Government of the Islamic Republic of Afghanistan

NATIONAL IMPLEMENTATION PLAN FOR THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS

November 2017

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Building Environmental Resilience

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EXECUTIVE SUMMARY

The National Environmental Protection Agency of the Islamic Republic of Afghanistan has prepared this National Implementation Plan (NIP) in partial fulfilment of its obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs).

The Stockholm Convention came into effect in 2001 with the aim of eliminating or reducing the release into the environment of POPs, a class of highly toxic and stable chemicals produced by human activity, which accumulate in the environment and are transported and concentrated in certain regions by atmospheric circulation. Afghanistan acceded to the Stockholm Convention in 2013.

Afghanistan is currently recovering from nearly four decades of conflict, which has damaged much of the country's infrastructure and weakened its institutions. Following the Bonn Conference in 2001, Afghanistan adopted a new constitution as an Islamic Republic with Executive, Legislative and Judicial branches.

Afghanistan's Constitution gives a high priority to environmental protection through the powers that it vests in the National Environmental Protection Agency (NEPA). Environmental protection legislation takes precedence over any other and NEPA has overarching authority in environmental matters over other ministries and government agencies. The Environment Law gives NEPA powers to prevent activities liable to damage the environment. In line with its commitment to environmental protection, Afghanistan has acceded to a number of Multilateral Environmental Agreements (MEAs).

The Central Statistics Organization estimates the country's population at 29.7 million. Afghanistan also has a fast growth rate as well as a youth bulge, with persons under 14 years of age accounting for nearly half of the total population. Poverty is widespread, affecting more than a third of the country's total population, and reflected in the country's low per capita GNI of US$580.[1] Nevertheless, over the past 15 years, considerable gains have been made in the areas of education and health. More children than ever are going to school, and literacy rates are increasing with more than half of the youth (15-24 years old) able to read and write.

Agriculture is the primary mode of subsistence in Afghanistan and engages 78% of the population, but produces only 22.6% of the GDP. Afghanistan ranked 169 out of 188 countries in the 2015 UNDP Human Development Index (HDI), and ranked the lowest in its region of South Asia. Life expectancy was 63.3 years and under-five mortality was 55 per 1,000 live births. Much of the population continues to suffer from shortages of housing, clean water, electricity, medical care, and jobs.

Despite investment by the international community, the country's infrastructure, which was heavily damaged during the war years, remains inadequate to the needs of a growing population. Proven mineral resources, valued at US$3 trillion, promise future economic growth but will also require considerable investment in extraction and processing. Meanwhile the economy remains heavily dependent on foreign aid.

Afghanistan has a diverse natural environment, ranging from high alpine with permanent snow and glaciers to hot lowland desert. It thus supports a wide diversity of wildlife with a high level of floral endemicism. It also lies on main bird migration routes and its limited wetland habitats are of considerable international importance.

1. WB (n.d.). *World Data Bank, World Development Indicators, Afghanistan, a*vailable (November 2017) at: http://databank.worldbank.org/data/reports.aspx?source=2&country=AFG

It is not possible to measure the direct impact of POPs on the health of the Afghan people or on the natural environment due to a lack of monitoring capacity; however, both remain highly vulnerable. In cities, there is a high level of atmospheric pollution from the use of organic fuels which are known to produce dioxin-like substances. End-of-life products liable to contain POPs, are disposed of in solid waste from which they may leach into water courses and groundwater on which most people depend for their domestic supply. Only one of Afghanistan's drainage basins, the Kabul River, discharges into the open sea via the Indus River. The rest drain into inland basins and wetlands, where the accumulation of toxic chemicals will be most damaging.

A largely qualitative inventory of POPs releases in Afghanistan has been prepared as part of this NIP, which identifies clear national priorities for addressing POPs. The most significant is the unintended production of dioxin-like substances from the use of wood and coal for domestic heating and cooking and also from the incineration of clinical waste. Also of major importance is the disposal of end-of-life materials manufactured while POPs, such as the brominated fire-retardants HBB, PBDE and HBCD, were in widespread use. It is impossible to estimate precisely the quantities that may exist in the country as no statistics for imports exist over the relevant period, but these chemicals were commonly used in many consumer products in the period before the war. These POPs will be released into the environment unless the materials that contain them are disposed of in an environmentally sound manner.

The same considerations apply in relation to PFOS in imported textiles, plastics, synthetic carpet and paper products among many others. This is complicated by its continued Acceptable Uses under the Stockholm Convention for aviation hydraulic fluid, fire-fighting foams and certain medical devices. Another significant problem is the residue from the large quantities of HCH (Lindane) powder imported into Afghanistan from the Soviet Union for locust control over many decades until 1990. The warehouses used for storage in Herat, Mazar and Kunduz remain contaminated.

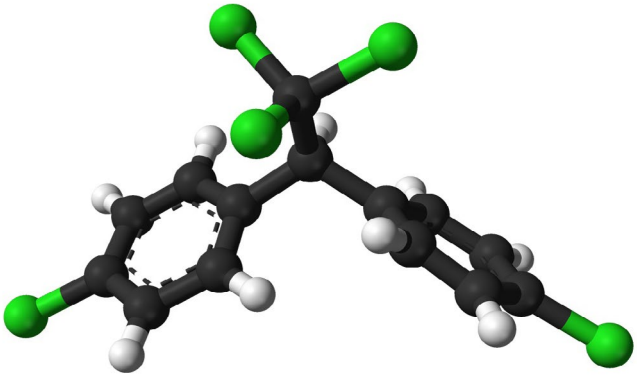
The final significant source of POPs was identified is the remains of the pre-war electrical distribution system in which cooling oils containing PCBs were used in transformers. Over 3,000 transformers from this period remain in Afghanistan, some still in use.

Based on these priorities, chemical action plans have been prepared, involving a number of responsible ministries and agencies. These include ongoing strategies to reduce air pollution and to improve management of solid waste. The electrical supply company, DABS, will undertake a survey of the remaining old transformers to determine their condition and make plans for their replacement and disposal. The Ministry of Public Health has an ongoing project to equip government hospitals with modern incinerators. These POPs action plans also include setting standards for products and materials that exclude POPs, and the Customs Service will develop Tariff Codes to identify commodities liable to contain POPs. In addition to these activities, projects, specific to the reduction or elimination of POPs and requiring a total funding of US$70.450 million are identified.

1

INTRODUCTION

The Stockholm Convention promotes international cooperation to eliminate or reduce the release of POPs into the environment



The Chemical Structure of DDT: a complex molecule containing Carbon and Chlorine

INTRODUCTION

The objective of the Stockholm Convention on Persistent Organic Pollutants (POPs) is to protect human health and the environment from the effects of POPs. The Stockholm Convention sets out a range of control measures to reduce and, where feasible, eliminate POPs releases, including emissions of unintentionally produced POPs. The Stockholm Convention also aims to ensure the sound management of stockpiles consisting of or containing POPs, and wastes consisting of, containing, or contaminated with POPs.

The Stockholm Convention was adopted on 22 May 2001 at the Conference of Plenipotentiaries on the Stockholm Convention on POPs in Stockholm on 22-23 May 2001. Afghanistan acceded to the Convention on 20 February 2013 and its accession came into effect on 21 May 2013.

The Stockholm Convention lists 26 chemicals, classified as pesticides, industrial chemicals or unintended production, in three annexes that collectively have the goal of continuing their minimization and, where feasible, ultimate elimination. For chemicals listed in these three annexes, parties to the Stockholm Convention are required to:

- Annex A: take measures to ***eliminate the production and use*** of these chemicals.
- Annex B: take measures to ***restrict the production and use*** of these chemicals.
- Annex C: take measures to ***reduce the unintentional release*** of these chemicals.

Chemicals in Annex B have Acceptable Uses specified. Parties may register specific exemptions for the use of chemicals in both Annexes A and B for whose use they have no effective replacement.

