTN	INDOCO REMEDIES LIMI	/ /
4480	SCABEX-S CREAM	1%w/v	CREA	INDOCO REMEDIES LIMI	/ /
138/241	SCABEZ CREAM (25 GM)	1% W/W	CREA	NEPAL PHARMACEUTICAL	2015/02/14
138/196	SCABEZ (100 ML)	1% W/V	LOTN	NEPAL PHARMACEUTICAL	2015/02/14
4481	SCABOMA CREAM	1%W/V	CREA	GLENMARK PHARMACEUTI	2010/08/05
4482	SCABOMA LOTION	1%W/V	LOTN	GLENMARK PHARMACEUTI	2010/08/05
270/205	SCADERM CREAM (25 GM)	1%W/V	CREA	S.R. DRUG LABORATORI	/ /
270/219	SCADERM LOTION (60 ML)	1%W/V	LOTN	S.R. DRUG LABORATORI	2015/04/16
156/410	SCAMEL	1% W/V	EXSO	PHARMACO INDUSTRIES	/ /
136882	SCAMEL (100 ML)	1 %	ORSU	PHARMACO INDUSTRIES	2010/07/14
136881	SCAMEL (450 ML)	1%	ORSU	PHARMACO INDUSTRIES	2010/07/14
4484	SCAMEL (60ML)	1%	EXSO	PHARMACO INDUSTRIES	2010/07/14
136970	SCAMEL CREAM	1% W/W	CREA	PHARMACO INDUSTRIES	2015/07/15
4485	SCARAB CREAM (25 GM)	1%W/W	CREA	ARISTO PHARMACEUTICA	2010/07/22
4486	SCARAB LOTION	1%W/V	LOTN	ARISTO PHARMACEUTICA	2010/07/22
134/66	SCAZEN CREAM 25 GM	1 %W/W	CREA	NATIONAL HEALTH CARE	2009/12/29
134/67	SCAZEN LOTION 100ML	1%W/W	LOTN	NATIONAL HEALTH CARE	2009/12/29

Annex III: Updated Activity data (based on UNEP Toolkit 2012) for different source categories (Group/ Category/ Class) for UPOPs releases for the year 2003.

Group	Category	Class	Source Category	Activity Data	Source
1			Waste Incineration		
	c.		*Medical waste incineration*		
		1	Uncontrolled batch combustion, no APCS	300 t/a	Inventory, 2005
2			Ferrous and Non-Ferrous Metal Production		
	c.		*Iron and steel production plants and foundries*		
		2	Clean scrap/virgin iron or dirty scrap, afterburner, fabric filter	400309 t/a	DOI, 2004
			Foundries		
		1	Cold air cupola or hot air cupola or rotary drum, no APCS	800 t/a	DOI, 2004
	d.		*Copper production*		
		2	Sec. Cu - Well controlled	25839 t/a	DOI, 2004
	e.		*Aluminum production*		
		1	Processing scrap Al, minimal treatment of inputs, simple dust removal	3500 t/a	DOI, 2004
3			Heat and Power Generation		
	a.		*Fossil fuel power plants*		
		2	Coal fired power boilers	106 TJ/a	
	c.		*Landfill biogas combustion*		
		1	Biogas-/landfill gas fired boilers, motors/turbines and flaring	6766 TJ/a	BSP, 2004
	d.		*Household heating and cooking - Biomass*		
		2	Virgin wood/biomass fired stoves	169722 TJ/a	
	e.		*Domestic heating - Fossil fuels*		
		5	Oil fired stoves	802 TJ/a	
4			Production of Mineral Products		
	a.		*Cement kilns*		
		1	Shaft kilns	2531760 t/a	DOI, 2004
	b.		*Lime*		
		1	Cyclone/no dust control, contaminated or poor fuels	6000 t/a	DOI, 2004
	c.		*Brick*		
		1	No emission abatement in place and using contaminated fuels	34902924 t/a	DOI, 2004
	f.		*Asphalt mixing*		
		1	Mixing plant with no gas cleaning	201218 t/a	DOC, 2004
5			Transport		
	a.		*4-Stroke engines*		
		2	Unleaded gasoline without catalyst	246724 t/a	HMG/MOF, 2000
	b.		*2-Stroke engines*		
		2	Unleaded fuel	132515 t/a	

Group	Category	Class	Source Category	Activity Data	Source
	c.		*Diesel engines*		
		1	Regular Diesel	157359 t/a	
6			Open Burning Processes		
	a.		*Biomass burning*		
		1	Agricultural residue burning in the field of cereal and other crops stubble, impacted, poor burning conditions	3328971 t/a	DOF, 1999
		4	Forest fires	345000 t/a	
		5	Grassland and savannah fires	13200	
	b.		*Waste burning and accidental fires*		
		2	Accidental fires in houses, factories	1274 t/a	
		3	Open burning of domestic waste	21636 t/a	
		4	Accidental fires in vehicles (per vehicle)	167 t/a	MOHA, 2004
7			Production and Use of Chemicals and Consumer Goods		
	a.		*Pulp and paper mills **		
		2	Power boilers fueled with sludge and/or biomass/bark	43009 t/a	DEVS consult, 2004
			Aqueous discharges and products		
		7	TMP pulp	43009 t/a	
	g.		*Textile plants (per ton textile)*		
		2	Mid-Range, non-BAT Technologies	13230 t/a	
	h.		*Leather plants*		
		1	Low-End Technologies	1248 t/a	DEVS consult, 2004
8			Miscellaneous		
	a.		*Drying of biomass*		
		3	Clean fuel	46605 t/a	
	b.		*Crematoria*		
		1	No control (per cremation)	222124 t/a	
	e.		*Tobacco smoking*		
		2	Cigarette (per million items)	7660 t/a	
9			Disposal		
	b.		*Sewage/sewage treatment*		
		3	Domestic inputs		
			With sludge removal	494 t/y	
	d.		*Composting*		
		1	Organic wastes separated from mixed wastes	4327 t/y	
	e.		*Waste oil disposal*		
		1	All fractions	460 t/y	
10			Contaminated Sites and Hotspots		
	f.		*Use of PCB*		
			Low chlorinated, e.g., Clophen A30, Aroclor 1242	106000 t/y	

Annex IV: Activity data (based on UNEP Toolkit 2012) for different source categories (Group / Category/ Class) for UPOPs releases for the year 2014/15

Group	Category	Class	Source category	Activity data	Source
1.			Waste Incinerator		
	a.		*Municipal solid waste incineration*		
		1.	Low technol combustion, no APCs	14 t/y	CBS (2013): Env. Statistics of Nepal
	b.		*Hazardous waste incineration*		
		1.	Low technol combustion, no APCs	31 t/y	CBS (2013): Env. Statistics of Nepal
	c.		*Medical waste incineration*		
		1.	Controlled , batch, no or minimal APCs	7971 t/y	CBS (2013): Env. Statistics of Nepal
	f.		*Waste wood and waste biomass incineration*		
		1.	Old furnaces, batch, no/little APCs	388 t/y	Cow dung cakes used as domestic fuel; MoF (2015): Economic Survey 2014/15
2.			Ferrous and Non-Ferrous Metal Production		
	b.		*Coke production*		
		1.	No gas cleaning	318,201t/y	CBS (2014): Foreign Trade Statistics of Nepal 2013/14
	c.		*Iron and steel production plants and foundries*		
			Iron steel production		
`		2.	Clean scrap/virgin iron or dirty scrap, afterburner, fabric filter	713,510 t/y	Energy Efficiency Center FNCCI, 2014
			Foundries		
		1.	Cold air cupola or hot air cupola or rotary drum, no APCs	800 t/y	Previous Inventory 2005
	d.		*Copper production*		
		2.	Sec. Cu - Well controlled	25839 t/y	Previous Inventory 2005; Present data could not to be received
	e.		*Aluminum production*		
		1.	Processing scrap Al, minimal treatment of inputs, simple dust removal	3,500 t/y	Previous Inventory 2005; Present data could not to be received
3.			Heat and power generation		
	a.		*Fossil fuel power plants*		
		2.	Coal fired power boilers	277 TJ/a	15924 ton coal imported and consumed in brick kiln, railway and boilers

Group	Category	Class	Source category	Activity data	Source
	c.		*Landfill biogas combustion*		
		1.	Biogas-/landfill gas fired boilers, motors/turbines and flaring	21,865TJ/a	Based on BSP Nepal (2016), 360000 biogas plants are in use
	d.		*Household heating and cooking - Biomass*		
		2.	Virgin wood/biomass fired stoves	15 TJ/a	CBS 2013: Env Statistics of Nepal
	e.		*Domestic heating - Fossil fuels*		
		6.	Natural gas or LPG fired stoves	7,047 TJ/a	MOF 2013/14: Economic Survey of Nepal 2013/14 Kerosene imported is mainly used in domestic stoves
4.			Production of Mineral Products		
	a.		*Cement kilns*		
		1.	Shaft kilns	2,500,000 t/a	FNCCI (2014): Energy Efficiency Center
	b.		*Lime*		
		1.	Cyclone/no dust control, contaminated or poor fuels	6,000 t/a	Previous Inventory
	c.		*Brick*		
		1.	No emission abatement in place and using contaminated fuels	36,728,135 t/a	EEC/FNCCI 2014
	f.		*Asphalt mixing*		
		1.	Mixing plant with no gas cleaning	34,308 t/a	DOC, Foreign trade Statistics, 2014/15
5.			Transport		
	a.		*4-Stroke engines*		
		2.	Unleaded gasoline without catalyst	187,502 t/a	NOC, 2015
	c.		*Diesel engines*		
		1.	Regular Diesel	687,282	NOC, 2015
6.			Open Burning Processes		
	a.		*Biomass burning*		
		1.	Agricultural residue burning in the field of cereal and other crops stubble, impacted, poor burning conditions	403 t/a	MOF 2013/14: Economic Survey
		4.	Forest fires	9,200,000 t/a	MOFSC, personal communication
		5.	Grassland and savannah fires	13,200 t/a	Previous Inventory 2005
	b.		*Waste burning and accidental fire*		
		2.	Accidental fires in houses, factories	77,863 t/a	CBS, Statistical year book, 2013
		3.	Open burning of domestic waste	21,636 t/a	Previous Inventory 2005
		4.	Accidental fires in vehicles (per vehicle)	167 t/a	Previous Inventory 2005

Group	Category	Class	Source category	Activity data	Source
7.			Production and Use of Chemicals and Consumer Goods		
	a.		*Pulp and paper mill*		
		2.	Power boilers fueled with sludge and/or biomass/bark	5,800 t/a	DOI 2014/15 & MKPaper Mills 2016
			Aqueous discharges and products		
		9.	Recycling pulp/paper from modern papers	5,800 t/a	MK Paper mills 2016
	g.		*Textile plants (per ton textile)*		
		2.	Mid-Range, non-BAT Technologies	13,230 t/a	Previous Inventory 2005
	h.		*Leather plants*		
		1.	Low-End Technologies	1,248 t/a	Previous Inventory 2005
8.			Miscellaneous		
	a.		*Drying of biomass*		
		3.	Clean fuel	85,576 t/a	Tea &Coffee Development Board 2015
	b.		*Crematoria*		
		1.	No control (per cremation)	169,017 t/a	
	e.		*Tobacco smoking*		
		2.	Cigarette (per million items)	105	
9.			Disposal		
	a.		*Landfills, Waste Dumps and Landfill Mining*		
		3.	Domestic wastes	237,250 t/a	SWMTSC 2015
	b.		*Sewage/sewage treatment*		
		3.	Domestic inputs		
			With sludge removal	1,019t/y	
	d.		*Composting*		
		1.	Organic wastes separated from mixed wastes	34,546	SWM data and computed for organic wastes
	e.		*Waste oil disposal*		
		1.	All fractions	460	Previous Inventory 2005, as no data for 2014/15 was acquired
10.			Contaminated Sites and Hotspots		
	f.		*Use of PCB*		
			Low chlorinated, e.g., Clophen A30, Aroclor 1242	106,000t/y	PCB Inventory, 2005

Annex V: Import of Petroleum products during the Fiscal Years (2060/61-2071/72) (Nepal Oil Corporation, 2015)

Fiscal Year	Petrol	diesel	Kerosene	ATF	LPG	FO	LDO	Total
	KL	KL	KL	KL	MT	KL	KL	KL
2050/51(1993/94)	31476	195474	162324	30438	9308	27319	1530	457869
2051/52(1994/95)	35019	228016	176963	37886	13049	32003	3794	526730
2052/53(1995/96)	41736	254323	213830	40667	18600	18293	4449	591898
2053/54(1996/97)	46621	259358	244546	48722	21824	17296	1983	640350
2054/55(1997/98)	47507	302063	287595	51700	22961	27776	967	740569
2055/56(1998/99)	51584	319158	298351	56010	25019	34245	547	784914
2056/57(1999/2000)	55570	327427	350196	59123	30627	26876	4005	853824
2057/58(2000/01)	60653	333791	325198	65602	40102	20999	3418	849763
2058/59(2001/02)	63578	287657	390113	47274	48757	18255	2413	858047
2059/60(2002/03)	68482	301672	351696	53646	56079	14502	610	846687
2060/61(2003/04)	67965	302644	313127	64394	66142	12672	590	827534
2061/62(2004/05)	76097	308076	231463	68340	77594	2651	88	764309
2062/63(2005/06)	81817	292381	225007	66100	81005	3754	292	750356
2063/64(2006/07)	98435	299419	192576	63650	93562	4624	180	752446
2064/65(2007/08)	101624	303212	152168	68534	96837	2940	308	725623
2065/66(2008/09)	128372	489219	77799	76660	115813	2188	380	890431
2066/67(2009/10)	162902	608065	52714	82824	141171	2612	240	1050528
2067/68(2010/11)	188082	652764	43399	99990	159286	1434	220	1145175
2068/69(2011/12)	202467	653560	41609	109904	181446	440	0	1189426
2069/70(2012/13)	223087	721203	24065	115896	207038	2456	260	1294005
2070/71(2013/14)	253381	808567	18409	125678	232660	2172		1440867
2071/72(2014/15)	287473	921714	19653	141404	258299	883		1629426
Total	**2373928**	**9169763**	**4192801**	**1574442**	**1997179**	**276390**	**26274**	**19610777**

Annex VI: Comparison of total PCDD/F releases from each group for the inventory years 2003 and 2014/2015.

Group	Source Category	Comparison of Annual Releases gTEQ/y		
		2003 Inventory (as published in Inventory 2005)	2003 Inventory updated using Toolkit 2012 (Revised EXCEL file)	Inventory for base year 2014/15 using Toolkit 2012 (Revised EXCEL file)
1	Waste Incineration	12.0	12.1	25.9
2	Ferrous and Non-ferrous metal production	29.5	25.8	32.4*
3	Heat and power generation	45.5	17.4	0.2
4	Production of Mineral products	19.7	22.5	22.8*
5	Transportation	0.4	0.4	0.1
6	Open Burning Process	156.9	135.5	73.8*
7	Production of Chemicals and Consumer Goods	45.8	1.5	1.3*
8	Miscellaneous	21.3	20.2	15.6
9	Disposal	4.9	2.2	3.0*
10	Identification of Hot-Spots	0.0	0.0	0.0
1-10	Total	**336.0**	**237.7**	**175.2**

**For uPOPs inventory for base year 2014/15, activity data for the sources 2c (foundries), 2d (copper production), 2e (aluminum production), 4b (lime production), 6b3 (open burning of domestic wastes), 6b4 (accidental fires in vehicles) 7g2 (textile plant), 7h1 (leather plants) and 9e1 (waste oil disposal) were not available, so data from uPOPs Inventory 2005 were used with the view to represent emissions from these source groups for 2014/15 base year*.

Annex VII: Chimney height and Emission for Incinerator (prepared as per Rule 15 of EPR 1997 and published in, Nepal Gazette Section 64, No 30 Part 5 on December 22, 2014).

S.N.	Parameters	Unit	Limit
1	Chimney height from the ground level	Meter (m)	Higher than 11*
2	Suspended particulate matters (SPM) at 11% oxygen (O_2) reference	Milligram per normal cubic meter (mg/Nm^3)	50
3	Carbon monoxide (CO)	Milligram per normal cubic meter (mg/Nm^3)	50
4	Total organic carbon (TOC)	Milligram per normal cubic meter (mg/Nm^3)	20
5	Dioxin/Furans	Nanogram per Toxic equivalent per cubic meter ($ng/TEQ/Nm^3$)	0.1
6	Hydrochloric acid (HCl)	Milligram per normal cubic meter (mg/Nm^3)	50
7	Hydrogen fluoride	Milligram per normal cubic meter (mg/Nm^3)	4
8	Oxides of Sulfur (Sox)	Parts per million (ppm)	200
9	Oxides of Nitrogen (Nox)	Parts per million (ppm)	250
10	Lead (Pb), same for Chromium (Cr), Beryllium (Be), Argon (Ar), Arsenic (As), Antimony (Sb), Barium (Ba)	Milligram per normal cubic meter (mg/Nm^3)	1
11	Cadmium (Cd), same for Thorium	Milligram per normal cubic meter (mg/Nm^3)	0.05
12	Mercury (Hg) and its compounds	Milligram per normal cubic meter (mg/Nm^3)	0.05
The temperature must be maintained at minimum 1100°C for incinerating halogenated (fluorinated, chlorinated and brominated) compounds, and the retention time shall be 2-3 seconds			
Temperature monitoring devices, firing nozzles and water spraying system of the wet-scrubber should be maintained properly			
Only trained operators should be allowed to operate such incinerator			
* The chimney should be higher than the height of existing surrounding			

PART - II

Reviewed and Updated Inventory of Old and New Persistent Organic Pollutants (POPs)

1. Introduction

1.1 Background

The Stockholm Convention on Persistent Organic Pollutants (POPs) was adopted in May 2001 with the objective of protecting human health and the environment from toxic and hazardous POPs. It entered into force on 17 May 2004 initally listing twelve chemicals as POPs. Nepal signed the Stockholm Convention on April 5, 2002 and according to Article 7 of the Convention, Nepal developed the National Implementation Plan (NIP) under Stockholm Convention in 2006. The Nepalese Parliament ratified the Stockholm Convention on October 13, 2006 and following this Nepal became Party to this Convention. The NIP was developed by the then Ministry of Environment, Science and Technology (MOEST) with assistance from UNIDO and GEF to address the initial twelve POPs, and it was submitted to SC Secretariat in 2007.

Parties are required to review and update their NIPs in a manner specified by a decision of the COP. Among others the addition of chemicals to the Annexes in COP5 (2009), COP6 (2011) and COP 7 (2013) is a factor that leads to the need to review and update the original NIP for a Party. Thus, Parties to the Convention will have to review, update and submit their NIPs within two years of the date of entry into force of the amendments to the COP (for chemicals added at COP5 in August 2012).

The NIP update process will enable Nepal to establish inventories of products and articles containing new POPs and to identify industrial processes where new POPs are employed or unintentionally produced. The NIP update will build on existing national coordination mechanism and capacities established during the development of the original NIP (2004-06) and implementation of a MSP on PCBs Management (2011-014). The Ministry of Population and Environment being the SC Focal Point will review and update the NIP involving all relevant stakeholders in the country.

Nepal has already an experience in conducting inventories and drafting action plans for elimination of pesticides, PCBs, DDT, and unintentionally produced POPs, thus the new POPs may be to a large extent be managed similar to original POPs. However, new approaches are required to manage the industrial POPs chemicals such as brominated diphenyl ethers (BDE) and PFOS, due to their global use in industrial processes, waste (especially electronic appliances and cars) and recycling streams. For such chemicals, new inventory analyses such as supply chain, material flow and stakeholder analyses would be required to cope with the challenges of new POPs chemical risks posed by consumer products in use and in the market. Nepal does not have large industries that produce chemicals and raw materials for other industries. It is noteworthy that Nepal imports either final products, products produced elsewhere as raw materials, or chemicals in question might have been used during production (industrial) processes.

1.2 Objectives of Inventory Update and Review

- Obtain, review and summarize information on the sources, use, and production of POPs, including gathering information on presence in stockpiles and wastes, and determine the baseline situation.
- Identify whether the current situation meets the requirements of the Stockholm Convention, and other chemicals and waste conventions if possible, and identify areas where it does not.

- Identify technical and financial assistance needed to complete NIP development, review, or updating as well as implementation.
- Prepare, endorse and submit the updated and reviewed NIP, including inventory, prioritization and action plans to the Stockholm Convention Secretariat;
- Allow the country to fulfill its obligation under Article 7 of the SC and reporting requirements of the Convention;
- Aware the participating stakeholders to manage the additional POPs with newly developed technical skills and expertise;
- Gain stakeholders' endorsement of the NIP including strategies and actions required by Nepal, in meeting the obligations under the convention.

1.3 Obligations under the Stockholm Convention

The Party shall inter alia:

- Develop and implement plan, & review and update plan (**Article 7**)
- Facilitate or undertake the exchange of information relevant to POPs (**Article 9**)
- Promote and facilitate widely the public information, awareness and education measures for all the concerned stakeholders including policy and decision makers (**Article 10**)
- Encourage and/or undertake appropriate research, development, monitoring and cooperation pertaining to POPs and their alternatives (**Article 11**)

The goal of present NIP Review and Update is to review and update the NIP and comply with the obligation under Article 7 of the SC

- Develop and implement action plans for unintentionally produced chemicals (Article 5)
- Develop and implement strategies for identifying stockpiles, products and article in use, and wastes with POPs (Article 6)
- Implement control measures to reduce or eliminate releases from intentional production and use (Article 3 and 4)
- Include the new chemicals in the programme for the effectiveness evaluation (Article 16)
- Include new chemicals in the reporting (Article 15)

2. Addition of New POPs

2.1 Addition in 2009

At its 4th meeting of the Conference of Parties (COP) in May 2009, the Stockholm Convention was amended to include nine new POPs in Annex A and Annex B. The amendments entered into force for most of the Stockholm Convention Parties on 26 August 2010.

Annex A: Elimination

- Alpha hexachlorocyclohexane,
- Beta hexachlorocyclohexane,
- Chloredecone,

- Hexabromobiphenyl
- Hexabromodiphenyl ether and heptabromodiphenyl ether,
- Lindane,
- Pentachlorobenzene (also listed in Annex C),
- Tetrabromodiphenyl ether and pentabromodiphenyl ether

Annex B: Restriction

- Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride).

2.2 Addition in 2011

The Stockholm Convention was amended at the 5th meeting of the COP (April 2011) to include endosulfan in Annex A, and Nepal also needs to cover endosulfan in the present EA project. The amendments entered into force for most of the Stockholm Convention Parties on 27 October 2012.

Annex A: Elimination

- Endosulfan

2.3 Addition in 2013

In May 2013, the Conference of the Parties amended the Stockholm Convention on persistent organic pollutants (POPs) to add hexabromocyclododecane (HBCD) to Annex A, with specific exemption (decision SC-6/13; United Nations 2013). Pursuant to paragraph 4 of Article 21 of the Convention, the amendment was communicated by the depositary to all Parties and on 26 November 2014, one year after notification, the amendment listing HBCD in Annex A to the Stockholm Convention entered into force for most parties.

Annex A:

- **Hexabromocyclododecane (HBCD)**

The chemicals as of 2013 targeted by the Stockholm Convention are listed in the annexes of the convention text as follows (**Table 1**).

Annex A (Elimination)

Parties must take measures to **eliminate** the production and use of the chemicals listed under Annex A. Specific exemptions for use or production are listed in the Annex and apply only to Parties that register for them.

Annex B (Restriction)

Parties must take measures to **restrict** the production and use of the chemicals listed under Annex B in light of any applicable acceptable purposes and/or specific exemptions listed in the Annex.

Annex C (Unintentional production)

Parties must take measures to reduce the **unintentional releases** of chemicals listed under Annex C with the goal of continuing minimization and, where feasible, ultimate elimination.

Table 1: Listing of POPs chemicals in the Annexes of the Stockholm Convention		
Elimination (Annex A)	**Restriction (Annex B)**	**Unintentional Production (Annex C)**
1. Aldrin 2. Alpha hexachlorocyclohexane 3. Beta hexachlorocyclohexane 4. Chlordane 5. Chlordecone 6. Dieldrin 7. Endrin 8. Heptchlor 9. Hexabromobiphenyl 10. Hexabromodiphenyl ether and heptabromodiphenylether 11. Hexachlorobenzene 12. Lindane 13. Mirex 14. Pentachlorobenzene 15. Tetrabromodiphenyl ether and pentabromodiphenyl ether 16. Toxaphene 17. Endosulfan 18. Polychlorinated biphenyls (PCBs) 19. Hexabromocyclododecane (HBCD)	1. DDT 2. Perfluorooctane sulfonic acide, its salts and perfuorooctane sulfonyl fluoride	1. Hexachlorobenzene (HCB) 2. Pentachlorobenzene 3. Polychlorinated biphenyls (PCBs) 4. Polychlorinated dibenzodioxins (PCDD) 5. Polychlorianted dibenzofurans (PCDF)

Pesticide, Industrial chemical, Unintentional production

3. Update of initial POPs Inventories

3.1 POPs Pesticides (Annex A)

The goal is to limit the import and use of POPs pesticides and to effectively implement the law and enforcement related to POPs pesticides. This may include the amendment of existing legal instruments and strengthening effective law enforcement, to strengthen institutional capacity, to raise public awareness on obsolete pesticides and to eliminate stockpile of obsolete pesticides, including POPs.

The stock of POPs pesticides, mentioned in the initial Inventory (2005) and NIP (2007) was 33.668 mtons. Out of this, 32.558 mtons was POPs and 1.11 mtons was mixed, which after analysis was found to be POPs contaminated (**Table 2**). The whole stock along with other obsolete pesticides made a stock of 74.515 mtons, which were stored in 25 different sites of the country, but in 2008 some from remote areas were brought to more accessible sites; thus the stores were limited to 22 locations. The stores of these obsolete pesticides (including POPs), mainly Amlekhgunj, NARC Khmaltar and Nepalgunj were identified as POPs contaminated sites, which are till now not decontaminated.

Table 2: Quantity of different groups of date expired pesticides in different locations (in mtons) (MOEST 2007)													
SN	**Office /Location**	**Amount**	**POP pesticides**	**Organomercury**	**Organochlorine**	**Orgaophosphates**	**Carbamates**	**Synthetic pyrethroids**	**Mixed**	**Fungicides**	**Rodentocides**	**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

The stock of obsolete pesticides (74.515 mtons), which included both POPs 33.668 mtons (45.2%) and non-POPs 40.847 mtons (54.8%), was disposed off in an environmentally sound manner through a joint project between the MOEST/ GON and GIZ/Germany in 2011. Disposal of all obsolete pesticides, as mentioned in the initial NIP, was the first priority and MOSTE/GON could secure the support, both technical and financial, from GIZ to manage this. As to the contract between MOSTE/GON and GIZ, the GIZ contracted an international company SAVA to undertake this job. This company repackaged all pesticides in UN approved packages/containers before shipping them to Germany for final disposal in an incinerator. Also, the notification and other processes in line with Basel Convention, for which GON also issued required documents needed in this process, were carried out by this company. The obsolete stock of pesticide included mercurial fungicides, too, which is safe-stored permanently deep below in an old mine near Frankfurt/Main in Germany.

A study done during 2008 showed that the ground soil on the north and south sides of Amlekhgunj storehouse had considerable amount of POPs, like DDT, its derivatives and HCH (Shah & Devkota, 2009) (**Table 3**). Sangroula (2013) also detected (detection limit 2µg/Kg) two POPs pesticides endrin and heptachlor exo epoxide in two summer vegetables bitter-guard and egg plant in vegetable growing pocket, 40 km east of Kathmandu, though the retailers claimed that such organochlorines were not sold there since they were banned in 2001. A practice of returning the unsold pesticide (20% of the farmers were found to do so) to the retailers indicated an elevated awareness among the farmers.

With the environmentally sound disposal of obsolete stock of pesticides, including POPs pesticides, no stock was found, however some of the sites namely Amlekhgunj, Nepalgunj and Pokhara need to be decontaminated. These sites are among those sites where obsolete pesticides were stored until they were collected for repackaging prior to transport to Germany for final disposal. This decontamination can be one project for the future.

Table 3: Pesticides and heavy metal concentration (mg/kg) in soil samples from the school-playground adjacent to the pesticide store house at Amlekhgunj (2008) (Shah & Devkota, 2009)

S.No.	Pesticides	Class	North			South			
			Om	1m	2m	1m	2m	3m	4m
1	α-HCH	OC	0.0013	0.0009	0.3617	0.0007	ND	ND	ND
2	β.HCH	OC	0.0014	ND	1.2566	0.0018	ND	ND	ND
3	γ.CHC		0.0412	0.0135	0.7684	ND	0.0080	0.0252	ND
4	Heptachlor	OC	0.0029	0.0016	0.3925	ND	0.0036	0.0048	0.0034
5	Aldrin	OC	ND	ND	0.3613	ND	ND	ND	ND
6	Phosphamidon	OP	ND	ND	1.0728	ND	ND	ND	0.0094
7	α.Endosulfan	OC	0.0158	0.0044	0.7537	0.0011	ND	ND	ND
8	Cis chlordane	OC	ND	ND	ND	0.0502	0.0440	0.0565	ND
9	Trans chlordane	OC	0.0137	0.0020	0.3885	ND	ND	ND	ND
10	DDE	OC	0.0300	0.0175	0.3378	0.0013	0.0119	0.0145	0.0139
11	Dieldrin	OC	0.0407	0.0111	1.0076	ND	ND	ND	0.0016
12	DDD	OC	0.0328	0.0161	0.2460	ND	0.0155	0.0125	0.0128
	Heavy Metal								
13	Mercury	Heavy Metal	3.4600	1.8700	1.6090	ND	ND	3.4250	2.4110

OC – Organochlorine., OP. – Organophosphorus ; ND – Not detected

Ministry of Agricultural Development (MOAD) has been working to bring new Pesticides Act and Regulations to replace the older ones (Pesticide Act 1991 and Regulations 1994) ; this step was necessary in the changing context of establishment of new pesticides industries, Nepal's international and regional commitments and to streamline the pesticides management within the government mechanism.

3.2 Industrial Chemicals – PCB (Annex A)

The goal is to reduce risks and minimize impacts caused by PCBs with sound economic and ecological management and a proper economic and ecological management of PCBs and its contaminated articles.