Afghanistan, owing to its post-conflict context, faces unique challenges in addressing the problems posed by POPs. During the decades of conflict, much of the country's infrastructure was destroyed and its institutions damaged or weakened, which have since needed to be rebuilt. The extremely low economic base from which the country is recovering means that both industry and agriculture depend on low level technologies, while much of the intellectual and technical capital of the country has been lost to emigration. Continuing insurgency and insecurity in many areas make it difficult for the Government and development agencies to enforce chemical management and regulation, while the country's long and porous land borders make it impossible to prevent the importation of environmentally damaging materials.

By acceding to the Stockholm Convention, Afghanistan undertook to submit to the Secretariat a National Implementation Plan (NIP) to fulfil the objectives of eliminating or reducing the production and use of the listed chemicals. The National Environmental Protection Agency (NEPA) of the Government of the Islamic Republic of Afghanistan is responsible for the implementation of the Stockholm Convention's obligations. This current NIP was developed by NEPA, with the generous support of the Global Environment Facility (GEF), and technical guidance from UN Environment.

Table 1: Chemicals listed as POPs under the Stockholm Convention

Chemical	Abbreviated name	Annex A	Annex B	Annex C
Pesticides				
Aldrin	n/a	X		
Alpha hexachlorocyclohexane	alpha HCH	X		
Beta hexachlorocyclohexane	beta HCH	X		
Chlordane	n/a	X		
Chlordecone	n/a	X		
DDT	DDT		X	
Dieldrin	n/a	X		
Endrin	n/a	X		
Gamma hexachlorocyclohexane	Lindane	X		
Heptachlor	n/a	X		
Hexachlorobenzene	HCB	X		X
Mirex	n/a	X		
Pentachlorophenol and its salts and esters	PCP	X		
Technical endosulfan and its related isomers	n/a	X		
Toxaphene	n/a	X		
Industrial Chemicals				
Hexabromobiphenyl	PBB	X		
Hexabromocyclododecane	HBCD	X		
Hexabromodiphenyl ether and heptabromodiphenyl ether	PBDE	X		
Hexachlorobutadiene	HCBD	X		
Pentachlorobenzene	peCB	X		
Perfluorooctane sulfonic acid its salts and perfluorooctane sulfonyl fluoride	PFOS	X	X	
Polychlorinated biphenyls	PCB	X		X
Polychlorinated naphthalenes	n/a	X		
Tetrabromodiphenyl ether and pentabromodiphenyl ether	PBDE	X		
Unintentional Production				
Polychlorinated dibenzo furans	PCDF/Furans			X
Polychlorinated dibenzo-p-dioxins	PCDD/Dioxins			X

While the lead government agency responsible for the development of the NIP process is NEPA, the extensive breadth of sectors where POPs can be found requires the involvement of a larger group of stakeholders and institutions for effective design and implementation. Therefore, a National Chemical Working Group was established, consisting of senior and technical staff from relevant government agencies (Annex 5). The overall process of developing the NIP was led by the National POPs Coordinator, with further support provided by technical staff of NEPA.

The structure of the following NIP is as follows:

1. Introduction
2. National Circumstances
3. Health and Environment Impacts of POPs
4. Institutional Assessment on POPs Management
5. National POPs Inventory
6. Chemical Action Plans and Gaps, Limitations, and Required Resources
7. Education, Outreach, and Awareness of POPs
8. References
9. Annexes

2

NATIONAL CIRCUMSTANCES

NATIONAL CIRCUMSTANCES

2.1 Geography

Afghanistan is a landlocked country in South and Central Asia with a rich history and diverse population. Afghanistan shares borders with six countries: Pakistan to the south and east, Iran to the west, Turkmenistan, Uzbekistan and Tajikistan to the north, and China in the far northeast. It lies between latitudes 29°N and 39°N, and longitudes 60°E and 75°E. It has an area of 652,864 square kilometres.[2]

Afghanistan has a continental climate with very harsh winters in the Central Highlands, the Northeast and the Wakhan Corridor, where the average temperature in January is below -15°C, and hot summers in the low-lying areas of the Sistan Basin of the Southwest, the Jalalabad Basin in the East, and the Turkestan Plains along the Amu River in the North, where temperatures average over 35°C in summer.

Afghanistan has a highly diverse environment, extending from hot sub-tropical desert to permanent snow. As well as the effect of altitude, its biodiversity is increased by its location at the junction of several biogeographical regions: the Irano-Turanian, the Saharo-Sindian, the Himalayan and the Indian, which all contribute elements to its flora and fauna. There is also a high degree of floral endemicism, estimated to be approximately 25-30%. In addition, its biological importance is enhanced by its position on the migratory pathway of birds between Siberia and the Indian subcontinent. Fragile wetlands in Afghanistan, such as Ab-e Estada and Kol-e Hashmat Khan, are crucial to the survival of migrating birds, some of which, such as the Siberian Crane, are endangered.

2.2 Demography

In the Human Development Report 2016, Afghanistan ranks 169 out of 188 states on the Human Development Index (HDI), a composite measure of welfare.[3] The national population in 2017 was estimated by the Central Statistics Organization at 27.9 million. The dependency ratio, defined as the number of dependants per 100 people of working age (ages 15-64) is 87%.[4] As a point of comparison, the corresponding figures for neighbouring Iran and Pakistan are 40% and 65%, respectively.

Life expectancy (for 2015) was estimated at 63.3 years. The maternal mortality rate in 2015 was 396 deaths per 100,000 live births, an improvement from 1,050 in 2001 and 536 in 2011.[5] Afghanistan's under-5 mortality rate is among the highest in the world, but has decreased considerably over the past 16 years, from 257 per 1,000 live births in 2000, to 161 in 2007/08, and further down to 70.4 deaths per 1,000 live births in 2015.[6] For the period 2010-2015, the under-5 mortality rate was 55 deaths per 1,000 live births.[7] And from 2000 to 2006, basic immunization coverage increased from 27 to 37%, and further up to 45% of male children (aged 12-23 months) and 46.4% of female children in 2015.[8]

2. CSO. (2014). *Afghanistan Statistical Yearbook 2013-2014*. Kabul: Central Statistics Organization.
3. UNDP. (2015). *Human Development Index 2015: Work for Human Development*. New York: United Nations Development Programme.
4. WB. (n.d.). *World Data Bank, World Development Indicators, Afghanistan*, available (November 2017) at: http://databank.worldbank.org/data/reports.aspx?source=2&country=AFG
5. WB. (n.d.). *World Data Bank, World Development Indicators, Afghanistan*, available (November 2017) at: http://databank.worldbank.org/data/reports.aspx?source=2&country=AFG
6. CSO. (2016). *Afghanistan Living Conditions Survey 2013-14: National Risk and Vulnerability Assessment*. Kabul: Central Statistics Organization.
7. CSO, MoPH, & ICF International. (2016). *Afghanistan Demographic and Health Survey 2015: Key Indicators*. Kabul & Rockville, Maryland: Central Statistics Organization, Ministry of Public Health and ICF International, p. 15.
8. Ibid, p. 15.

2.3 Economy

Agriculture is the foundation of the country's economy and livelihoods, and employs about 78% of the workforce. In 2015, agriculture contributed 22.6% of GDP even though only 12% of its total land is arable.[9] Production is constrained by an almost total dependence on winter snows and spring rains for water, which are susceptible to the impacts of climate change. The country's major staple is wheat, but it is not self-sufficient in its production.

The Crop Production Index (2004-6 = 100) was 134.5 in 2013, indicating a 34.5% rise over a seven-year period. Cereal yields in 2014 were 2,021 kg/ha.[10] The Agricultural Value Added per Worker (estimated in 2005 US$) is US$396 (equal to Kenya, 13th from bottom).[11] This is perhaps the most important indicator relating to building a prosperous rural economy.