This may include to develop legal instruments and technical standards for managing equipment and articles contained and contaminated with PCBs, ESM of out-of-use of equipment, articles and wastes containing and/or contaminated with PCBs and to strengthen capacity and to enhance public awareness on PCBs issue. There is no specific regulation to control or ban PCBs, but Nepal Electricity Authority (NEA), the main user or transformer oil, has included in its transformer oil procurement specifications that the oil should be PCBs free; however there is no mechanism of monitoring and testing of PCBs in the imported oil (MOEST 2012)[5].

Nepal Electricity Authority (NEA) 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 (at >50ppm or higher level) were also present in significant quantity. The preliminary inventory of 2005 had estimated about 106 mtons of transformer oil having PCBs at >50ppm level (MOEST 2006) and such dielectric fluid is considered PCBs contaminated, which according to UNEP, needs internationally accepted and proper disposal. Environmentally sound management of polychlorinated biphenyls (PCBs) was another major priority of initial NIP (2007) and this was made possible with the technical support of UNIDO and financial support of GEF through a Medium-Size Project (MSP) on "Environmentally Sound Management of PCBs in Nepal".

During this project, detail inventory of transformers was prepared focusing on power transformers under NEA from all parts of the country (generating stations, grid stations, sub-stations and maintenance workshops) and distribution transformers from the Kathmandu Valley. Level of PCBs in the collected oil samples was quantified using an UN recommended Dexsil Analyzer LX 2000 in a temporarily established laboratory within the NEA.

Table 4: Details of sampled and contaminated Power Transformers region-wise

S. No	Regions	Total number of power transformer sampled	PCB Contaminated Transformer in each region (more than 50 ppm)
1	Eastern	82	3
2	Central	166	7
3	Western	91	5
4	Far Western	54	0
	Total	**393**	**15**

Table 5: Transformers within Kathmandu valley in different distribution centers

Name of Distribution Centers	Number of Transformers in the area	Number of transformers covered by inventory survey	Total number of PCB contaminated transformer
Ratna Park	639	395	69
Baneshor (and Chabel subcenter)	345	316	17
Jorpati	90	65	5
Lalitpur	489	303	14
Kuleshwor	497	372	50
Maharajgunj	232	207	4
Kirtipur	175	99	1
Bhaktapur	234	72	8
Pulchowk	175	168	2
Thimi	112	114	3
Lainchaur Workshop		47	14
Total	2963	**2158**	187

[5] MOEST (2012): *Policy Review-Environmentally Sound Management and Disposal of PCBs*

Table 6: PCB contaminated oil and weight of contaminated transformers quantified during Inventory Survey					
S. No	**Type of Equipment**	**Oil Wt. in Kg**	**Total weight of the transformers in Kg**	**Metal Wt in Kg of transformer (Total wt- oil wt)**	**No of Contaminated Transformers**
1	Power	78990	243512	164522	**15 (among 393)**
2	Distribution	34207	141962	107755	**185 (among 2158)**
3	Barrel	34400			2
	Total wt in Kg	147597	385474	272277	202
	Total wt in mtons	**147 mtons**	**385 mtons**	**272 mtons**	

A total of 393 power transformers (all over Nepal) (**Table 4**) and 2158 distribution transformers (in Kathmandu valley) (**Table 5**) were surveyed in this exercise. Oil samples were collected from these transformers and analyzed using Dexsil L2000DX PCB test kit. This exercise revealed a total of 419 mtons of PCB contaminated[6] equipment (oil: 147 mtons and metallic part: 272 mtons) (**Table 6**).

As NEA, the owner of PCBs contaminated transformers, could not afford disposing PCBs contaminated oil and transformers, the project thoroughly worked out on different alternatives that would not bring additional cost to NEA while managing the PCBs contaminated oil and transformers. Three vendors (SeaMarconi from Italy, SetCar from Romania and Aprochim from France), who could provide the technology for dechlorination / decontamination appropriate to Nepal's condition, were found interested. A workshop was then organized by the MOEST and UNIDO in August 2012 in Kathmandu to let the vendors present their technologies. Among them two vendors, who were equipped with Decontamination/Dechlorination Mobile Unit (DMU) transportable in containers, could convince MOSTE, UNIDO and NEA to provide refined oil of the reusable quality after dechlorination of PCBs in the old oil. Of these, SetCar was selected after international bidding process and was awarded the contract to carry out the dechlorination/decontamination activities.

The decontamination of all available PCB oils and equipment was completed by March 2014. While the inventory revealed a total of 532 mtons (385 mtons of transformer and 147 mtons of oil) (**Table 6**) of PCB contaminated equipment, only a total of 209 mtons of PCB equipment (155 mtons) and oil (54 mtons) was treated by the mobile unit. The other PCB contaminated transformers were not available for decontamination as they were not easily accessible or could not be removed from the grid or had already gone for repairing and maintenance and old oil was changed. To confirm that the decontamination was successful, SetCar sent 99 oil samples to an independent accredited laboratory in Romania for analysis and found the PCBs at < 50 ppm level in these samples.

During the implementation of a post-NIP MSP on "Environmentally Sound Management of PCBs in Nepal", "Guidelines for Environmentally Sound Management and Disposal of Polychlorinated biphenyls (PCBs), 2015" was developed to help in the management of PCBs and identification of

[6]According to the Stockholm Convention, an equipment is considered contaminated if it contains more than 50 ppm of PCBs.

PCBs contaminated equipment and sites in Nepal. The transformer maintenance sites of NEA and sites where old transformers are stockpiled should be regarded as the contaminated sites, which need proper management.

3.3 UPOPs: Dioxin and Furans PCDD/F (Annex C)

The goal is to reduce and eliminate the release of unintentionally produced POPs and a proper management of the release of unintentionally produced POPs.

This may include to revise or develop the legislations related to the sound management of unintentionally produced POPs, to strengthen capacity and raise public awareness on unintentionally produced POPs issues and hazard, to improve waste management practices and prevent uncontrolled burning of waste and implementation of guidelines on best available techniques (BAT) and best environmental practice (BEP) to prioritized sources of unintentionally produced POPs.

As of now, there is no legal instrument to specifically address the issues on UPOPs, but the Industrial Policy 2011 put forward by the GON has, among others, one main objective of establishing industrial entrepreneurship as a sustainable and reliable sector by utilizing latest technology and environment friendly production process. It envisages to provide technical and financial assistance to such industries that use environment-friendly and energy saving technology on their own costs and to take special measures to promote green industries and to make the established industries pollution free and zero to carbon emission. The policy has the provisions of providing concessions and facilities to industrial research and development, environment protection, and the use of clean production technology and process.

3.3.1 UPOPs (Dioxins/Furans) inventory for 2003

The preliminary inventory on Dioxins and Furans emissions was prepared for the base year 2003 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 (base year 2003), the major source of PCDDs and PCDFs releases was found to be the uncontrolled combustion of agricultural and other wastes (**Table 7**).

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

Table 7: Nepal National PCDD/PCDF Inventories, for the base year 2003, according to UNEP Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases, 2005							
No.	**Source category**	**Annual release g TEQ/y)**					**Total/Sector (g TEQ/y)**
		Air	**Water**	**Land**	**Product**	**Residue**	
1	Waste Incineration	12.0	0.0	0.0	0.0	0.0	12.0
2	Ferrous and Non Ferrous Metal Production	5.8	0.0	0.0	0.0	23.7	29.5
3	Power Generation and Cooking	38.0	0.0	7.5	0.0	0.0	45.5
4	Production of Mineral Products	19.7	0.0	0.0	0.0	0.0	19.7
5	Transportation	0.4	0.0	0.0	0.0	0.0	0.4
6	Uncontrolled Combustion Processes	108.7	0.0	35.2	0.0	13.0	156.9
7	Production of Chemicals and Consumer Goods	0.2	0.0	0.0	2.6	43.0	45.8
8	Miscellaneous	20.7	0.0	0.2	0.0	0.4	21.3
9	Disposal and Land filling	0.0	0.1	0.5	4.3	0.0	4.9
10	Potential Hot- Spots	-	-	-	-	-	-
	Total	**205.5**	**0.01**	**43.4**	**6.9**	**80.1**	**336.0**

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

The PCDD/F inventory prepared for the base year 2003 for different source categories needed to be updated using the new tool kit (UNEP-POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs.En2013) for the activity data from 2003 (**Annex I**) under different Source Groups with new emission factors (EF). The annual PCDD/F emission (336.0gTEQ/y) calculated in 2005 was found to be 237.7 gTEQ/y (**Table 8**) when calculated on the basis of emission factors given in ToolKit 2013. This change in the value thus seemed to be due to new emission factors (EF) set for some source groups.

Table 8: Updated National PCDD/PCDF Inventories recalculated for the base year 2003, according to UNEP-POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs. En 2013							
		Annual Releases (g TEQ/y)					**Total/Sector**
Group	**Source Groups**	**Air**	**Water**	**Land**	**Product**	**Residue**	**(g TEQ/y)**
1	Waste Incineration	12.0	0.0	0.0	0.0	0.1	12.1
2	Ferrous and Non-Ferrous Metal Production	2.9	0.0	0.0	0.0	23.0	25.8
3	Heat and Power Generation	17.0	0.0	0.0	0.0	0.3	17.4
4	Production of Mineral Products	19.7	0.0	0.0	2.1	0.7	22.5
5	Transportation	0.4	0.0	0.0	0.0	0.0	0.4
6	Open Burning Processes	101.6	0.0	33.9	0.0	0.0	135.5
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	1.3	0.2	1.5
8	Miscellaneous	20.0	0.0	0.0	0.0	0.2	20.2
9	Disposal	0.0	0.0	0.0	2.2	0.0	2.2
10	Identification of Potential Hot-Spots				0.0	0.0	0.0
1-10	Total	173.6	0.0	33.9	5.5	24.7	**237.7**
						Grand Total:	**237.7**

3.3.2 UPOPs (Dioxins/Furans) inventory for 2014/15

Based on Annex 6 of Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants the annual emission of PCDD/F for the base year 2014/15 (2071 BS Nepali calendar year) was calculated on the basis of Excel worksheet developed by UNEP (POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs.En) with new EFs and the status of PCDD/F was found lower (174.7 gTEQ/y) than in 2005 (**Table 9**).

Table 9: National PCDD/PCDF Inventories prepared for the base year 2014/15, according to UNEP-POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs. En 2013

	Source Groups	**Annual Releases (g TEQ/y)**					**Group Total**
Group		**Air**	**Water**	**Land**	**Product**	**Residue**	**gTEQ/y**
1	Waste Incineration	25.1	0.0	0.0	0.0	0.8	25.9
2	Ferrous and Non-Ferrous Metal Production	4.7	0.0	0.0	0.0	27.7	32.4
3	Heat and Power Generation	0.2	0.0	0.0	0.0	0.0	0.2
4	Production of Mineral Products	19.9	0.0	0.0	2.2	0.7	22.8
5	Transportation	0.1	0.0	0.0	0.0	0.0	0.1
6	Open Burning Processes	41.2	0.0	32.6	0.0	0.0	73.8
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	1.3	0.0	1.3
8	Miscellaneous	15.2	0.0	0.0	0.0	0.4	15.6
9	Disposal	0.0	0.1	0.0	1.7	1.2	3.0
10	Identification of Potential Hot-Spots				0.0	0.0	0.0
1-10	**Total**	**106.5**	**0.1**	**32.6**	**5.2**	**30.9**	**175.2**
	Grand Total	**175.2**					

Inventory of uPOPs for the base year 2014/15 is based on the information that could be acquired from Economic Survey (MOF 2013/14), Import data (DOC 2013/14), fuel import (NOC 2015) and different industries during inventory field visit. In some instances, however, the required activity data for 2014/15 (**Annex II**) could not be acquired because of weak information updating or weak institutional memory; in such case the data of old inventory 2005 were used with the view that the emissions from these source categories are at least included in the present inventory.

3.3.2.1 Changes in the emission from different sources between 2003 and 2014/15 (Table 10)

1. Waste Incinerator: In 2003, UPOPs emission (1c1 uncontrolled batch combustion, no APCS) for only 300 mtons of medical wastes was reported to be 12 gTEQ/y, but no other sources were considered, perhaps no data on incineration of other wastes were available. Such sources for 2014/15 were more thus the emission of UPOPs was also higher (25.9 gTEQ/y). According to CBS (2013) about 14 mtons of municipal wastes and 31 mtons of hazardous wastes were incinerated (burnt!!) during 2013. Considering that such incineration of municipal and hazardous waste in 2013 could fall under low technology combustion (no APCS) the emission of UPOPs was calculated using the EF for source categories 1a1 and 1b1. In case of medical wastes, some hospitals were found to combust/incinerate their wastes in incinerators, they have installed in recent years, though all such incinerators do not meet international standard; in such condition EF for 1c1(Controlled batch no or minimal APCS) was taken and the UPOPs emission for 7971 mtons of medical wastes (CBS 2013) calculated. As given by MOF (2015), 388 mtons of cattle dung cakes were used during 2014/15 as domestic fuel, for which UPOPs emission for source category 1f1 (old furnace, no or little APCS) was calculated.

Table 10: Comparison of total PCDD/F releases from each group for the inventory years 2003 and 2014/2015				
Group	**Source Category**	**Comparison of Annual Releases gTEQ/y**		
		2003 Inventory (as published in Inventory 2005)	2003 Inventory updated using Toolkit 2012 (Revised EXCEL file)	Inventory for base year 2014/15 using Toolkit 2012 (Revised EXCEL file)
1	Waste Incineration	12.0	12.1	25.9
2	Ferrous and Non-ferrous metal production	29.5	25.8	32.4*
3	Heat and power generation	45.5	17.4	0.2
4	Production of Mineral products	19.7	22.5	22.8*
5	Transportation	0.4	0.4	0.1
6	Open Burning Process	156.9	135.5	73.8*
7	Production of Chemicals and Consumer Goods	45.8	1.5	1.3*
8	Miscellaneous	21.3	20.2	15.6
9	Disposal	4.9	2.2	3.0*
10	Identification of Hot-Spots	0.0	0.0	0.0
1-10	**Total**	**336.0**	**237.7**	**175.2**

*For uPOPs inventory for base year 2014/15, activity data for the sources 2c (foundries), 2d (copper production), 2e (aluminum production), 4b (lime production), 6b3 (open burning of domestic wastes), 6b4 (accidental fires in vehicles), 7g2 (textile plant), 7h1 (leather plants) and 9e1 (waste oil disposal) were not available, so data from uPOPs Inventory 2005 were used with the view to represent emissions from these source groups for 2014/15 base year.

2. Ferrous and Non-Ferrous Metal Production: Except 713510 t/y of iron production (FNCCI 2014) for 2c2 (clean scrap/virgin iron or dirty scrap), no information on metal production (2d-copper production and 2e-aluminum production) by different industries and foundries were updated by Ministry of Industries and the relevant industries for 2014/15; in such condition, the data of 2003 were used for these source categories, at least to include the release from such source categories. The higher emission (32.4gTEQ/y) for 2014/15 was due to higher iron/steel production and new source category 2b1 (318201t/y of coke production, no gas cleaning).

3. Heat and Power generation: High reduction in releases from this source category seemed to be due to several factors, namely two fossil fuel plants have ceased operating due to high operating and maintenance since 5 years, sharp decrease in the use of virgin wood for domestic cooking by shifting to LPG or ever increasing installation of biogas plants (360000 biogas plants currently in use according to BSP-Nepal 2016) or decreasing consumption of fire-woods due to smaller household sizes or migration. The change in release from 45.5 gTEQ/y in 2003 inventory to 17.4 gTEQ/y in inventory updated for 2003 was due to using the quantity of coal without converting it to TJ/y for 2003.

4. Production of mineral products: There was slight increase during 2014/15 in the release from this source category than in 2003; it may be due to increase in the production of bricks using coal. For lime production (4b), the data of 2003 is used, as updated data was not available.

5. Transportation Reduction in Emission from Transportation source group may be due to replacement of 2-stroke engines vehicles by 4 stroke engines. Shifting of the households in urban and urbanizing area from firewood use to LPG (very high annual increase in LPG can be verified from **Table 11**) or electricity use might have reduced PCDD/F emission in the recent years. Also,

the joint effort of MOFSC and ICIMOD in the forest fire control, though not completely controlled, seemed to reduce PCDD/F emissions.

Table 11: Import of Petroleum products during the Fiscal Years (2060/61-2071/72) (Nepal Oil Corporation, 2015)

Fiscal Year	Petrol	diesel	Kerosene	ATF	LPG	FO	LDO	Total
	KL	KL	KL	KL	mton	KL	KL	KL
2050/51(1993/94)	31476	195474	162324	30438	9308	27319	1530	457869
2051/52(1994/95)	35019	228016	176963	37886	13049	32003	3794	526730
2052/53(1995/96)	41736	254323	213830	40667	18600	18293	4449	591898
2053/54(1996/97)	46621	259358	244546	48722	21824	17296	1983	640350
2054/55(1997/98)	47507	302063	287595	51700	22961	27776	967	740569
2055/56(1998/99)	51584	319158	298351	56010	25019	34245	547	784914
2056/57(1999/2000)	55570	327427	350196	59123	30627	26876	4005	853824
2057/58(2000/01)	60653	333791	325198	65602	40102	20999	3418	849763
2058/59(2001/02)	63578	287657	390113	47274	48757	18255	2413	858047
2059/60(2002/03)	68482	301672	351696	53646	56079	14502	610	846687
2060/61(2003/04)	67965	302644	313127	64394	66142	12672	590	827534
2061/62(2004/05)	76097	308076	231463	68340	77594	2651	88	764309
2062/63(2005/06)	81817	292381	225007	66100	81005	3754	292	750356
2063/64(2006/07)	98435	299419	192576	63650	93562	4624	180	752446
2064/65(2007/08)	101624	303212	152168	68534	96837	2940	308	725623
2065/66(2008/09)	128372	489219	77799	76660	115813	2188	380	890431
2066/67(2009/10)	162902	608065	52714	82824	141171	2612	240	1050528
2067/68(2010/11)	188082	652764	43399	99990	159286	1434	220	1145175
2068/69(2011/12)	202467	653560	41609	109904	181446	440	0	1189426
2069/70(2012/13)	223087	721203	24065	115896	207038	2456	260	1294005
2070/71(2013/14)	253381	808567	18409	125678	232660	2172		1440867
2071/72(2014/15)	287473	921714	19653	141404	258299	883		1629426
Total	**2373928**	**9169763**	**4192801**	**1574442**	**1997179**	**276390**	**26274**	**19610777**

6. Open burning processes: Like few instances mentioned earlier, the source data for 6b3 (open burning of domestic wastes), 6b4 (accidental fires in vehicles), 6a5 (Grassland and savannah fires), 6b3 (open burning of domestic wastes) and 6b4 (accidental fires in vehicles) are used for the present inventory as the updated information were not available. The activity data for 6a1 (Agricultural residue burning in the field of cereal and other crops stubble, impacted, poor burning conditions) was drastically reduced from 3328971ton/y in 2003 (DOF 1999) to 403 ton/y in 2014/15 (MOF 2013/14); this could be due to increased stall feeding or agricultural lands becoming increasingly barren due to less and less people engaged in agriculture. Government sources say that the people engaged in agriculture have reduced to 61% in 2014/15 (MOAD 2016) against 85% in 2003. This change in agriculture practice seemed to greatly reduce the UPOPs release from 135.5 gTEQ/y in 2003 to 73.8 gTEQ/y in 2014/15, despite an increase in 6a4 (forest fires) from 345000 mton/y to 9200000t/y (personal communication with Joint Secretary, MOFSC) and 6b2 (accidental fires in houses /factories) from 1274 mton in 2003 to 77863 mton in 2014/15 (CBS 2013).

7. Production and Use of Chemicals and Consumer goods: The great change in annual release of 45.8gTEQ/y and 1.5 gTEQ/y for the same source data of 2003 was due to different EF (EF 1000 used in 2004 according to Toolkit 2003, but EF 5 in its update in 2014/15 according to Toolkit 2012). As in some previous cases, the activity data for 7g2 (Textile plant- Midrange Non-BAT) and 7h1(Leather plants- low-end technology) are used from previous inventory and this led to similar annual releases for 2014/15. However, the paper factory of the earlier time has ceased producing, thus decreasing the release from this source, but there are two paper recycling plants, whose production is limited to 5800 mton/y due to shortage of power supply. This seemed to reduce the annual release and limit to 1.3gTEQ/y for the year 2014/15.

8. Miscellaneous: For 2003 inventory, the release to air from 222124 dead bodies was calculated for source category 8b2: Medium control-Open air cremation (per cremation) and release from 93356 mtons of biomass used to cremate (burn) these bodies was again added to it, thus increasing the annual release to 21.3gTEQ/y. In the update for 2003 using Toolkit 2012, it is calculated for 8b1 (No control per cremation) and the biomass used is considered included in the cremation; this has brought reduction in the same activity data. For the year 2014/15, the total dead cremated using fire on pyre has reduced to 169017; this is because of decreasing mortality in the country (CBS, 2013) and based on ethnicity and religions not all deads are cremated on pyre. Moreover, establishment of electric crematorium, one of the priorities set in the initial NIP, has helped in shifting from biomass- burning cremation to electric cremation. It is thus expected that the annual release from this source category would continue reducing in the future.

There was an increase in the use of biomass in tea drying (activity data 8a3 – clean fuel) from 46605 mton/y (Inventory 2005) to 85576 mton/y (Tea & Coffee Development Board 2015), but this increase seemed not to bring significant increase in the annual release from this source category. Regarding activity data 8e2 (Tobacco smoking-cigarette), there was a great reduction in the cigarette and cigar consumption (shown by import and production data from DOC and DOI), thus reducing the annual release, but this reduction was insignificant compared to that from cremation.

9. Disposal and land filling: The wastes generated in 58 municipalities of Nepal are of municipal (domestic) nature and no industrial waste is mixed. Moreover, the organic part in the wastes has decreased from over 80% in 2003 to 66% in 2014/15 and only 10% of the organic waste is composted (SWMTRC, 2015), the compostable quantity was 43274 mton/y (for 2003) and 34546 mton/y (for 2014/15), though the quantity of total wastes was increased to 237250t/y in 2014/15. Still, domestic input (9b3) of 1019 mton/y was higher for 2014/15 than 494 mton/y for 2003. The only waste treatment plant operating in Kathmandu was found to discharge 5913000000 L water (activity data for 9c2 Urban and peri-urban waste water) and this value could not be found for 2003. With these changes in activity data for different source categories, the total release for 2014/15 was higher (3.0 gTEQ/y) than for 2003 (2.2gTEQ/y).

With the participation in international fora, GON has started to undertake the steps towards good environmental practices within the limits of its resources. There are the provisions made in Industrial Policy 2011 to encourage environment friendly and energy saving technology and to establish green industries. Establishment of electrical crematoria, increasing use of LPG in urban and even in some rural areas and ever-rising installation of bio-gas plants in rural settlements, real-time registration of forest fires as a step to control it jointly (mechanism established by MOFSC and ICIMOD) are some steps that would help in reducing the releases of UPOPs from different source categories.

4. INVENTORIES OF NEW POPS

During series of presentations and discussions in the inventory Training Workshop, the Expert appointed by the UNIDO, Project Team and participants from stakeholder organizations found some new POPs, pesticides (lindane and endosulfan) and industrial chemicals (PBDE, HBCD and PFOS), to be of interest for a country like Nepal, which is not a chemical producing/manufacturing industrial country. The training thus focused on ***updating of the status of initial POPs pesticides, PCBs and uPOPs, and preparing the inventory of Pesticides (lindane, endosulfan), and Industrial chemicals (PBDEs, HBCD and PFOS).***

4.1 Pesticides (Annex A)

The goal is to limit the import and use of new POPs pesticides and to effectively implement the legal instrument related to new POPs pesticides. This may include the amendment of existing legal instruments and strengthening of effective law enforcement to strengthen institutional capacity, to raise public awareness on obsolete pesticides and to eliminate stockpiles of obsolete pesticides, including new POPs.

Guided by the Annex 2 of Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants, the Working group on new POP pesticides inventory discussed on the new POPs pesticides (lindane and alpha and beta HCH, endosulfan, pentachlorobenzene, chlordecone, PFOS pesticide) listed by the Convention. As lindane was banned for agricultural purpose already in 2001 and alpha and beta HCH, pentachlorobenzene, chlordecone, PFOS pesticide were not registered with PRMD in Nepal, the working group advised to focus on endosulfan and lindane use in pharmaceutical sector.

The main production and use of chlordecone had in effect ceased by the end of the eighties. In Nepal, the inventory survey revealed that chlordecone has not been imported and sold since almost a decade. This pesticide was unknown to many retailers and they were surprised about the existence of this pesticide.

Nepal has been importing and also formulating different pesticides for agricultural purpose to meet its demand (**Table 12**). Among the organochlorines, endosulfan was imported till the year 2011/12, but due to regular information sharing among MOSTE (now MOPE), MOAD and PRMD and also between PRMD and importers/retailers or farmers during trainings or counseling programmes endosulfan and other pesticides under IA, IB and II of WHO category are increasingly replaced (among which POPs and IA & IB totally banned) by other pesticides like pyrethroids and carbamates in the recent years. Still, some pesticides under the Rotterdam Convention (PIC chemicals) like methyl parathion, monocrotophos and phosphamidon are not given the import license any more (**Table 13**).

Table 12: Pesticide Imported and Formulated (Kg a.i.) in Nepal (PRMD, 2013 mentioned in Environmental Statistics of Nepal, 2013)								
SN	Kinds of Pesticides	Period of import and production						
		2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2013/14
1	Insecticides	46553.25	60282.42	105814.60	61615.80	96115.33	114717.70	162326.00
	i. Organochlorines	8214.50	11046.00	11403.90	11019.80	14031.85	10437.00	0
	ii. Organophosphates	24682.60	17709.05	65838.20	23280.30	40148.42	60497.48	69352.7
	iii. Carbamates	115.40	321.05	1100.34	1344.15	2127.95	2847.97	5036.95
	iv. Synth. Pyrethroids	2640.43	4592.66	7228.88	5255.65	9313.62	6101.78	15499.41
	v. Botanical Products	4.31	2.15	0	0	0	0	3746.65
	vi. Mixed insecticides	2290.35	3625.25	6736.68	7284.3	16463.24	18069.04	40677.89
	vii. Others	8605.66	22986.26	13506.60	13431.6	14030.25	16764.45	
2	Herbicides	5701.70	6574.05	11124.30	15683.10	46696.00	53476.66	90127.00
3	Fungicides	74368.45	237372.2	203392	129567	183893	166815.4	192204.60
4	Rodenticides	1808	37297.75	31086.9	2468	5528.07	8183.107	9836.36
5	Bio-pesticides	57.58	57.12	30.08	82.08	78.26	121.687	71.74
6	Acaricides	238.65	2458.06	2080.4	38	1085.25	1424.1	181.25
7	Bactericides	0	750	6.64	25	1.6	0	31.25
8	Others	0	0	0	0	0	120	
Agri- Pesticides (1-8)		**128727.6**	**344791.6**	**353556.9**	**209479**	**333397.5**	**344858.7**	**454778.20**
9	Public health-Pesticides	2556.8	2703	2811	1600	2276	174	
Grand Total (Agri. &Pub. health)		**131284.40**	**347494.60**	**356367.90**	**211079.00**	**335673.50**	**345032.70**	**454778.20**

4.1.1 Inventory of Lindane

International initiatives on Lindane include the Protocol on Persistent Organic Pollutants of the Convention on Long-Range Transboundary Air Pollution, the Rotterdam Convention, and the OSPAR Commission for the Protection of the Marine Environment of the Northeast Atlantic. Lindane is banned for use in 52 countries, restricted or severely restricted in 33 countries, not registered in 10 countries, and registered in 17 countries.

For each mton of lindane produced, around 6-10 mtons of other isomers are also obtained. In the last years the production of lindane has rapidly decreased and it appears that only Romania and India are current producing countries. Lindane has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment and against ectoparasites in both veterinary and human applications.

Table 13: List of banned pesticides in Nepal (Source: PRMD 2016)			
S. No	**Name of Pesticides**	**Banned Date & Gazette section**	**Relevant CAS numbers**
1	Chlordane	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	57-74-9
2	DDT	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	50-29-3
3	Dieldrin	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	60-57-1
4	Endrin	Decision of Government of Nepal published in the Gazette Section 50, No.51, Part 3, Date 09/04/2001 in Nepal.	72-20-8
5	Aldrin	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	309-00-2
6	Hepatchlor	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	76-44-8
7	Mirex	Decision of Government of Nepal published in the Gazette Section 50, No.51, Part 3, Date 09/04/2001 in Nepal.	2385-85-5
8	Toxaphene	Decision of Government of Nepal published in the Gazette Section 50, No.51, Part 3, Date 09/04/2001 in Nepal.	8001-35-2
9	BHC	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	
10	**Lindane**	**Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.**	**58-89-9**
11	Phosphamidon	Decision of Government of Nepal published in the Gazette Section 50, No. 51, Part 3, Date 09/04/2001 in Nepal.	13171-21-6
12	Methyl parathion	Decision of Government of Nepal published in the Gazette Section 57, No. 37, Part 3, Date 31/12/2007 in Nepal.	56-38-2
13	Monocrotophos	Decision of Government of Nepal published in the Gazette Section 57, No. 37, Part 3, Date 31/12/2007 in Nepal.	6923-22-4
14	**Endosulfan**	**Decision of Government of Nepal published in the Gazette Section 62, No.31, Part 3, Date 05/11/2012 in Nepal.**	**115-29-7**

There are several chemical alternatives for lindane for seed treatment, livestock, and veterinary uses. Alternatives that are currently in use are considered, in general, technically feasible, efficient, available and accessible by the countries that are already using them. A different scenario exists for pharmaceutical alternatives for lindane, where alternatives are available, but failures have been reported for scabies and lice treatments producing a big concern in relation to the limited number of available alternative products in the market.