Table 2: The Structure of Afghanistan's Economy 2016[12]

Indicator	Value/Percentage
GDP	US$ 19,469,022,207
GDP per Capita	US$ 580.0
GDP growth	2.2%
Inflation (consumer prices)	5.3%
Imports of goods and services as percentage of GDP	49.0%
Exports as percentage of GDP	6.9%
Services as percentage of GDP	55.4%
Agriculture value added as percentage of GDP	21.9%
Industry as a percentage of GDP (2011)	22.70%

Other natural resources include natural gas, petroleum, coal, copper, chromite, talc, barites, sulfur, lead, zinc, iron ore, salt, precious and semiprecious stones (emerald, lapis lazuli, red garnet and ruby). The country holds up to US$3 trillion in untapped mineral deposits, which could make it one of the richest mining regions on earth.[13] It also has potential to benefit from the proposed Turkmenistan-Afghanistan-Pakistan-India (TAPI) natural gas pipeline, which is intended to provide an export route for natural gas from the landlocked Central Asian countries.

Infrastructure across the country remains poor, despite massive recent investments. There are 9,468 km of paved road and 24,396 km of unpaved road.[14] Communications have been revolutionized by mobile phone systems developed by private companies, and CSO estimates that there are 24,888,203 mobile phones in the country, which have a great impact on access to information and communication. [15]

9. *World Data Bank, World Development Indicators, Afghanistan*, available (November 2017) at: http://databank.worldbank.org/data/reports.aspx?source=2&country=AFG
10. Ibid.
11. Ibid.
12. Ibid.
13. Yousaf, S. (2016). 'Afghanistan's Mineral Resource Potential: A Boon or Bane?' *Journal of Current Affairs*, Vol. 1, No. 1 & 2: 86-109.
14. CSO. (2014). Afghanistan Statistical Yearbook 2013-2014. Kabul: Central Statistics Organization.
15. Ibid.

2.4 Governance

Afghanistan is an Islamic Republic consisting of three branches: Executive, Legislative and Judicial. The UN-sponsored Bonn Conference in 2001 established a process for political reconstruction that included the adoption of a new constitution, a presidential election in 2004, and National Assembly elections in 2005. In December 2004, Mr. Hamid Karzai became the first democratically elected president of Afghanistan and the National Assembly was inaugurated the following December. President Karzai was re-elected in August 2009 for a second term. In September 2014, Prof. Ashraf Ghani, former Finance Minister, was elected President and Dr. Abdullah Abdullah was appointed Chief Executive Officer. Despite gains toward building a stable central government, continuing provincial instability, particularly in the south and the east, remain serious challenges.

The Constitution also establishes that the administration of the country be divided into ministries at the central level and provinces at the local level. Each province is governed by a publicly elected Provincial Council and a presidentially appointed Governor. Provinces are further sub-divided into the units of districts and villages, each of which can establish publicly elected councils to oversee activities and ensure active public participation in local level administration.[16] In urban areas, municipalities are established to administer city affairs, and are governed by a Mayor and Municipal Council.[17] Across the country, local level administration also includes Community Development Councils (CDCs) that lead community-based governance as well as reconstruction and development projects.

The glacial waters and snow-capped mountains of the Wakhan Corridor, Badakhshan.
©Alec Knuerr, UN Environment

2.5 International Relations

Afghanistan is a party to a total of 16 multilateral environmental agreements (MEAs), including the Rio Conventions on biodiversity, climate change, and desertification, as well as additional ones on endangered species and chemicals (see Table 3: *Multilateral Environmental Agreements to which Afghanistan is a Party*).

16. Afghanistan. (2004). *Constitution of the Islamic Republic of Afghanistan*, Art. 140.
17. Afghanistan. (2004). *Constitution of the Islamic Republic of Afghanistan*, Art. 141.

3

HEALTH AND ENVIRONMENT IMPACTS OF POPS

HEALTH AND ENVIRONMENT IMPACTS OF POPS

3.1 POPs in Afghanistan

Afghanistan does not have a large or advanced industrial sector, but it is growing as the country advances its development. Nevertheless, those industries that do exist are largely using processes of a low technological level generating high levels of pollution and with poor control of emissions and effluents. Industrial waste is usually mixed with general Municipal Solid Waste (MSW) or with domestic sewage. MSW and is usually disposed of in landfills, which may not be adequately sited or managed. Liquid effluents are mixed into the domestic sewage system, which itself is not treated, but discharged into open water or dumped. The problem of the impact of POPs on health and the environment in Afghanistan is inseparable from the general problems of pollution of the atmosphere, water, and soil.

3.1.1 Pesticides

Although it would not be true to say that there is no problem with pesticide exposure in Afghanistan, there are only two listed chemicals that are of concern in the context of POPs and the Stockholm Convention: endosulfan and lindane (and its related isomers). DTT is not used for malaria control in Afghanistan, but it is possible that some may be illegally imported.

Endosulfan:	Products containing endosulfan can be found in pesticide shops, even though it is banned by the Ministry of Agriculture, Irrigation and Livestock (MAIL). The danger of exposure is mainly to those using it, since it is not systemic. Where small farmers store their chemicals in their homes, there is a danger of accidental poisoning.
Lindane and Related Isomers:	Up until the 1980s, the USSR provided large quantities of HCH powder insecticide for locust control in the northern provinces of Kunduz, Samangan, Balkh, Jawzjan and Herat. This was primarily lindane (□-HCH), but the origin and hence the isomer mix is unknown. Many hundreds of thousands of tonnes were imported and stored in warehouses in Herat, Mazar-e Sharif and Kunduz. These stores were looted during the 1990s and the fate of their contents is unknown. The stores themselves were, and remain, heavily contaminated. The locations that were treated, which were mainly seasonal pastures, tended to be the same from year to year and so may remain contaminated. The possibility exists that HCH may enter the food chain through livestock grazing in contaminated areas.

3.1.2 Industrial Chemicals

PCB	Prior to the onset of war in Afghanistan, PCBs were widely used as coolant oils in the electrical distribution systems. During the war, some installations were destroyed or damaged and the oil spilled. These locations must now be regarded as contaminated hotspots. In some circumstances, the PCBs from the spilled oil may have leached into the groundwater, but, in any case, has contaminated the soil. Since 2002, some of the old equipment has been replaced, using oils that do not contain PCBs, though some remain in use. The damaged equipment is held in provincial stores pending disposal.
HBB and PBDE	Hexabromobiphenyl (HBB) and the polybrominated diphenyl ethers tetrabromodiphenyl ether, pentabromodiphenyl ether, hexabromodiphenyl ether and heptabromodiphenyl ether (PBDE) were widely used as fire retardants in the manufacture of electrical and electronic equipment, the interiors of vehicles, textiles and carpets between 1975 and 2004. They occur in polyurethane foam (PUR), textiles, epoxy resins, rubber, PVC, paints and hydraulic oils. Their release into the environment occurs at the end of the useful life of these items, when they are disposed of. Even though POP-PBDEs are considered to be no longer produced, the main challenge for their elimination is the identification of existing stockpiles and articles containing POP-PBDEs and their disposal at end-of-life. There are many old vehicles and other equipment from this period still in Afghanistan. Their most probable fate is recycling of the metal components and landfill or open burning of the plastics and fabrics. They are thus likely to be a significant element in the pollution to which the population is exposed. PBDEs are also precursors of brominated dibenzofurans (PBDF) and dibenzo-p-dioxins (PBDD). They are largely formed during primitive recycling of e-waste and incineration of PBDEs containing materials.[18] In addition, in other countries, biosolids from wastewater treatment plants are known to contain PBDEs, which were disposed in landfills and applied in agricultural lands.
PFOS (cntd)	Perfluoro-octane sulfonic acid, its salts, and perfluoro-octane sulfonyl fluoride (PFOS) are listed in Annex B of the Stockholm Convention, which means that their use, under certain restrictions, is still permitted. PFOS is a fully fluorinated anion, which is commonly used as a salt in some applications or incorporated into larger polymers, in which it forms a minor constituent. Such polymers are called PFOS-related substances and are also regulated by the Stockholm Convention, as they may break down and release the anion into the environment. PFOS is very persistent and ac-cumulates in biological systems. Unlike most other POPs, it does not accu-mulate in fatty tissue, but binds to proteins in the blood and liver.

18. UNEP. (2010). *Technical Review of the Implications of Recycling Commercial Penta and Octabromodiphenyl Ethers. Annexes. Stockholm Convention Document for 6th POP Reviewing Committee Meeting (UNEP/POPS/POPRC.6/INF/6) Geneva 11-15*. Geneva: United Nations Environment Programme.

PFOS (cntd)	The industrial use of PFOS is due to its surface-active properties, making it valuable in many applications. These include surface treatment of textiles (especially synthetic carpet), leather, paper (especially water and grease-proof food packaging). PFOS-related substances were also used in cleaning materials (such as automobile waxes, alkaline cleaners, denture cleaners and shampoos, cosmetics and hand cream, dishwashing liquids, waterproof sprays and car wash products), fire-fighting foam and mining. They are also used in certain medical devices, such as endoscopes. PFOS-related substances have various specific uses as chemical agents in the electronics, semiconductor and photographic industries. They are used in small quantities in closed systems and are not found in the final end products, such as digital cameras, cell phones, printers, scanners, satellite communication systems, radar systems. In the context of Afghanistan, the major concerns for PFOS are synthetic carpets because of the possible direct exposure of small children and ba-bies. Studies in other countries have found PFOS in house dust and indoor air, sewage sludge and releases from municipal treatment facilities. PFOS can be released when carpets are washed. At the end of their useful life, carpets may be disposed of in landfill or recycled, leading to further re-lease. Articles such as textiles, carpets, furniture and paint containing PFOS have in the past been dumped at landfills or dumpsites. Carpets can repre-sent a huge amount of contaminated waste. Recycling and reuse of synthet-ic carpets containing PFOS and its related substances are banned by the Stockholm Convention, and many of the products produced from recycled synthetic carpets represent direct exposure to the environment and humans. The use of PFOS and its related substances in food packaging is also of concern because of the direct exposure and possible implications for hu-man health. It is also the source for PFOS releases into the environment when it becomes waste. Finally, there is also the possible use of PFOS in mining and oil drilling. This has the potential of releases to water and the ground at the production sites, resulting in contaminated sites.

3.1.3 Unintended Production

Dioxins (PCDD) and Furans (PCDF)	Polychlorinated Dibenzo-p-dioxins (PCDD) and Polychlorinated Dibenzo Fu-rans (PCDF) occur entirely as the unintended by-products of combustion or as impurities in industrial chemical manufacture. They are produced by the combustion of biomass and fossil fuels for heat and power, some metal and chemical based industrial processes, the incineration of waste and internal combustion engines. They, therefore, are mainly released into the air, but may also find their way into water and soil through sewage and leachate from solid waste.

3.2 POPs Exposure Pathways

3.2.1 Air

Human exposure to POPs in Afghanistan is primarily through air. In Kabul, especially, there is a high degree of atmospheric pollution caused by domestic, transport and industrial combustion. The use of wood, coal, and oil (often recycled engine oil) for domestic heating and cooking results in higher concentrations within the home, increasing the exposure of women and children, which is reflected in their high mortality from respiratory disease.

3.2.2 Water

The lack of any effective treatment of urban waste water, including that from industrial activities, means that groundwater and open water, including rivers, lakes and wetlands, are the destination for POPs. In addition, the leachate of solid waste dumps and landfills, which also contains POPs, may find its way into waterways and groundwater. Many households depend on wells drawing on groundwater which may be contaminated.

Lakes and wetlands in Afghanistan play an important role in the migration of waterbirds. In particular, ducks, waders and herons rest and feed in the Kol-e Hashmat Khan wetlands near Kabul. Where fish form part of the diet, pollution of wetlands can enter the human food chain.

3.2.3 Soil

Compost from wastewater sludge and solid waste landfill is used as a fertiliser. This may be heavily contaminated with a range of toxic pollutants, such as heavy metals, but may also include POPs. This may result in POPs entering the food chain through fruit and vegetables.

3.3 Health Impacts

Although the health of the population of Afghanistan, as measured by life expectancy, infant/child mortality and maternal mortality is steadily improving, the effects of the lack of medical care, poor nutrition and poverty over the years of conflict are still present. A survey conducted on mortality in the three years until 2010 provides a profile of morbidity and a context in which to consider the effect of POPs. The proportion of female deaths attributed to respiratory infections was 14.7% compared with 10.9% for males. The proportion of deaths of children under five attributed to acute respiratory infection was 35.4%.[19] This is suggestive of the impact of air pollution within the home caused by the use wood, coal and other fuels for domestic heating and cooking.

The problem with assessing the impacts of POPs is that most exposed people and animals have a mixture in their bodies and these may interact in complex ways which we do not fully understand. Epidemiological studies therefore find it difficult to separate out the effects of the different chemicals. PCBs are probably the most common and for that reason are the most studied. In addition, some studies are based on individual incidents of mass poisonings from contaminated food or factory disasters, but these may not be typical of normal low level exposure. Most POPs listed in the Stockholm Convention are thought likely to be carcinogenic, though through different mechanisms, and their detailed health impacts are summarized below.

19. APHI/MoPH, CSO, ICF Macro, IIHMR & WHO/EMRO. (2011). *Afghanistan Mortality Survey 2010*. Calverton, Maryland: Afghan Public Health Institute, Ministry of Public Health, Central Statistics Organization, ICF Macro, Indian Institute of Health Management Research, and World Health Organization Regional Office for the Eastern Mediterranean.

Organo-chloride pesticides	Lindane and endosulfan are both chlorinated hydrocarbons and are highly persistent in the environment. Lindane is a carcinogen and interferes with development and reproduction. Endosulfan is acutely toxic and has caused many fatal poisonings, as well as developmental and reproductive defects.[20] It is highly persistent in the environment and residues have been found around the world far from where it has been used. Its bio-accumulation in fish makes it particularly dangerous where this is an important part of the human diet.
PCBs	PCBs are known to affect the functioning of the thyroid gland, which controls overall metabolic rate.[21] PCBs are also known to interfere with mental development, effecting language skills, memory and visuo-motor integration.[22] PCBs are carcinogenic and effect oestrogen metabolism, which is thought to be the mode by which it causes cancer. Bone growth and development is also reduced by exposure to PCBs.[23] It is known from mass poisoning incidents that PCBs increase the chances of infertility and stillbirths, and can also lead to lower birth weights, reduce cognitive function, and impede mental development. Exposure during gestation is also associated with a smaller thymus gland (an important organ in the immune system) at birth and lower response to vaccinations, indicating interference with the immune system.[24] An association has also been found between exposure to PCBs and furans (PCDF) and the death rate from Lupus erythematosus, an auto-immune disease.[25]
HBB and PBDE	These chemicals are less studied but exposure is associated with reduction in serum levels of Thyroid Stimulating Hormone and so interferes with metabolic rate in the same way as PCBs.[26]
PFOS	PFOS and related compounds have been shown to effect fertility. In studies in other countries, high levels of PFOS detected in serum and plasma samples have been correlated with fewer normal sperm and delayed pregnancy.[27] Other studies have shown the risk of developmental effects: There are correlations between prenatal exposure to PFOS and PFOA and reduced foetal growth, and a linkage between cord serum concentrations of PFOS and PFOA and reduced weight and size at birth.[28] Increased frequency of attention deficit hyperactivity disorder (ADHD) have also been observed in children with higher serum levels of PFOS and related substances.[29]
PCDD and PCDF	Dioxins and furans are associated with a number of serious toxic effects, including immune disorders, liver disorders, and chloracne (a skin disease).[30] There have been serious effects on children of parents exposed to dioxins. For example, Vietnam war veterans who were exposed to herbicides with dioxin impurities gave birth to a considerable number of children with congenital abnormalities, birth defects, and stillbirths. They are also thought to be possible carcinogens and to increase the risk of Type 2 Diabetes.[31] In another case, boys exposed to a mass poisoning incident during gestation had lower fertility.[32] And, as with exposure to PCBs, PCDF has been linked to higher incidence of the auto-immune disease Lupus erythematosus.