Consideration may also be given to additional reporting and reviewing requirements in collaboration with the World Health Organisation for the specific exemption mentioned above and to the following elements for additional control measures under this specific exemption:

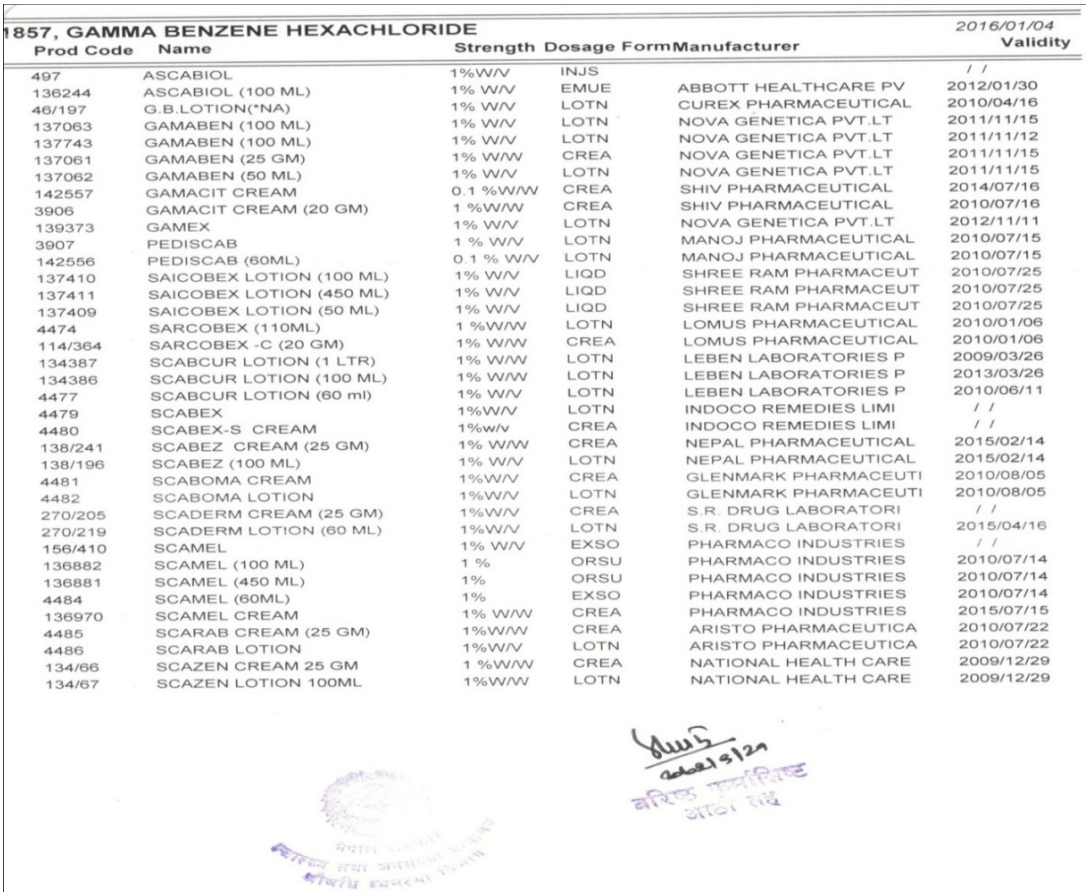
- Limiting the package size;
- Requiring appropriate labelling;
- Use of Lindane as a second-line treatment only;
- Protecting vulnerable groups especially infants;
- Outreach and awareness programmes;
- Promoting alternative products, methods and strategies
- Further consideration may also be given to control measures regarding the production of Lindane such as prevention and sound management of generated waste.

4.1.1.1 Status of Lindane in Nepal

Government of Nepal has banned lindane for agricultural purpose already in 2001 (**Table 13**, *S No.10: Government of Nepal has decided and published it in the Gazette Section 50, Number 51, Part 3, Dated 09/04/2001 in Nepal*), but according to the information provided by the Department of Drug Administration (DDA), it is still in use against the ectoparasites (lice and scabies). The information provided by DDA (**Table 14**: Letter issued by DDA to MOPE on January 5, 2016) could reveal only the importing companies and in different dates, but the exact quantity was beyond the limit of institutional system, as the importing and producing companies were not submitting such data. During inventory, no stock of lindane was thus identified; however, DDA is now taking step to inform the importing and producing companies to go for the alternatives of lindane.

A notification to the Secretariat of SC is required to request the exemption to use lindane as a human health pharmaceutical for control of head lice and scabies as a second line treatment.

Table 14: Data on Import of different formulations of Lindane (Gamma benzene hexachloride) made available by the Department of Drug Administration till January 4, 2016.



1857, GAMMA BENZENE HEXACHLORIDE — 2016/01/04

Prod Code	Name	Strength	Dosage Form	Manufacturer	Validity
497	ASCABIOL	1%W/V	INJS		/ /
136244	ASCABIOL (100 ML)	1% W/V	EMUE	ABBOTT HEALTHCARE PV	2012/01/30
46/197	G.B.LOTION(*NA)	1% W/V	LOTN	CUREX PHARMACEUTICAL	2010/04/16
137063	GAMABEN (100 ML)	1% W/V	LOTN	NOVA GENETICA PVT.LT	2011/11/15
137743	GAMABEN (100 ML)	1% W/V	LOTN	NOVA GENETICA PVT.LT	2011/11/12
137061	GAMABEN (25 GM)	1% W/W	CREA	NOVA GENETICA PVT.LT	2011/11/15
137062	GAMABEN (50 ML)	1% W/V	LOTN	NOVA GENETICA PVT.LT	2011/11/15
142557	GAMACIT CREAM	0.1 %W/W	CREA	SHIV PHARMACEUTICAL	2014/07/16
3906	GAMACIT CREAM (20 GM)	1 %W/W	CREA	SHIV PHARMACEUTICAL	2010/07/16
139373	GAMEX	1% W/V	LOTN	NOVA GENETICA PVT.LT	2012/11/11
3907	PEDISCAB	1 % W/V	LOTN	MANOJ PHARMACEUTICAL	2010/07/15
142556	PEDISCAB (60ML)	0.1 % W/V	LOTN	MANOJ PHARMACEUTICAL	2010/07/15
137410	SAICOBEX LOTION (100 ML)	1% W/V	LIQD	SHREE RAM PHARMACEUT	2010/07/25
137411	SAICOBEX LOTION (450 ML)	1% W/V	LIQD	SHREE RAM PHARMACEUT	2010/07/25
137409	SAICOBEX LOTION (50 ML)	1% W/V	LIQD	SHREE RAM PHARMACEUT	2010/07/25
4474	SARCOBEX (110ML)	1 %W/W	LOTN	LOMUS PHARMACEUTICAL	2010/01/06
114/364	SARCOBEX -C (20 GM)	1% W/W	CREA	LOMUS PHARMACEUTICAL	2010/01/06
134387	SCABCUR LOTION (1 LTR)	1% W/W	LOTN	LEBEN LABORATORIES P	2009/03/26
134386	SCABCUR LOTION (100 ML)	1% W/W	LOTN	LEBEN LABORATORIES P	2013/03/26
4477	SCABCUR LOTION (60 ml)	1% W/V	LOTN	LEBEN LABORATORIES P	2010/06/11
4479	SCABEX	1%W/V	LOTN	INDOCO REMEDIES LIMI	/ /
4480	SCABEX-S CREAM	1%w/v	CREA	INDOCO REMEDIES LIMI	/ /
138/241	SCABEZ CREAM (25 GM)	1% W/W	CREA	NEPAL PHARMACEUTICAL	2015/02/14
138/196	SCABEZ (100 ML)	1% W/V	LOTN	NEPAL PHARMACEUTICAL	2015/02/14
4481	SCABOMA CREAM	1%W/V	CREA	GLENMARK PHARMACEUTI	2010/08/05
4482	SCABOMA LOTION	1%W/V	LOTN	GLENMARK PHARMACEUTI	2010/08/05
270/205	SCADERM CREAM (25 GM)	1%W/V	CREA	S.R. DRUG LABORATORI	/ /
270/219	SCADERM LOTION (60 ML)	1%W/V	LOTN	S.R. DRUG LABORATORI	2015/04/16
156/410	SCAMEL	1% W/V	EXSO	PHARMACO INDUSTRIES	/ /
136882	SCAMEL (100 ML)	1 %	ORSU	PHARMACO INDUSTRIES	2010/07/14
136881	SCAMEL (450 ML)	1%	ORSU	PHARMACO INDUSTRIES	2010/07/14
4484	SCAMEL (60ML)	1%	EXSO	PHARMACO INDUSTRIES	2010/07/14
136970	SCAMEL CREAM	1% W/W	CREA	PHARMACO INDUSTRIES	2015/07/15
4485	SCARAB CREAM (25 GM)	1%W/W	CREA	ARISTO PHARMACEUTICA	2010/07/22
4486	SCARAB LOTION	1%W/V	LOTN	ARISTO PHARMACEUTICA	2010/07/22
134/66	SCAZEN CREAM 25 GM	1 %W/W	CREA	NATIONAL HEALTH CARE	2009/12/29
134/67	SCAZEN LOTION 100ML	1%W/W	LOTN	NATIONAL HEALTH CARE	2009/12/29

4.1.2 Inventory of Endosulfan

Endosulfan is a synthetic organochlorine compound. It is commonly used as an agricultural insecticide. It has been sold from the mid 1950s but it is still contained in pesticide products in some countries. Technical endosulfan is a 2:1 to 7:3 mixture of the α- and β-isomers. The use of endosulfan has been declining globally. It is now banned in at least 60 countries with former uses replaced. However, endosulfan is still used in different regions of the world.

4.1.2.1 Production, trade, stockpiles of endosulfan

Endosulfan is synthesized involving the following steps: Diels-Alder addition of hexachloro-cyclopentadiene and cis-butene-1,4-diol in xylene. Reaction of this cis-diol with thionyl chloride forms the final product.

Endosulfan was developed in the early 1950s. In 1984, global annual production of endosulfan was estimated to be 10,000 mtons. Current production is judged to be significantly higher. India is regarded as being the world's largest producer (9900 mtons per year) (Government of India 2001- 2007) and exporter (4104 mtons in 2007-08) to 31 countries (Government of India); followed by Germany (approximately 4000 mtons per year); China (2400 mtons), Israel and South Korea.

4.1.2.2 Uses of endosulfan

Endosulfan is an insecticide used to control chewing, sucking and boring insects, including aphids, thrips, beetles, foliar feeding caterpillars, mites, borers, cutworms, bollworms, bugs, white flies, leafhoppers, snails in rice paddies, earthworms in turf, and tsetse flies.

Endosulfan is used on a very wide range of crops. Major crops to which it is applied include soy, cotton, rice, and tea. Other crops include vegetables, fruit, nuts, berries, grapes, cereals, pulses, corn, oilseeds, potatoes, coffee, mushrooms, olives, hops, sorghum, tobacco, and cacao. It is used on ornamentals and forest trees, and has been used in the past as an industrial and domestic wood preservative. The use of endosulfan has been declining globally. It is now banned in at least 60 countries with former uses replaced by less hazardous products and methods.

4.1.2.3 Releases to the environment

As a result of the use of endosulfan as an insecticide, endosulfan is released to the environment. No natural sources of the compound are known. From the manufacture of formulation operations, local scale environmental releases to the air, waste water, or surface waters may also occur.

The general trend of total global endosulfan use has increased continuously since the first year this pesticide was applied. No recent figures, updated after the recent banning in several countries, are available. India is the world's largest consumer of endosulfan with a total use of 113 kt from 1958 to 2000. Total global endosulfan emissions have also increased continuously since the year when this pesticide was first applied and presently amounting to an estimated total emission around 150 Ktons.

4.1.2.4 Status of Endosulfan in Nepal

Organochlorine seemed to have been in use till 2011/12, but it was mainly endosulfan and during 2013/14 no such pesticides was imported (**Table 12**). As a result of the information the MOSTE received during COP4 of Stockholm Convention that endosulfan would be in the list (Annex A) to

be banned in the next COP5, GON informed MOAD to restrict or limit the import and use of endsulfan. When endosulfan was included in the list during COP5 in 2011, most of the importers and formulators were notified to limit their stocks. By the time the GON published the notice in this regard (**Table 13**, *SN 14: Government of Nepal has been decided and published in the Gazette Section 62, No.31, Part 3, Date 05/11/2012 in Nepal*), the importers, formulators and retailers had limited their stocks. During the present inventory survey, there was no endosulfan found in the market, and in the stores of formulators and importers.

4.2 Industrial Chemicals (Annex A)

Inventories are the basis for the identification and prioritization of problems, action plan development and for deciding on management strategies. It allows the assessment whether the current country situation meets the SC requirements and where not. It provides a basis for the reporting obligations and helps to identify information gaps for prioritization and action plan development and to identify the need for further financial/technical support

4.2.1 Inventory of POP-BDEs (commercial PentaBDE, commercial OctaBDE)

The goal is to identify the need to develop legal frameworks/measures and effective enforcement of POP PBDEs in E-Waste and in Transport Sector, to build capacity of officials and the public and promote awareness of POP PBDEs in E-Waste and in Transport Sector and to strengthen the management and applying monitoring measure of POP PBDEs in E-Waste and in the Transport Sector. COP4 listed certain congeners from c-PentaBDE and c-OctaBDE as POPs in Annex A. c- PentaBDE contains Tetra-, Penta-, Hexa-, HeptaBDEs (about 100 % POPs). c- OctaBDE contains Hexa-, Hepta, Octa-, NonaBDEs (about 54 % POPs)

The Convention prohibits their production and use but allows a time-limited exemption for the recycling and use/reuse of articles that may contain POP-PBDEs.

For the inventory the Guidance for the inventory of polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on Persistent Organic Pollutants, draft March 2014, was used.

The polybrominated diphenyl ethers in general are used as flame retardants of the additive type. They are physically combined with the material being treated rather than chemically combined (as in reactive flame retardants). The commercial products cover several congeners and bromination levels. The information provided by the bromine industry indicates that (c-OctaBDE) has been produced in The Netherlands, France, USA, Japan, UK and Israel, but since 2004, it is no longer produced in the EU, USA and the Pacific Rim and there is no information that indicates it is being produced in developing countries. According to the Bromine Science and Environmental Forum (BSEF), OctaBDE was commercialized sometime in the mid 70's. By the early 2000's global production was <4000 mtons/year and by the time production ceased, demand was <500 mtons; assuming 30 years of production at 6000 tonnes per year total production volume would be around 180,000 mtons.

Although the commercial OctaBDE seems to be no longer produced, releases during the service life of articles containing the commercial mixtures and at the end of article service life during disposal operations are still relevant.

c-OctaBDE has been used as an additive flame retardant mainly in the plastics industry for polymers used for housings of equipment containing electronics (**Table 15**).

Table 15: Hazardous constituents used in the electronic products (source: UNEP 2007)		
S.N.	**Components**	**Constituents**
1	Cathode Ray Tubes (CRTs)	Lead, cadmium, tin, antimony, mercury and phosphorus
2	Switches & flat screen monitors	Mercury
3	Mother boards	Mercury
4	Computer batteries	Cadmium
5	Capacitors and transformers	Polychlorinated biphenyls (PCBs)
6	Plastic casing cable	Brominated flame retardants (BFR)
7	Cable insulation/ coating	Polyvinyl chloride (PVC)
8	Printed circuit boards	Lead, cadmium, antimony, silver, chromium, zinc, tin, copper and BFR
9	Rubber	Phthalate plasitcizer, lead, BFR
10	Batteries	Lead, lithium, cadmium, mercury
11	CFC, HCFC, HFC, HC	Ozone depleting substances

Approximately 5,400 mtons of Hexabromobiphenyl (HBB) were produced in the US from 1970 to 1976. Available information suggests that production and use of HBB ceased in most, if not all, countries in the 1970s. It is possible, however, that HBB is still being produced in developing countries or in countries with economies in transition. Due to the small production and limited use, it is likely that most HBB-containing materials were disposed off decades ago. Hence, the chemical is of minor relevance for the inventory process in many countries and will not be considered in this inventory.