20. Carpenter, D.O. (Ed). (2013). *Effects of Persistent and Bioactive Organic Pollutants on Human Health.* Hoboken: Jon Wiley & Sons, Inc.
21. Ibid.
22. Ibid.
23. Ibid.
24.Ibid.
25. Ibid.
26. Ibid.
27. Ibid.
28. Ibid.
29. Ibid.
30. Ibid.
31. Ibid.
32. Ibid.

3.4 Environmental Impacts

Assessing the broader environmental impacts of POPs in Afghanistan is more difficult due to the nature and behaviour of the chemicals; however, the release of POPs into Afghanistan's precious water resources must be expected to have harmful effects. The lack of waste water treatment means that POPs in effluent will find their way into waterways and groundwater. Farmers depend on rivers for irrigation water, and if they are contaminated with chemicals, these will find their way into the soil and potentially back into the human food chain.

Of Afghanistan's five major river basins, only one, the Kabul River, drains into the open sea. The Amu Darya basin drains into the degraded inland Aral Sea, while the remainder drain into inland wetlands of great importance to the country's biodiversity, or are expended in irrigation. In either case, the accumulation of persistent toxic chemicals can only be extremely harmful.

3.5 Conclusion

In the absence of detailed studies and medical statistics, it is not possible to estimate the impact of POPs on the health of the population of Afghanistan in a quantitative way. Nevertheless, as demonstrated above, it is possible to draw attention to the range of risks which exposure poses.

Wastewater is discharged into the Kabul River, Kabul. ©Andrew Harvey, UN Environment

4

INSTITUTIONAL ASSESSMENT

INSTITUTIONAL ASSESSMENT

4.1 Environmental Policy in Afghanistan

Environmental Policy in Afghanistan is founded on the Environment Law that entered into force in 2007. This created the National Environment Protection Agency (NEPA) as the country's premier environmental body with an overarching role in determining environmental policy across government. All branches of government have obligations towards environmental policy, but NEPA has an over-riding authority.

The Environment Law is based on 13 fundamental principles and consists of nine chapters and 78 articles addressing all the country's main environmental concerns. For example, Chapter 4 addresses the regulatory provisions for pollution control and waste management, while Chapter 6 focuses on biodiversity, conservation and management of natural resources.[33] Overall, the Environment Law defines the functions and powers of NEPA and reflects the role of the agency as the apex body for the formulation, implementation, regulation and monitoring of Afghanistan's environmental policies and also as the coordinator for international environmental cooperation. To promote further integration and coordination of environmental matters with other government agencies, the Environment Law has established Afghanistan's Committee for Environmental Coordination (CEC) and the National Environmental Advisory Council (NEAC). Afghanistan has acceded to 16 Multilateral Environmental Agreements (see Table 3, below).

Table 3: Multilateral Environmental Agreements to which Afghanistan is a Party

#	MEA Name	Date of Accession
1	Convention on International Trade Endangered Species of Wild Fauna and Flora (CITES)	28 Jan 1986
2	United Nations Convention on Biodiversity (UNCBD)	19 Sep 2002
3	United Nation Convention to Combat Desertification (UNCCD)	01 Nov 1995
4	United Nations Framework Convention on Climate Change Convention (UNFCCC)	19 Sep 2002
5	Vienna Convention for the Protection of the Ozone Layer	17 Jun 2004
6	The Montreal Protocol on Substances that Deplete the Ozone Layer	17 Jun 2004
7	Kyoto Protocol to the UNFCCC	25 Mar 2013
8	Cartagena Protocol on Biosafety to the UNCBD	20 Jan 2013
9	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	06 Mar 2013
10	Stockholm Convention on Persistent Organic Pollutants	20 Feb 2013
11	Convention on the Conservation of Migratory Species	01 Aug 2015
12	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	25 Mar 2013
13	Ramsar Convention	*In Process*
14	The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the UNCBD	17 Jan 2017
15	Minamata Convention on Mercury	02 May 2017
16	Paris Climate Agreement under the UNFCCC	15 Feb 2017

33. NEPA & UNEP. (2015). *Climate Change and Governance in Afghanistan.* Kabul: National Environmental Protection Agency & United Nations Environment Programme.

4.2 Government Institutions with Responsibilities that Relate to Enforcement of POPs Policies

Although NEPA is the premier institution for overseeing Afghanistan's environment, the wide breadth of sectors in which POPs can be found requires a coordinated effort across government in order to reduce effectively the health and environmental risks of these chemicals. The most relevant institutions and their responsibilities are summarized in Table 4.

Table 4: Government Institutions with Responsibilities that Relate to Enforcement of POPs Policies

#	Institution	Responsibility
Government Ministries		
1	Ministry of Agriculture, Irrigation and Livestock (MAIL)	Pesticide Regulation
2	Ministry of Energy and Water (MEW)	Water quality and energy policy as it relates to environmental issues
3	Ministry of Finance (MoF)	Customs Service; controlling the import and export of goods
4	Ministry of Public Health (MoPH)	Regulation of all hospitals and clinics including standards for disposal of clinical waste
5	Ministry of Higher Education (MoHE)	Supervises universities and other institutions of tertiary education and determines university syllabuses.
6	Ministry of Interior Affairs (MoIA)	Responsible for Afghan National Police who enforce the law and civil fire-fighting service.
7	Ministry of Mines and Petroleum (MoMP)	Regulation of the mining and petroleum sector
8	Ministry of Transport (MoT)	Public transportation, land and air
9	Ministry of Commerce, Trade, and Industries (MoCTI)	Industrial Policy
10	Ministry of Urban Development and Housing (MoUDH)	Urban Policy and Planning, including waste management.
Government Independent Agencies		
11	National Environmental Protection Agency (NEPA)	Environmental law and policy
12	Independent Directorate of Local Governance (IDLG)	Municipalities are responsible for urban public services, including disposal of solid waste and for licensing small businesses.
13	Afghanistan Investment Support Agency (AISA)	Registers businesses to ensure compliance with law and manages industrial parks
14	Afghanistan National Standards Authority (ANSA)	Sets national standards for consumer products
15	Central Statistics Organization (CSO)	Collects, collates and publishes national statistics
16	Da Afghanistan Breshna Sherkat (DABS)	Responsible for the importation, generation and distribution of electricity.
17	Afghanistan Urban Water Supply and Sewerage Corp. (AUWSSC)	Developing and maintaining urban water supply and wastewater disposal

4.3 Inter-ministerial Structures with Responsibilities that Relate to POPs Management

Table 5: Inter-ministerial Structures with Responsibilities that Relate to POPs Management		
#	Inter-ministerial Structure	Responsibility
1	Committee for Environmental Coordination (CEC)	To guide mainstreaming of environmental issues into national development policies, assessing and providing recommendations on the delegation of functions of government institutions on environmental issues, and guiding the coordination of environmental activities across relevant stakeholders at the national and provincial levels.
2	National Environmental Advisory Council (NEAC)	To advise NEPA on financial, regulatory, and environmental matters of national importance.
3	Subnational Environment Advisory Councils (SEACs)	To make recommendations regarding financial matters, including budgets and annual accounts, and environmental issues that are of local importance.
4	The Afghanistan Wildlife Executive Committee (AWEC)	To assess the risk to Afghan species at the national level using the International Union for the Conservation of Nature's (IUCN) regional criteria.
5	The Parliamentary Committee on the Environment (PCE)	Responsible for considering legislation related to the environment, addressing environmental concerns, and environmental oversight, particularly in relation to the Environment Law.
6	National Chemical Working Group (NCWG)	To develop and oversee the application of National Implementation Plans for Chemical Conventions.
7	Supreme Commission on Air Pollution Prevention	To coordinate cross-government policies and actions related to air pollution.

4.4 Legislation that Relates to POPs Management

Table 6: Legislation that Relates to POPs Management[34]			
Agency name	Laws	Gazette	Year
ANSA	Afghanistan National Standard Law	1107	2014
CSO	Statistics Law	1110	2014
MAIL	Pesticide Law	1190	2016
MoF	Customs Law	847	2004
MoMP	The Hydrocarbons (Petroleum and Gas) Law	972	2009
MoMP	Mineral Law	972	2009
MoPH	Public Health Law	916	2007
MoT	Regulation of Fuel Consumption	1015	2011
MoCTI	Law of Tax on Consumer Goods	517	1982
MoCTI	Investment Law	797	2001
MoCTI	Law on trade of goods	1001	2009
MoCTI	Law of Commerce	n/a	1955
MoCTI	Law of Commercial Trademarks	n/a	1960
NEPA	Environment Law	912	2007

34. MoJ. (n.d.). *Official Gazette of the Islamic Republic of Afghanistan.* Kabul: Ministry of Justice.

In addition, ANSA has developed the following standards that are of relevance to POPs:

- Standard for Construction Materials
- National Standard on Textiles
- National Standards on Pharmaceutical Products and Cosmetics
- National Electronics and Telecommunication Standards
- National Environmental Standards
- National Fuel Standard
- National Standards on Chemicals and Plastics

4.5 Regulation of Pesticides

Regulation of pesticides is governed by the Pesticide Law of 2016. This places responsibility for registration of pesticide products, dealers and importers on MAIL. The law makes provision for a registration committee who will advise the Minister.

4.6 Regulation of Industrial Chemicals

All large businesses must be registered with MoCI, who ensure compliance with the Environment Law, including, for industrial enterprises, an Environmental Impact Assessment (EIA) approved by NEPA. This allows the prevention of any process that involves the use of POPs.

The Monitoring and Inspection Division of NEPA visit and inspect factories to ensure compliance with the Environment law. Staff of the EIA and Monitoring and Inspection Divisions of NEPA will require training to ensure compliance with the NIP, particularly on technical aspects. The Monitoring and Inspection Division lacks sufficient resources to enforce the law.

Small, bazaar-based workshops are registered with the municipalities, but there is little supervision of environmental compliance.

4.7 Regulation of Unintended Production

Most unintended production of POPs in Afghanistan is through incomplete combustion of fuel or waste. It is therefore covered by the regulation of atmospheric pollution. Under the Environment Law, there is a Supreme Commission on Air Pollution Prevention (see Table 5), on which 19 government ministries and agencies are represented. It is currently being chaired by the Chief Executive of the Government of the Islamic Republic of Afghanistan. Its role is to coordinate cross-government policies and actions. It takes action through the line ministries and agencies.

Inspection of waste disposal incinerators and industrial furnaces is the responsibility of NEPA. Fuel quality, which is a factor contributing to air pollution, is regulated by ANSA. Small workshops, which may use metallurgical processes that generate POPs, are effectively unregulated. ANSA also sets standards for imported vehicles. ANSA may need further technical briefing to modify these standards to reduce POPs production.

Waste landfills may generate POPs by combustion, or contain materials, such as synthetic carpet, with POPs. They are managed by municipalities and subject to inspection by NEPA.

Domestic heating from stoves (bukhari) is a major source of air pollution, as is the use of small electrical generators to make good the deficiencies in the power network. These are unregulated, although Afghanistan has banned the use of stoves in government offices and replaced them with gas heaters.

The disposal of clinical waste is problem beyond POPs, but inefficient incineration may produce dioxin-like substances. MoPH has the power to close hospitals which do not comply with clinical waste disposal regulations. Officials may need specific training in relation to the problem of POPs.

NEPA does not presently have equipment to detect and measure atmospheric emissions of POPs.

4.8 Regulation of Importation

Control of importation of goods through the border posts is the responsibility of the Customs Service, under MoF. Control is based on the international Harmonised System (HS) codes. The international code is six digits which define a broad category, e.g. all pesticides are 38 08 91. Countries may add a further four digits. In Afghanistan, this is the Tariff Specification Code (TSC). The Customs Service is willing to use the TSC to identify commodities containing POPs. Customs officers will require training to implement any regulations relating to POPs.

The Customs Service has a laboratory designed by the World Customs Organisation. It has six graduate staff and a director. It will be equipped for Gas Chromatography (GC) and Mass Spectroscopy (MS). The procurement package includes training of laboratory staff.

4.9 Regulation of Waste Disposal

Most waste is treated as MSW and disposed of in landfills. They are managed by the municipal authorities and are subject to regulation by NEPA. They contain a wide range of obsolete goods, such as carpets and furniture, which may contain POPs or produce them when burned or broken down.

Many landfills are poorly sited so that dangerous effluents may escape. They are also subject to spontaneous combustion of methane, which may release POPs into the air. NEPA is the regulating authority, but it is difficult to impose practical solutions on waste disposal.

4.10 Summary of Capacity for POPs Management

Afghanistan has a good institutional and legal structure for environmental regulation and this provides adequate provision to deal with POPs. Since management of POPs is a multi-agency task, staff in all agencies will require awareness training for the POPs issue and also may need further specific technical training to fulfil their roles effectively. However, the enforcement agencies are understaffed and under-resourced, and the data they collect is not computerised in a way that gives adequate information to management.

At present, there is no laboratory in Afghanistan certified to analyse materials for POPs. Therefore, any samples must be sent abroad if such analysis is required.

In addition, major sources of pollution, such as waste disposal and domestic heating, are too large and intractable to enable a significant reduction in their POPs emissions to be achieved without major structural development. Thus, the problem posed by POPs should not be seen in isolation. The production of POPs is one aspect of general pollution which includes ozone-depleting chemicals, greenhouse gases and other substances harming health such as heavy metals and particulates.

5

NATIONAL POPS INVENTORY

NATIONAL POPS INVENTORY

5.1 Pesticides (DDT, toxaphene, dieldrin, chlordane, pentachlorophenol with its salts and esters, aldrin, endrin, heptachlor, mirex, chlordecone, hexachlorobenzene with its related isomers and technical endosulfan)

A. Baseline Situation

Although the use of DDT for malaria control is permitted under the Stockholm Convention, Afghanistan has not taken advantage of this exemption and it is not used as part of the MoPH's malaria programme. None of the other pesticides listed in this category are currently used in Afghanistan, with the exception of some small-scale illegal importation of endosulfan.

The principal concern is the residue remaining of the large-scale locust control campaigns that took place up until the 1980s in the northern provinces of Badghis, Baghlan, Balkh, Herat, Jawzjan, Kunduz, and Samangan. These used large quantities of γ-HCH powder provided by the USSR. Over the decades, hundreds of thousands of tonnes were imported and stored in warehouses in Herat, Mazar-e Sharif and Kunduz cities. These stores were looted during the 1990s and the fate of their contents is unknown. The stores themselves were, and remain, contaminated. The locations that were treated, which were mainly seasonal pastures, tended to be the same from year to year and so may also remain contaminated. The possibility exists that HCH may enter the food chain through livestock grazing on contaminated areas.

B. Methodology

Without an extensive programme of soil sample analysis, it is not possible to quantify the amount of HCH that remains in the country. It is now more than 30 years since it was used extensively.

C. Conclusion

Residues in the treated areas have probably largely broken down or evaporated by now, but the sites of the stores must be regarded as contaminated. They are located in the cities of Herat, Mazar-e Sharif and Kunduz.

5.2 Polychlorinated biphenyls (PCBs)

A. Baseline Situation

Electrical equipment dating from the pre-war era was identified as the main source of industrial PCBs in the country. Most of the pre-war electrical distribution system was destroyed in the conflict and has since been replaced with modern equipment that does not use PCBs. However, some pre-war transformers are located across the country.