4.2.1.1 Manufacture of products containing PentaBDE and OctaBDE, during their use and after they are discarded as waste

Even though production of c-PentaBDE is phased out or being phased out worldwide, different products containing it will still be in use in several years to come, and thus getting continuously released to the environment. The products will in the end of their lifetime become wastes with the potential of additional releases.

The main source in North America and Western Europe has been the c-PentaBDE incorporated in polyurethane foam, used in domestic and public furniture. This use is now mainly phased out. It is considered that between 90% and 95% of the use of c-PentaBDE was for the treatment of polyurethane (PUR) foam. These foams were mainly used in automotive and upholstery applications. The information is too limited to draw conclusions on the importance of other uses, like textiles, electrical and electronic products, building materials, vehicles, trains and aeroplanes, packaging, drilling oil fluid and rubber products. While some representative examples are covered, detailed information on use is lacking for many regions of the world. Major releases to air are emissions from products during use, through volatilization of PentaBDE and dust-borne PentaBDE.

The main former use of c-OctaBDE was in acrylonitrile-butadiene-styrene (ABS) polymers, accounting for about 95% of c-OctaBDE supplied in the EU. The treated ABS was mainly used for housings/casings of electrical and electronic equipment (EEE), particularly for cathode ray tube (CRT) housings and office equipment such as copying machines and business printers.

E-waste is any electrical or electronic equipment loosely discarded, surplus, obsolete or broken. An estimated 50 million mtons of waste is produced annually worldwide and it constitutes on an average 1% of total solid waste generated in developed countries, whereas 0.01 -1% in developing countries (UNEP 2007). According to MOEST (2007), identification and quantification of electronic product that will convert into e-waste in Nepal had been initiated between the

years 2000 and 2006, especially for television, radio, computer, printers, telephone and their accessories. The study showed that old monitors were broken to recover copper wire and other metals, some e-items were sold to scrap vendors (locally called ***Kawadis***) and remaining items were thrown as wastes. Nepal lacks the formal recycling unit for e-waste.

Amatya (2013) in a study found EEE, especially desktops (5 years) and laptops (2 years) to have relatively short life, perhaps due to fast development of softwares. Other EEEs however were on an average used for a longer time: Printer (7yr), Scanner (5 yr), Copier machine (12 yr). There was a low Second-hand sale rate of E-items: Computer (12-16 pieces/month), and Printer (2-3 pieces/month). The study revealed the sale of such EEE increasing by 25% each year, but such EEEs very quickly turn to wastes (WEEE) and the item recovery and economic value of such WEEEs are very low. According to an association of scrap vendors called Kawadi Association of Nepal (estd. in 1990), such WEEE had the following cost when sold after recovering the following parts (Reference: USD 1 = NPR 106.50, average exchange rate for April 2016):

- CRT (NPR 400/pc)
- Copper Wire (NPR 300/Kg)
- Monitor (NPR 100/pc)
- Printed Circuit Board (NPR 400/Kg, where each board weighs 0.5 kg; 5-7 mtons of such board i.e. 10,000 – 14,000 pieces are exported by the scrap vendors to India).

4.2.1.2 POP-BDEs in EEE and WEEE (commercial OctaBDE)

Working group on new POP-BDEs inventory focused on the possible sources of these chemicals based on Annex 4 of Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants) & UNEP-POPS-GUID-NIP-2012-PBDEs-Inventory.En. The inventory was guided by the suggestion of Inventory Working Group, which suggested the inventory activity to focus on as presented in Annex III (**Tables 1, 2 and 3).**

There was a steady increase in the import of different types of electrical and electronic equipment (EEE) as presented in **Table 16**. When import information is matched with average life of EEE presented by Amatya (2013), it can be easily assumed that substantial quantity of wastes (WEEE) is generated at different installations of scrappers (called ***Kawadis*** locally), but actual data is not available, as there is no system of recording such information. There is a practice of breaking old EEEs to recover the usable components, which are ultimately sold at cheaper price by the scrappers; the unusable broken parts, which very probably contain PBDEs, are thrown with municipal wastes. This is thus a strong indication that the installations of scrappers and the wastes they generate may be POPs contaminated.

Table 16: Import of EEE (including CRT and polystyrene) during 2012/13 to 2014/15)

Items	2012/13	2013/14	2014/15	Total
Refrigerator, freezer and similar kind	160189	170821	254560	585570
Computers	2069	1936	13422	17427
Microovens	0	9363	12529	21892
Electric ovens, cookers, cooking plates	0	448122	48970	497092
CRT Monitors, TV and CRT Tubes	210550	347689	267390	825629
Polystyrene (Expansible in primary form)	83295	601885	465566	1150746

Source: DOC, Nepal Foreign Trade Statistics (from 2012/13, 2013/14, 2014/15).

The inventory of POP-PBDEs EEE/WEEE should address mainly CRT casings of TVs and monitors):

- Imported (new and second-hand) EEE and WEEE
- EEE stocks (in use and stored)
- EEE entering the waste stream (WEEE).
- Recycling of WEEE polymers (own/imported polymer)

The imported CRT casings from 2012 to 2014 can be taken from T**able 18** and result in 825628 for the three years. One cannot distinguish between TV CRT casings and monitor CRT casings.

The number CRT casings in use and stored is estimated to be at least 825628. This crude estimate does not allow to go to a tier II Preliminary Inventory. The number of CRT casings entering the waste stream per year is also not clearly known, as there is no updated and reliable information about the recycling of the plastic material in the CRT casings in the country.

A Tier I Initial Assessment calculation leads to the following results.

Countries that have not yet established an EEE/WEEE inventory could initiate the inventory by estimating the minimum POP-PBDEs amount in CRT in the country. This requires estimating the country's penetration rate (number of appliances per capita) in analogy to countries with similar economic development and consumer behaviour (see table 4-4 of the Guidance document), and then extrapolating from the per capita data to the target country. Table 4-5 of Guidance document shows the per capita data reported in the past. For Nepal one could use the number 0.17.

Once the per capita data have been estimated, the POP-PBDEs content in CRT casings (TVs and computer monitors) can be calculated taking into consideration the following additional data:

- Population of Nepal: **26494504** (CBS, 2014)
- Weight of the CRTs: **25 Kg per device** (estimated average weight of a CRT monitor, either TV or PC monitor; see also table 4-5);
- Polymer content of CRT casings: **30%** (estimated average, see table 4-9);
- A range of c-OctaBDE content, **0.87-2.54 Kg/mton,** for these polymers used in CRT casings (estimated average; see also table 4-11). A range of c-OctaBDE in CRT devices can be calculated as follows:

$M_{PBDE(i)}$ = [Number of CRTs/$capita_{Region}$] x population x 25 Kg x 0.3 x [0.00087 to 0.00254]

= [0.17*26494504*25*0.3*0.00087 to 0.00254] = 29389 Kg to 85802 Kg

Where:

- $M_{PBDE(i)}$ is the amount of POP-PBDEs (i) in [kg]

  (in Polymer (k) of electrical and electronic equipment (EEE) (j))

The POP-PBDEs (heptaBDE and hexaBDE) in the c-OctaBDE can be calculated according to the homologue content shown in Table 4-12 (of c-OctaBDE, the heptaBDE homologue is estimated as 43% and the hexaBDE as 11%). The amount of POPBDE is M_{PBDE} *0,54.

POPBDE=**(29389 Kg to 85802 Kg)*0.54= 15870 Kg to 46333 Kg**

It is necessary to notify the Secretariat of the Convention that CRT casings of TVs and computer monitors containing HexaBDE and HeptaBDE (c- OctaBDE) remain in use within the country. Another follow up action could be a project supported by the GEF for the waste management of hazardous (including POPs) waste from cars and electronic equipment.

4.2.1.3 POP-PBDEs in Transportation Sector (commercial PentaBDE)

Guided by the suggestions of the Inventory Working Group, the field work focused on acquiring data from Department of Transport Management (DOTM) (Annex III, **Tables 4, 5, 6**)

The total vehicles registered across the country till the fiscal year 2014/15 stood at 2514761, but 556912 vehicles of different types (**Table 17**) are not plying on the roads (i.e. missing), indicating that they are either dumped or destroyed and their non-usable non-metallic body part are thrown as wastes. According to a vehicle importer (communication with Mr. S. Shrestha), approximately 250 vehicles from American and British manufacturers were imported to Nepal before 2005, indicating the possible presence of POP-PBDEs.

Table 17: Number of Transport Vehicles Registered and missing (as given by Department of Transport Management)

Vehicle Types	Fiscal Years[1]							Difference (Missing)
	Total till 2010/11	2011/12	2012/13	2013/14	2014/15	Total Registered	Total as of present[2]	
Bus	24790	2085	3263	2776	3737	36651	**35289**	1362
Minibus/ Mini truck	10908	1170	1328	1412	2270	16989	**16007**	982
Crane/Dozer/ Excavator/Truck	45527	1333	3332	2789	4236	57217	**54448**	2769
Car/Jeep/Van	120429	8711	9595	11372	13560	163667	**159161**	4506
Pickup	9768	2981	5422	5668	6057	29896	**27542**	2324
Microbus	2323	155	158	178	932	3746	**3425**	321
Tempo	7443	10	57	17	1541	9068	**8441**	627
Motorcycle	886745	145135	175381	163945	196383	1567589	**1513447**	54142
Tractor/Power tiller	64893	8413	9795	10070	10524	103695	**100082**	3613
Others	6184	91	152	116	343	6886	**6592**	294
Total	**1178911**	**170084**	**208483**	**198343**	**239583**	**1995404**	**1924434**	**70970**

Source:[1]DOTM (2072): Transport vehicles registration Information (till 2015/16); [2]MOF/GON (2072): Final Economic Survey 2071/72 (2014/15)

The inventory of POP-PBDEs in the transport sector is expected to address the following:

- Vehicles imported (for the inventory year and for the years with relevant vehicle imports as a base for estimating stocks);
- Vehicles in use;
- End-of-life vehicles in the inventory year and those having already reached end-of-life;
- Polymers from end-of-life vehicles.

Table 17 gives information on registered vehicles and missing vehicles. The total present vehicles give information about the vehicles in use and the missing vehicles could be vehicles exported or end-of-life vehicles. There is no additional information on the number of end-of-life vehicles in the inventory year and those having already reached end-of-life and about the recycling of polymers from end-of-life vehicles.

The amount of c-PentaBDE can be calculated according to the Tier I Initial Assessment in the Guidance chapter 5.2.1 together with chapter 5.3 using the following additional assumptions.

The cars imported are all from the Asian region with a regional factor of 0.05. Some 80 % of the cars in use were produced in 2004 and before.

Different types of vehicles in use (Table 17) at present are as follows:

- Minibuses, trucks, cars, pick-ups and microbuses: 260583
- Buses: 35289

The formula for C-PentaBDE content in buses is:

Number of buses *0.8 *1 Kg*0.05= 35289*0.8*1*0.05 Kg = **1411.6 Kg**

The formula for C-PentaBDE content in cars and trucks is:

Number of cars/trucks*0.8*0.16 Kg*0.05= 260583*0.8*0.16*0.05 Kg= **1667.7 Kg**

If one adds the above two numbers, the Tier I assessment gives an amount of **1411.6 +1667.7 Kg = 3079.3 Kg POPBDE** in the Nepal.

It is necessary to notify the Secretariat of the Convention that cars with TetraBDE and PentaBDE (c- PentaBDE) containing PUR foam in car seats remain in use within the country.

Another follow up action could be a project supported by the GEF for the waste management of hazardous (including POPs) waste from cars and electronic equipment.

4.2.2 Inventory of HBCD

HBCD has a strong potential to bioaccumulate and biomagnify. It is persistent in the environment, and has a potential for long-range environmental transport. It is very toxic to aquatic organisms. Though information on the human toxicity of HBCD is to a great extent lacking, vulnerable groups could be at risk, particularly to the observed neuroendocrine and developmental toxicity of HBCD. Hexabromocyclododecane is listed in Annex A with pproduction only allowed for registered use and a specific exemption for expanded polystyrene (EPS) and extruded polystyrene (XPS) in insulation material in buildings. Production for “all other uses” and “these other uses” are not allowed. Also, trade for “these other uses” is not allowed.

The goal is to identify the need to develop legal frameworks/measures and effective enforcement of HBCD, to build capacity of officials and the public and promote awareness and to strengthen the management of HBCD in insulation material for buildings. For the inventory the Guidance for the inventory, identification and substitution of Hexabromocyclododecane (HBCD), draft April 2015, was used.

Guided by suggestions made by the Working Groups during the Inventory Training (Annex IV **Tables 1, 2, 3, 4, 5 and 6**), the inventory team collected information and data as far as possible.

4.2.2.1 Use and production of HBCD

Commercially available hexabromocyclododecane is a white solid substance. HBCD is used as a flame retardant additive, providing fire protection during the service life of vehicles, buildings or articles, as well as protection while stored. The main uses of HBCD globally are in expanded and extruded polystyrene foam insulation while the use in textile applications and electric and electronic appliances is smaller. The production of hexabromocyclododecane is a batch-process, where elemental bromine is added to cyclododecatriene at 20 to 70°C in the presence of a solvent in a closed system. **As presented in Table 16, DOC has recorded the import of 1150746 Kg polystyrene during the last three fiscal years (2012/13 to 2014/15).**

4.2.2.2 Replacement of HBCD

The production of HBCD has decreased in the last few years and there are already chemical alternatives available in the market to replace HBCD in high-impact polystyrene (HIPS) and textile back-coating. After any alternative becomes available in commercial quantities, it will take some time for the industry to seek qualification and re-certification of polystyrene bead and foam products, but in Nepal HBCD producing industries are not in existence, and the issue on the stocks of HBCD may therefore be not critical, however the GON should develop the mechanism by which such products which may contain such chemicals can be properly managed.

The import of potentially HBCD containing commodities such as Refrigerator/ freezers and similar kinds, Computers, Micro ovens, Electric ovens, cookers, cooking plates, CRT monitors, television and similar kinds including Polystyrene are shown in **Table 16**.

HBCD as flame retardant is relevant mainly in countries with flammability standards requirements for all EPS/XPS applications in construction. For insulation materials, the end-of-life usually occurs when the building is altered, demolished, or burned down, and after a service life of 30 to 50 years (Europe). During demolition, HBCD may be released in dust. The amount of XPS and EPS insulation in this waste is unknown; it is expected to increase after 2025 in Europe.

In Nepal, there exist no flammability standards for polystyrene EPS/XPS applications in construction and the buildings in Nepal by virtue of the climate or due to economic conditions of the users are rarely insulated. Therefore it can be assumed that the imported polystyrene for EPS/XPS applications in construction does not contain HBCD, however HBCD that might be present in imported electric equipment needs properly addressed. A follow-up action could be a project for the management of hazardous materials and wastes containing HBCD.

4.3 Inventory of PFOS (Annex B)

(PFOS, its salts, PFOSF and PFOS related chemicals

The goal is to minimize the use of PFOS and take counter measure to manage waste contaminated PFOS based on environmentally sound principles. This may include *inter alia* to identify whether the current situation meets the requirements of the Stockholm Convention and identify areas where it does not, to give valuable inputs for developing a strategy on new POPs management, developing of actions plans and prioritization of sectors and actions that need special attention and to provide a basis for the reporting obligations under the Stockholm Convention for PFOS.

For the inventory the Guidance for the inventory of perfluorooctane sulfonic acid (PFOS) and related chemicals listed under the Stockholm Convention on Persistent Organic Pollutants (draft March 2014) was used.

One of the substances (96 PFOS-related substances) included in the original proposal to list PFOS in Annexes A, B or C of the Stockholm Convention, perfluorooctane sulfonyl fluoride (PFOSF) is the most common starting material for different PFOS derivatives, that the probability that PFOSF will degrade to PFOS is very high and that therefore listing PFOSF together with PFOS acid and its salts would be the most effective measure to reduce releases of PFOS to the environment. PFOS-related chemicals are chemicals that contain the structural element PFOS in their molecular structure and are or were produced with PFOSF as starting or intermediate material. These chemicals are covered through the listing of PFOSF. PFOS related chemicals have the potential to degrade to PFOS in the environment.

PFOS is a fully fluorinated anion, which is commonly used as a salt in some applications or incorporated in larger polymers. Due to its surface-active properties, it has historically been used in a wide variety of applications, typically including fire fighting foams and surface resistance / repellence to oil, water, grease or soil. PFOS and PFOS-related substances can be released to the environment during their manufacture, use in industrial and consumer applications, and from disposal of the chemicals or of products containing them after their use.

Other uses: carpets, leather/apparel, textiles/upholstery, paper and packaging, coatings and coating additives, industrial and household cleaning, products, pesticides and insecticides, use of existing fire fighting foam stock, photographic industry, photolithography and semiconductor, hydraulic fluids, metal plating, termite and ant bait insecticide products (in Brazil).

4.3.1 Qualitative assessment of PFOS in the country

For the purpose to facilitate national decision making with acceptable purposes or specific exemptions (that means which uses of the chemicals), it is necessary to set priorities with special attentions. For this an inventory of PFOS in the country should be prepared.

PFOS, PFOS salts, PFOSF or PFOS related chemicals are used in the process to produce products and articles that do not contain these chemicals. Therefore countries importing theses products and articles do not need to control them as they are no POPs. Only countries that use these chemicals during the processes are of concern, as they use and may release PFOS, PFOS salts, PFOSF or PFOS related chemicals into the environment. Nepal having no chemical industry of such nature may have imported materials during the production of which PFOS, PFOS salts, PFOSF,PFOS or PFOS related chemicals might have been used.

Production product/mixture means that for the use a mixture containing PFOS, PFOS salts, PFOSF or PFOS related chemicals has been produced. Therefore countries that use this mixture (for example after import) need to control it according to the Convention. A mixture allows the POP to be released more easily into the environment than is the case when the POP is contained in an article (solid matrix).

Production article/matrix means that for the use an article containing PFOS, PFOS salts, PFOSF or PFOS related chemicals has been produced. Therefore countries that use this mixture (for example after import) need to control it according to the Convention. The POPs chemicals are bound in a solid matrix and the release to the environment is expected to be lower than from a mixture.

4.3.2 Status of PFOS in Nepal

There are indications that Nepal might have imported PFOS, PFOS salts, PFOSF or PFOS related chemicals, though during inventory the import record of these chemicals could not be found with the Custom and with the importers. But their presence cannot be excluded as these compounds are under use in certain processes or in some materials, during production of which these chemicals might have been used or may be present in **Production product/mixture or Production article/matrix**. Accordingly, the inventory was carried out with special focus on potential sources of PFOS in Nepal and their specific exemptions, as suggested by the plenary meeting of the Inventory Training Workshop (**Annex V**: **Table 1**).

As of now, there is no legal instrument specific to PFOS, PFOS salts, PFOSF or PFOS related chemicals, but it can be addressed by new Hazardous Substances Management Regulations, draft of which is under discussion within the ministries.

The Inventory Team guided by Annex 5 of Guidance for Developing, a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants) & UNEP-POPS-GUID-NIP-2012-PFOS-Inventory, collected the information that could be acquired from different sources. The information is presented in **Table 18**. Also, the import of fire extinguishers is given in **Table 19**.

Table 18: Potential sources of PFOS in Nepal

PFOS Acceptable purposes	Data Source	Inventory
Photo-imaging **(process)**	Nepal Printer's Association, Mr. Madhav K.C. (President)	**Plate (Solid Sheet)**: 10 mtons/printing house/Yr means 20000 mtons per year; **Printing ink**: 3 mtons/printing house/Yr means 6000 mtons per year; **Washing Chemical**: 1000 lt. /printing house/Yr means 2000000 mtons per year; **Gum**: 1000 lt/Printing house/yr means 2000000 mtons per year.
Etching agent for compound semiconductors and ceramic filters **(process)**		Information not received
Aviation hydraulic fluids **(production product/mixture, use open application)**	Nepal Oil Corporation (2015)	Aircraft Turbine fuel – 1574442 KL, Furnace oil – 2763690 KL and Low Density Oil – 26274 KL was imported till the fiscal Year 2014/15 (Table 10, NOC data).
Fire fighting foam **(production product/mixture, use open application)**	Civil Aviation Authority Nepal (CAAN); Fire Control Department Mr. Chiranjivi Bhandari, Mr. Arun Bdr. Raut, Mr. Ram Krishna Lamichhane	Dry Chemical Powder, Mechanical Foam, Sulfuric Acid + Soda Ash, Water + Nitrogen gas or Carbondioxide, Chemical Form (Aluminium phosphate + Sodium bicarbonate), Helon Type (Bromo-chloro-furo-methane), Haletron-1 (Bromo-chloro-di-furo-methane) CAAN has the record of 100 Kg of Cartridge, 500 Kg of DCP, 100 Kg of CO2, 50 Kg Heltron and 60 DCP pressure type. In addition to this, 100 mton of DCP is imported for industrial and organizational use.

PFOS Specific exemptions		
Metal plating (hard metal plating) **(process open application)**	FNCCI, Labor Office and Chamber offices; Mr. Ghanshyam Jha of **Aarati Strips Pvt Ltd**. (contact no. 9842553055).	This industry has been importing Zn-ingot and Pb from India and along with this NaOH, HCl and Fe_2Cl_3 were used to protect the sheets from oxidization (ie. Anti-corrosion); There are about 15-20 industries of medium to large scale in operation, mainly in Buratnagar, Birgunj, Bhairhawa and Nepalgunj.
Metal plating (decorative plating) **(process open application)**		Information not received
Insecticides for control of red imported fire ants and termites **(production product/mixture, use open application)**	PRMD	Nepal is not manufacturing any pesticide and PRMD communicated that PFOS is not among the ingredients of the pesticides used for ant control.

Table 19: Number of Fire extinguishers imported during (2012/13 to 2014/15) (DOC, 2012/13 to 2014/15)

Items	2012/13	2013/14	2014/15	Total
Preparations for fire extinguishers (charged fire extinguishers)	21580	27007	12480	61067
Fire extinguishers	23483	19606	23189	66278

Though no information pertaining to import and use of PFOS, PFOS salts, PFOSF or PFOS related chemicals could be found during inventory preparation, it cannot be excluded that PFOS containing mixtures might still be imported to Nepal for certain use. It is therefore necessary for Nepal, as a Party to SC, to notify about the acceptable purposes and specific exemptions for relevant uses in fire fighting purpose to the SC Secretariat, as Nepal may have been using this and it may require several years to go for other alternatives.

The inventory was largely based on the information that could be retrieved from the records of custom, industries and relevant documents, and also through personal contacts, though analytical determination of the POPs (including HBCD and PFOS) was highly desirable. Establishment of required laboratory facilities would help to generate such data, and thus support Nepal in fulfilling its international commitments.

5. Conclusion

The present Inventory Update for old and new POPs revealed that the stocks of POPs pesticides and POP PCBs identified in the initial inventory (2005) and initial NIP (2006) POPs were properly managed in Nepal. The emission of UPOPs for the base year 2003 when updated on the basis of new emission factors for different source categories as given in UNEP-POPS-TOOLKIT-TOOLK-PCDD-PCDF-EFs. En 2013 gave a lower value. The emission for the base year 2014/15 was even less.

Regarding the new POPs pesticides, no stock of endosulfan could be found, but lindane was still in pharmaceutical use. Among the new POPs listed by SC, the inventory of PBDE, PFOS and HBCD showed that these POPs chemicals were neither produced nor imported for industrial purpose in

Nepal, but there were the imported items, which might contain some of the POPs or during the production (process) of which these POPs might have been used.

The inventory could show that EEE and their wastes in Nepal contain POPBDE: 29389 Kg to 85802 Kg of commercial-OctaBDE, and 15870 Kg to 46333 Kg of hexaBDE and heptaBDE. In the transport sector, buses were calculated to contain 1434 Kg of commercial PentaBDE, whereas 1705 Kg of this POP was found in cars and trucks: thus having a total of 3139 Kg of commercial-PentaBDE in the transport vehicles.

As HBCD producing industries are not in existence in Nepal, the issue on the stocks of HBCD may not be critical, however the GON should develop the mechanism to properly manage the products or wastes, which may contain such chemicals.

As of now, there is no legal instrument specific to PFOS, PFOS salts, PFOSF or PFOS related chemicals, but it can be addressed by new Hazardous Substances Management Regulations, draft of which is under discussion within the ministries.

The major problem faced during inventory preparation was weak institutional memory and not-updating of information, adequately trained human resources often lacking, inadequate legislations and weak implementation.

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ANNEXES

Annex I: Updated Activity data (based on UNEP Toolkit 2012) for different source categories (Group/Category/Class) for UPOPs releases for the year 2003

Group	Category	Class	Source Category	Activity Data	Source
1			**Waste Incineration**		
	c.		***Medical waste incineration***		
		1	Uncontrolled batch combustion, no APCS	300 t/y	Inventory, 2005
2			**Ferrous and Non-Ferrous Metal Production**		
	c.		***Iron and steel production plants and foundries***		
		2	Clean scrap/virgin iron or dirty scrap, afterburner, fabric filter	400309 t/y	DOI, 2004
			Foundries		
		1	Cold air cupola or hot air cupola or rotary drum, no APCS	800 t/y	DOI, 2004
	d.		***Copper production***		
		2	Sec. Cu - Well controlled	25839 t/y	DOI, 2004
	e.		***Aluminum production***		
		1	Processing scrap Al, minimal treatment of inputs, simple dust removal	3500 t/y	DOI, 2004
3			**Heat and Power Generation**		
	a.		***Fossil fuel power plants***		
		2	Coal fired power boilers	106 TJ/y	
	c.		***Landfill biogas combustion***		
		1	Biogas-/landfill gas fired boilers, motors/turbines and flaring	6766 TJ/y	BSP, 2004
	d.		***Household heating and cooking - Biomass***		
		2	Virgin wood/biomass fired stoves	169722 TJ/y	
	e.		***Domestic heating - Fossil fuels***		
		5	Oil fired stoves	802 TJ/y	
4			**Production of Mineral Products**		
	a.		***Cement kilns***		
		1	Shaft kilns	2531760 t/y	DOI, 2004
	b.		***Lime***		
		1	Cyclone/no dust control, contaminated or poor fuels	6000 t/y	DOI, 2004
	c.		***Brick***		
		1	No emission abatement in place and using contaminated fuels	34902924 t/y	DOI, 2004
	f.		***Asphalt mixing***		
		1	Mixing plant with no gas cleaning	201218 t/y	DOC, 2004
5			**Transport**		
	a.		***4-Stroke engines***		
		2	Unleaded gasoline without catalyst	246724 t/y	HMG/MOF, 2000
	b.		***2-Stroke engines***		
		2	Unleaded fuel	132515 t/y	

Group	Category	Class	Source Category	Activity Data	Source
	c.		***Diesel engines***		
		1	Regular Diesel	157359 t/y	
6			**Open Burning Processes**		
	a.		***Biomass burning***		
		1	Agricultural residue burning in the field of cereal and other crops stubble, impacted, poor burning conditions	3328971 t/y	DOF, 1999
		4	Forest fires	345000 t/y	
		5	Grassland and savannah fires	13200	
	b.		***Waste burning and accidental fires***		
		2	Accidental fires in houses, factories	1274 t/y	
		3	Open burning of domestic waste	21636 t/y	
		4	Accidental fires in vehicles (per vehicle)	167 t/y	MOHA, 2004
7			**Production and Use of Chemicals and Consumer Goods**		
	a.		***Pulp and paper mills ****		
		2	Power boilers fueled with sludge and/or biomass/bark	43009 t/y	DEVS consult, 2004
			Acqueous discharges and products		
		7	TMP pulp	43009 t/y	
	g.		***Textile plants (per ton textile)***		
		2	Mid-Range, non-BAT Technologies	13230 t/y	
	h.		***Leather plants***		
		1	Low-End Technologies	1248 t/y	DEVS consult, 2004
8			**Miscellaneous**		
	a.		***Drying of biomass***		
		3	Clean fuel	46605 t/y	
	b.		***Crematoria***		
		1	No control (per cremation)	222124 t/y	
	e.		***Tobacco smoking***		
		2	Cigarette (per million items)	7660 t/y	
9			**Disposal**		
	b.		***Sewage/sewage treatment***		
		3	Domestic inputs		
			With sludge removal	494 t/y	
	d.		***Composting***		
		1	Organic wastes separated from mixed wastes	4327 t/y	
	e.		***Waste oil disposal***		
		1	All fractions	460 t/y	
10			**Contaminated Sites and Hotspots**		
	f.		***Use of PCB***		
			Low chlorinated, e.g., Clophen A30, Aroclor 1242	106000 t/y	

Annex II: Activity data (based on UNEP Toolkit 2012) for different source categories (Group/Category/Class) for UPOPs releases for the year 2014/15

Group	Category	Class	Source category	Activity data	Source
1.			**Waste Incinerator**		
	a.		***Municipal solid waste incineration***		
		1.	Low technol combustion, no APCs	14 t/y	CBS (2013) Environmental Statics of Nepal
	b.		***Hazardous waste incineration***		
		1.	Low technol combustion, no APCs	31 t/y	CBS (2013) Environmental Statics of Nepal
	c.		***Medical waste incineration***		
		1.	Controlled , batch, no or minimal APCs	7971 t/y	CBS (2013): Environmental Statics of Nepal
	f.		***Waste wood and waste biomass incineration***		
		1.	Old furnaces, batch, no/little APCs	388 t/y	Cow dung cakes used as domestic fuel; MoF (2015): Economic Survey 2014/15
2.			**Ferrous and Non-Ferrous Metal Production**		
	b.		***Coke production***		
		1.	No gas cleaning	318,201t/y	CBS (2014): Foreign Trade Statistics of Nepal 2013/14
	c.		***Iron and steel production plants and foundries***		
			Iron steel production		
`		2.	Clean scrap/virgin iron or dirty scrap, afterburner, fabric filter	713,510 t/y	Energy Efficiency Center FNCCI, 2014
			Foundries		
		1.	Cold air cupola or hot air cupola or rotary drum, no APCs	800 t/y	Previous Inventory 2005
	d.		***Copper production***		
		2.	Sec. Cu - Well controlled	25839 t/y	Previous Inventory 2005; Present data could not to be received
	e.		***Aluminum production***		
		1.	Processing scrap Al, minimal treatment of inputs, simple dust removal	3,500 t/y	Previous Inventory 2005; Present data could not to be received
3.			**Heat and power generation**		