B. Methodology

The responsible agency, DABS, was asked to provide details of stockpiles of old equipment and of sites where substations had been destroyed and the sites contaminated.

C. Conclusion

There are:

- One non-functional Russian transformer with capacity of 20MVA located in the Eastern substation of Kabul region.
- Approximately 3,330 old Russian, Pakistani, Bulgarian, Eastern German and Siemens active transformers located in north, south-east and west regions of Kabul province with medium voltage capacity and still functional.

- Six old damaged transformers in the Kandahar area.
- Damaged substations located in eastern Hoot Khail village, and Breshna Koot area.

There is clearly a major problem with large numbers of transformers from the pre-war era, some being still in use. A survey of these to establish the level of PCB contamination is necessary (see Annex 1 for appropriate survey form).

5.3 Dioxins (Polychlorinated dibenzo-p-dioxins - PCDD), Furans (Polychlorinated dibenzo-furans - PCDF) and PCBs from Unintentional Production

A. Baseline Situation

Dioxins, Furans, and PCBs constitute families of closely similar congeners which nonetheless differ significantly in their toxicity. Total emissions are therefore expressed in terms of grams Toxic Equivalency (TEQ). The quantities of the various congeners are multiplied by a toxicity factor that relates to the most toxic. The TEQ of a congener half as toxic as the most toxic would be 0.5. The quantities of the various congeners in the emissions are multiplied by their respective TEQs and the sum of these is the gTEQ.

The sources of unintended production of POPs are classified into the following nine groups:

1. Waste Incineration

2. Ferrous and Non-Ferrous Metal Production

3. Heat and Power Generation

4. Production of Mineral Products

5. Transportation

6. Open Burning Processes

7. Production of Chemicals and Consumer Goods

8. Miscellaneous

9. Disposal

B. Methodology

UN Environment has developed a toolkit for calculating gTEQ from the level of activity of various processes. For example, one thousand tons of Municipal Solid Waste (MSW) incinerated by low technology with no air pollution control would release 350 gTEQ into the air. The following section presents an overview of the situation of each of the sources of unintended POPs production as well as the research methods employed to harvest data for inclusion in the POPs inventory.

Unintended Production Source	Overview and Research Methods
Waste Incineration	There is no incineration of MSW. Infectious medical waste must be disposed of by incineration because of the danger of transmitting pathogenic micro-organisms. Most hospitals have simple diesel incinerators which, unfortunately, do not operate at a sufficiently high temperature to prevent the production of dioxins and furans. The new hospital in Bamyan is equipped with a high technology medical incinerator that conforms to all international standards. The MoPH currently has a project to equip government hospitals with modern incinerators but its resources are insufficient. A commercial company in Kabul has a modern incinerator which provides services to private hospitals. More information is needed on current medical waste incineration facilities, especially in Kabul. A survey form for this has been developed for waste incineration and is given in Annex 1. Emissions from this source may be much higher than estimated if the technology is lower than thought.
Ferrous and Non-ferrous Metal Production	From currently available information, it seems that most metal production in Afghanistan consists of recycling scrap into low quality products such as aluminium pressure cookers and steel bars used in construction. No information is yet available on the quantities involved. The technologies used for this are likely to be quite low and with high levels of pollution. No quantities have been entered into the toolkit for this activity. A survey form for this activity has been developed and is given in Annex 1.
Heat and Power Generation	DABS provided data on the output (MWhrs) of its fossil fuel power stations. The quantities of fuel used for domestic heating and cooking are taken from Asian Development Bank (ADB)'s Greenhouse Gas Inventory for Afghanistan (2007). They are converted to Terajoules for the Toolkit. These data are likely to be an underestimate of the current usage, but give an indication of the scale of emissions from this sub-sector. Survey forms for power stations, bakeries and domestic fuel have been developed and are given in Annex 1.
Production of Mineral Products	With construction being a major sector of Afghanistan's economy and important source of employment, there has been a great increase in the demand for building materials. Of these, bricks produced by traditional kilns are a major part. These may use mixed fuels which include rubber tyres, waste timber, plastics, waste oils and almost any other cheap combustible material. They constitute a major source of atmospheric pollution. WB estimate that there are more than 2,000 kilns. They operate for 7 months/year and have a maximum output of 200,000 bricks/month. This is equal to 1 million tons. Assuming effective output of 50%, a figure of 500,000 tons has been used.

Unintended Production Source	Overview and Research Methods
	There is a small traditional glass industry in Herat and a traditional pottery industry in Istalif, but they would not contribute significantly to the emission of POPs. No quantities have been entered into the toolkit for these activities. A survey form for this activity is has been developed and is given in Annex 1.
Transportation	Data on the number of motor vehicles registered during the year 1392 AH were taken from the CSO Statistical Yearbook 2013/14. Estimates on the proportion of petrol and diesel vehicles and daily use are taken from NEPA/ADB Kabul Air Quality Management Strategy (2007). Estimates of fuel consumption (litres/100 km) are derived from the Ministry of Justice Annexes to Regulation on Fuel Consumption, Official Gazette Issue No:(1015). From these data, an estimated calculation of the total annual consumption of diesel and petrol by motor vehicles was made (Annex 2): • diesel 343 million litres • petrol 1,330 million litres. These figures must be treated as approximate, but provide an indication of the relative scale of emissions from this source. A significant finding is that 2-stroke engines (motor-cycles and rickshaws) are producing 1.965g TEQ whereas 4-stroke engines are producing 0.96g TEQ. This does not include the emissions from heavy machinery, which will be from diesel or heavy oil.
Open Burning Processes	In general, agricultural residues are not burned in Afghanistan, but used as domestic fuel or animal feed. There are few reports of forest fires, but grassland fires may occur at the end of the season as pastures dry out. The ADB Greenhouse Gas Inventory provides a figure for open burning of 3,170.67 Gg.[35] This includes crop residues used as fuels. MoI provided data for the number of accidental fires over a 6-month period. Wood from demolition is likely to be used for domestic fuel.
Production of Chemicals and Consumer Goods	Afghanistan has no major chemical or manufacturing sector. The CSO gives the number of enterprises in the chemical sector as 50 and the number in light industry at 189. A total of 104 is given for printing paper and carpentry. There is a small sector manufacturing low quality plastic products such as sandals, probably using recycled material. No quantities for these activities are entered in the Toolkit.

35. ADB. (2007). *Afghanistan Greenhouse Gas Inventory Report*. Manila: Asian Development Bank.

Unintended Production Source	Overview and Research Methods
Miscellaneous	As a Muslim country, cremation is not regularly practiced in Afghanistan, but there are small Hindu and Buddhist communities which do so. The annual number of cremations is small. New crematoria are planned. This activity is not regarded as a significant source of POPs. The Customs Service reported that 878 tons of cigarettes were legally imported in the Fiscal Year 1394. Given the extreme porosity of Afghanistan's borders, this is certainly a considerable underestimate.
Disposal	NEPA provincial offices were asked for data on MSW landfill and waste water disposal (see Annex 3 for details). Where MSW quantity was given as cubic metres, a conversion factor of 2.12 m3 per ton has been used. Not all provinces have made returns. These enquiries are being followed up by NEPA staff.

C. Conclusion

The quantity of gTEQ/annum, as calculated by the toolkit, is included in Table 7, below. The data are given in Annex 4. In view of the very high production of these substances from low technology medical waste incineration and the lack of precise information, this should be regarded as a priority for further investigation and action.