Group	Category	Class	Source category	Activity data	Source
	a.		***Fossil fuel power plants***		
		2.	Coal fired power boilers	277 TJ/y	15924 ton coal imported and consumed in brick kiln, railway and boilers
	c.		***Landfill biogas combustion***		
		1.	Biogas-/landfill gas fired boilers, motors/turbines and flaring	21,865TJ/y	Based on BSP Nepal (2016), 360000 biogas plants are in use
	d.		***Household heating and cooking - Biomass***		
		2.	Virgin wood/biomass fired stoves	15 TJ/y	CBS 2013: Env Statistics of Nepal
	e.		***Domestic heating - Fossil fuels***		
		6.	Natural gas or LPG fired stoves	7,047 TJ/y	MOF 2013/14: Economic Survey of Nepal 2013/14 Kerosene imported is mainly used in domestic stoves
4.			**Production of Mineral Products**		
	a.		***Cement kilns***		
		1.	Shaft kilns	2,500,000 t/y	FNCCI (2014): Energy Efficiency Center
	b.		***Lime***		
		1.	Cyclone/no dust control, contaminated or poor fuels	6,000 t/y	Previous Inventory
	c.		***Brick***		
		1.	No emission abatement in place and using contaminated fuels	36,728,135 t/y	EEC/FNCCI 2014
	f.		***Asphalt mixing***		
		1.	Mixing plant with no gas cleaning	34,308 t/y	DOC, Foreign trade Statistics, 2014/15
5.			**Transport**		
	a.		***4-Stroke engines***		
		2.	Unleaded gasoline without catalyst	187,502 t/y	NOC, 2015
	c.		***Diesel engines***		
		1.	Regular Diesel	687,282	NOC, 2015
6.			**Open Burning Processes**		

Group	Category	Class	Source category	Activity data	Source
	a.		***Biomass burning***		
		1.	Agricultural residue burning in the field of cereal and other crops stubble, impacted, poor burning conditions	403 t/y	MOF 2013/14: Economic Survey
		4.	Forest fires	9,200,000 t/y	MOFSC, personal communication
		5.	Grassland and savannah fires	13,200 t/y	Previous Inventory 2005
	b.		***Waste burning and accidental fire***		
		2.	Accidental fires in houses, factories	77,863 t/y	CBS, Statistical year book, 2013
		3.	Open burning of domestic waste	21,636 t/y	Previous Inventory 2005
		4.	Accidental fires in vehicles (per vehicle)	167 t/y	Previous Inventory 2005
7.			**Production and Use of Chemicals and Consumer Goods**		
	a.		***Pulp and paper mill***		
		2.	Power boilers fueled with sludge and/or biomass/bark	5,800 t/y	DOI 2014/15 & MKPaper Mills 2016
			Aqueous discharges and products		
		9.	Recycling pulp/paper from modern papers	5,800 t/y	MK Paper mills 2016
	g.		***Textile plants (per ton textile)***		
		2.	Mid-Range, non-BAT Technologies	13,230 t/y	Previous Inventory 2005
	h.		***Leather plants***		
		1.	Low-End Technologies	1,248 t/y	Previous Inventory 2005
8.			**Miscellaneous**		
	a.		***Drying of biomass***		
		3.	Clean fuel	85,576 t/y	Tea &Coffee Development Board 2015
	b.		***Crematoria***		
		1.	No control (per cremation)	169,017 t/y	
	e.		***Tobacco smoking***		
		2.	Cigarette (per million items)	105	
9.			**Disposal**		
	a.		***Landfills, Waste Dumps and Landfill Mining***		

Group	Category	Class	Source category	Activity data	Source
		3.	Domestic wastes	237,250 t/y	SWMTSC 2015
	b.		***Sewage/sewage treatment***		
		3.	Domestic inputs		
			With sludge removal	1,019t/y	
	d.		***Composting***		
		1.	Organic wastes separated from mixed wastes	34,546t/y	SWM data and computed for organic wastes
	e.		***Waste oil disposal***		
		1.	All fractions	460	Previous Inventory 2005, as no data for 2014/15 was acquired
10.			**Contaminated Sites and Hotspots**		
	f.		***Use of PCB***		
			Low chlorinated, e.g., Clophen A30, Aroclor 1242	106,000t/y	PCB Inventory, 2005

ANNEX III: Inventory Training Working Group Exercise Results of PBDE Inventory Group

Table 1: Information on possible data sources on the use and recycling/waste of POP-PBDE					
Use categories		**Use**		**Recycling/End of life**	
Name of the relevant POP-PBDE	**Status under Stockholm Convention***	**Priority low, medium, high**	**Source of data**	**Priority low, medium, high**	**Source of data**
Electric and Electronic equipment (monitors and televisions) Octa BDE	continuous use of articles	High	MoI, CBS, Custom Department, Assemblers, Exporters/ Importers; Dealer Associations; FNCCI	Medium (Scrapper)	SWMTC; DoEnv; Local bodies (Municipalities & VDCs,); Waste collectors; Scrapper Association

Table 2: Information on methodology for data collection on OctaBDE in the EEE/WEEE sector		
Use categories	**Methodology**	**Type of data to be collected**
CRT in PC monitors and TVs	Team formation, Stakeholder Identification, Desk Study, Data Review (Access to internet, reports, legislation, stakeholders)	Secondary data
Past and current production of c-OctaBDE and articles containing c-OctaBDE in the country		
Past and current import of articles containing c-OctaBDE;	Data collection from Custom, importers / exporters, DoI, Research Institution; Screening	Secondary Data
Past and current (professional, consumer) use of articles containing c-OctaBDE in the country;	Data collection from Governmental Institutions and NGOs	Primary / Secondary
End-of-life articles containing c-OctaBDE entering the waste stream**;**	Data from Scrapper, Vendors, landfill site; Review on auction protocol	
Polymers from articles containing c-OctaBDE that are recycled, and the possible extent of recycling;	NA	
Polymers from end-of-life articles containing c- OctaBDE disposed;	Waste inventory	
Contaminated sites	Inventory on Landfill site, Scrap yard	

Table 3: Establish a National Inventory Team for the relevant c- OctaBDE uses in Nepal		
Stakeholder	**Name of responsible person/contact person**	**Responsibility (what specific task)**
MoI; MoPE, MoF,MoCs	Head of institutions	Planning, Policy, Supervision, Record keeping and reporting
Chambers, FNCCI, Assemblers		Record keeping and reporting
Research Institutions and Universities		Record keeping and reporting
Development Orgamizations		Record keeping and reporting
INGOs / NGOs		Record keeping and reporting

Table 4: Information on possible data sources on the use and recycling/waste of POP-PBDEs (Transportation)					
Use categories		**Use**		**Recycling/End of life**	
Name of the relevant POP-BDE	**Status under Stockholm Convention***	**Priority low, medium, high**	**Source of data**	**Priority low, medium, high**	**ce of data**
Transport (car, bus, truck, train, plane) **PentaBDE**	Specific exemption recycling, continuous use of articles	Cars before 2005 Private (medium), Public Bus, Truck, Taxi (medium)	Department of Transport Management	Waste	Scrap-vendors Municipal - land fill
Electric and Electronic equipment (monitors and televisions) **OctaBDE**	Specific exemption recycling, continuous use of articles				
Furniture, mattresses containing PUR foam **PentaBDE**	Specific exemption recycling, continuous use of articles	Furniture (Low), mattresses containing PUR foam(check with guidance)	Data from Department of Custom, FNCCI, CNI	Waste, reuse	Municipal - land fill
Textiles **PentaBDE**	Specific exemption recycling, continuous use of articles	Low	Data from Department of Custom, FNCCI, CNI	Waste, reuse	Municipal - land fill

Table 5: Information on methodology for data collection on PentaBDE in the transport sector		
Use categories cars, busses, trucks (Transport: see sections 3.3/3.4 and 5 of the guidance)	**Methodology**	**Type of data to be collected**
Vehicles imported/ exported in the inventory year. Possibly import data of previous years as a basis for estimating/ evaluating stocks	Secondary data from DOTM before 2005 Antique/Vintage car association	No. of all Vehicles, No. of all vehicles produced before 2005 and region where it was produced
Stocks of vehicles (vehicles in use or possession of consumer or corporate);	Secondary data from DOTM before 2005	No. of all Vehicles (Car, Buses, Trucks) No. of all vehicles produced before 2005 and region where it was produced
End-of-life vehicles entering the waste stream	De registered vehicles from DOTM, Scrapped vehicles from scrap vendors	No. of all Vehicles scrapped No. of all vehicles scrapped ;produced before 2005 and region where it was produced
Polymers from end-of-life vehicles recycled and the possible extent of recycling;	insignificant	
Polymers from end-of-life vehicles disposed.	from scrap vendors	
Contaminated sites	Possibly-River bank, Dismantling sites, landfill site	

Table 6: Establish National Inventory Team for relevant c-PentaBDE uses in the country		
Stakeholder	**Name of responsible person/contact person**	**Responsibility (what specific task)**
DOTM	Technical-Director	Data of Import/export/deregistration/socks Vehicles
NADA	Chairman	Data of Import/stocks Vehicles
Antique Vehicles association	Chairman	Data of old Vehicles
Ministry of Home Affairs, Traffic	Joint Secretary	Data of scrapped Vehicles from Gov. offices
Department of custom	DG	Data of Imported articles, regulation control of POPs
Scrap–Vendor Association	Chair	Data of scrapped Vehicles
MOSTE	Joint Secretary/NPD (Lead)	Policies, Act, Regulation Regarding POPS NIP
FNCCI	President/	Data of Import/export
Academic /NGOs	Researchers/Students	Information on POPs in vehicles, articles

ANNEX IV: Inventory Training Working Group Exercise
Results of HBCD Inventory Group

Table 1: Information on possible data sources on the use and recycling/waste of HBCD					
		Use		**Recycling/End of life**	
Use categories	**Status under Stockholm Convention**	**Priority low, medium, high**	**Source of data**	**Priority low, medium, high**	**Source of data**
Polystyrene EPS/XPS foam that is used in insulation boards	Specific exemption insulation buildings continuous use of articles	Cold storage, dairy/beverage industry (medium) **probable**	DOI, DOC	NA	NA
Polymer dispersion on cotton or cotton mixed with synthetic blends, in the back-coating of textiles	Specific exemption insulation buildings continuous use of articles	Textile industries (low) **Not probable**	DOI	NA	NA
EPS in packaging material	Specific exemption insulation buildings continuous use of articles	NA	NA	NA	NA
Electronic equipment and appliances, paints	Specific exemption insulation buildings continuous use of articles	NA	NA	NA	NA

Table 2: Information on methodology for data collection on HBCD		
Uses	**Methodology**	**Type of data to be collected**
Polystyrene EPS/XPS foam that is used in insulation boards	Record review of DOC, DOI (**Not probable**)	No of cold storage, No. of beverage, dairy Industries
Polymer dispersion on cotton or cotton mixed with synthetic blends, in the back-coating of textiles	Record review of DOC,DOI **(Not probable)**	No of textile Industries, Amount of HBCD imported
Contaminated sites	Land fill site (**Not probable**)	NA

Table 3: Establish a National Inventory Team for the HBCD uses in your country		
Stakeholder	**Name of responsible person/contact person**	**Responsibility (what specific task)**
MOPE	Joint Secretary/NPD(Lead)	Policies, Act, Regulation ,Collect information
Department of custom	DG/ Nominated person	Data of Imported articles, regulation control
FNCCI	President/ Nominated person	Data of Import/export
DOI	DG/ Nominated person	List of industries
Academic /NGOs	Researchers/Students	Information

Table 4: Information on methodology for data collection on HBCD		
Uses	**Methodology (section 3.3)**	**Type of data to be collected**
Polystyrene EPS/XPS foam that is used in insulation boards	Record review of DOC,DOI	No of cold storage, No. of beverage, dairy Industries
Polymer dispersion on cotton or cotton mixed with synthetic blends, in the back-coating of textiles	Record review of DOC,DOI	No of textile Industries, Amount of HBCD imported
Contaminated sites	Land fill site	NA

Possible answers for uses/production in the country: **not applicable, unknown, suspected, known**

Table 5: Establish a National Inventory Team for the HBCD uses in your country		
Stakeholder	**Name of responsible person/contact person**	**Responsibility (what specific task)**
MOSTE	Joint Secretary/NPD(Lead)	Policies, Act, Regulation
Department of custom	DG/ Nominated person	Data of Imported articles, regulation control
FNCCI	President/ Nominated person	Data of Import/export
DOI	DG/ Nominated person	List of industries
Academic /NGOs	Researchers/Students	Information

Table 6: Information on possible data sources on the use and recycling/waste of HBCD					
		Use		**Recycling/End of life**	
Use categories	**Status under Stockholm Convention**	**Priority low, medium, high**	**Source of data**	**Priority low, medium, high**	**Source of data**
Polystyrene EPS/XPS foam that is used in insulation boards	Specific exemption insulation buildings continuous use of articles	Cold storage, dairy/beverage industry (medium) probable	DOI, DOC	NA	NA
Polymer dispersion on cotton or cotton mixed with synthetic blends, in the back-coating of textiles	Specific exemption insulation buildings continuous use of articles	Textile industries (low) Not probable	DOI	NA	NA
EPS in packaging material	Specific exemption insulation buildings continuous use of articles	NA	NA	NA	NA
Electronic equipment and appliances, paints	Specific exemption insulation buildings continuous use of articles	NA	NA	NA	NA

ANNEX V: Inventory Training Working Group Exercise
Results of PFOS Inventory Group

Table 1: This table was the starting point for further group exercises (for PFOS).

PFOS Acceptable purposes
• [Photo-imaging **(process)]** • Photoresist and anti-reflective coatings for semiconductors **(process)** • [Etching agent for compound semiconductors and ceramic filters **(process)]** • Aviation hydraulic fluids **(production product/mixture, use open application)** • Metal plating (hard metal plating) only in closed-loop systems **(process)** • Certain medical devices (such as ethylene tetrafluoroethylene copolymer (ETFE) layers and radio opaque ETFE production, in-vitro diagnostic medical devices, and CCD colour filters) (**process** or production articles/matrix, use) • Fire fighting foam **(production product/mixture, use open application)** • Insect baits for control of leaf-cutting ants from *Atta* spp. and *Acromyrmex* spp. **(production product/mixture, use open application)**

PFOS Specific exemptions
• Photo masks in the semiconductor and liquid crystal display (LCD) industries (**process**) • [Metal plating (hard metal plating) **(process open application)**] • [Metal plating (decorative plating) **(process open application)**] • Electric and electronic parts for some colour printers and colour copy machines (**process, open application)** • [Insecticides for control of red imported fire ants and termites **(production product/mixture, use ope0n application)] Check with PRMD** • Chemically driven oil production **(production product/mixture, use open application)**