Table 7: Annual Releases of Dioxins, Furans and PCBs from Unintended Production (gTEQ)

Group	Source Groups	Annual Releases (gTEQ/a)			Product	Residue
		Air	Water	Land		
1	Waste Incineration	27.0	0.0	0.0	0.0	0.2
2	Ferrous and Non-Ferrous Metal Production	0.0	0.0	0.0	0.0	0.0
3	Heat and Power Generation	93.8	0.0	0.0	0.0	3.2
4	Production of Mineral Products	0.0	0.0	0.0	0.0	0.0
5	Transportation	3.0	0.0	0.0	0.0	0.0
6	Open Burning Processes	95.5	0.0	32.1	0.0	0.0
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	0.0	0.0
8	Miscellaneous	0.0	0.0	0.0	0.0	0.0
9	Disposal	0.0	2.4	0.0	1.0	211.5
10	Identification of Potential Hot-Spots				0.0	0.0
1-10	**Total**	**220.2**	**2.4**	**32.1**	**1.3**	**215.0**
Grand Total		**471**				

5.4 Hexabromobiphenyl (HBB) and the polybrominated diphenyl ethers (PBDE): tetrabromodiphenyl ether, pentabromodiphenyl ether, hexabromodiphenyl ether and heptabromodiphenyl ether

A. Baseline Situation

These polybrominated ethers have been used as fire retardants in a wide range of products including building materials, electronics, furnishings, motor vehicles, airplanes, plastics, polyurethane foams, and textiles. Although they are being replaced, there are many articles in use that contain them and so they are likely to occur in Afghanistan.

These chemicals have probably not been produced since 2004 and so are unlikely to occur in the products and materials that have been imported since the overthrow of the Taliban regime. Their likely fate at the end of their useful lives is as MSW and it is from landfill and dumps that HBB and PBDE can be released into the environment.

B. Methodology

Products and materials imported before this date are liable to contain them and there is no practical way of assessing the quantities involved.

C. Conclusion

The appropriate action to deal with these chemicals is the improved management of MSW.

5.5 Hexabromocyclodecane (HCBD)

A. Baseline Situation

HCBD has been used as a flame retardant for expanded and extruded polystyrene building materials. It has a strong potential to bioaccumulate. It has been replaced in most countries, but Turkey, China, the Czech Republic and the European Union retain specific exemptions for this and so polystyrene building materials from these countries should be checked for its presence.

B. Methodology

Not applicable.

C. Conclusion

The main risk of release lies when the materials are disposed of when the buildings are demolished.

5.6 Perfluoro-octane sulfonic acid, its salts, and perfluoro-octane sulfonyl fluoride (PFOS)

A. Baseline Situation

Perfluoro-octane sulfonic acid, its salts, and perfluoro-octane sulfonyl fluoride (PFOS) is the name given to a family of industrial chemicals valued for their surface-active properties. PFOS is listed in Annex B of the Stockholm Convention, which means that their use, under certain restrictions, is still permitted. PFOS is still produced in several countries.

Acceptable purposes:

- Photo-imaging, photo-resist and anti-reflective coatings for semi-conductor
- Etching agent for compound semi-conductor and ceramic filter
- Aviation hydraulic fluids
- Metal plating (hard metal plating) only in closed-loop systems
- Certain medical devices (such as ethylene tetrafluoroethylene copolymer (ETFE) layers and radio-opaque ETFE production)
- In-vitro diagnostic medical devices
- CCD colour filters
- Fire-fighting foam
- Insect baits for control of leaf-cutting ants from Atta spp. and Acromyrmex spp

A number of countries registered specific exemptions to permit the continued production or use of PFOS. Those that involve goods that may enter the market are listed in Table 8. Although most exemptions have expired, goods from these countries manufactured before the expiry may still be in circulation.

TABLE 8: Specific Exemptions Registered for the Production or Use of PFOS

PARTY	EXPIRY DATE	PURPOSE OF PRODUCTION USE	REASON FOR EXEMPTION
China	Not provided	04. Electric and electronic parts for some colour printers and colour copy machines	Currently in use without appropriate alternatives and transition will take some time
Viet Nam	Expired on 26/08/2015	04. Electric and electronic parts for some colour printers and colour copy machines	Still in use
Viet Nam	Expired on 26/08/2015	07. Carpets	Still in use
Viet Nam	Expired on 26/08/2015	08. Leather and apparel	Still in use
Viet Nam	Expired on 26/08/2015	09. Textiles and upholstery	Still in use
Viet Nam	Expired on 26/08/2015	10. Paper and packaging	Still in use
Viet Nam	Expired on 26/08/2015	11. Coatings and coating additives	Still in use
Viet Nam	Expired on 26/08/2015	12. Rubber and plastics	Still in use
Nigeria	Expired on 26/08/2015	07. Carpets	No alternative for now
Nigeria	Expired on 26/08/2015	08. Leather and apparel	No alternative for now
Nigeria	Expired on 26/08/2015	09. Textiles and upholstery	No alternative for now

Nigeria	Expired on 26/08/2015	10. Paper and packaging	No alternative for now
Nigeria	Expired on 26/08/2015	11. Coatings and coating additives	No alternative for now
Nigeria	Expired on 26/08/2015	12. Rubber and plastics	No alternative for now
Iran	Expired on 26/08/2015	07. Carpets	Country data not yet established
Iran	Expired on 26/08/2015	08. Leather and apparel	Country data not yet established
Iran	Expired on 26/08/2015	09. Textiles and upholstery	Country data not yet established
Iran	Expired on 26/08/2015	10. Paper and packaging	Country data not yet established
Iran	Expired on 26/08/2015	11. Coatings and coating additives	Country data not yet established
Iran	Expired on 26/08/2015	12. Rubber and plastics	Country data not yet established
Viet Nam	Expired on 26/08/2015	04. Electric and electronic parts for some colour printers and colour copy machines	Still in use
Viet Nam	Expired on 26/08/2015	07. Carpets	Still in use
Viet Nam	Expired on 26/08/2015	08. Leather and apparel	Still in use
Viet Nam	Expired on 26/08/2015	09. Textiles and upholstery	Still in use
Viet Nam	Expired on 26/08/2015	10. Paper and packaging	Still in use
Viet Nam	Expired on 26/08/2015	11. Coatings and coating additives	Still in use
Viet Nam	Expired on 26/08/2015	12. Rubber and plastics	Still in use

Consequently, PFOS may be released into the environment if Afghanistan from the following sources:

- Stockpiles of fire-fighting equipment
- Training sites for fire-fighting
- Waste containing treated paper, food packaging, old synthetic carpet, electronics textiles, and leather.
- Waste aviation hydraulic oil
- Incineration or disposal of waste medical devices
- Paper and printing industry

B. Methodology

UN Environment provides guidance for estimating the inventory for PFOS:

Using the Harmonised System (HS) Codes for internationally traded commodities, the Customs Service was requested to supply statistics for the importation of goods which may contain PFOS (see Table 9):

Table 9: Value of Imported Goods Possibly Containing PFOS

Item	HS Code	Value (Afs)
Synthetic carpet	57 01 90	540,440,000
Synthetic carpet	57 02 32	700,000
Synthetic carpet	57 02 42	850,000
Synthetic carpet	57 02 92	160,000
Firefighting foams	38 13 00	0
Waterproof paper and paper food packaging	48 06 40	9,000,000
Paints and varnishes	32 08 10	327,000,000
Paints and varnishes	32 08 20	2,000,000
Finishing agents for textiles	38 09 10	4,000,000
Finishing agents for textiles	38 09 91	60,000,000
Welding and soldering	38 10 10	1,380,000
Welding and soldering	38 10 90	190,000
Aircraft hydraulic fluid	38 19 00	293,000,000

C. Conclusion

These figures raise obvious priorities: synthetic carpet, finishing agents for textiles and aircraft hydraulic fluid. PFOS are only used in the very high quality paints and varnishes and so the high figure for this category should not be taken as an indication that large quantities of PFOS are entering Afghanistan in this form. Some of the companies listed in the chemical sector formulate domestic cleaning products from imported materials; these may contain PFOS. No return was made for fire-fighting foams as it is imported for government use and so not liable to customs duties.

5.7 Hexachlorobutadiene (HCB)

A. Baseline Situation

HCB is an industrial solvent no longer produced intentionally.

B. Methodology

Not applicable.

C. Conclusion

Since Afghanistan has no chemical industry, it does not produce it nor has any demand for it. It is not therefore considered further

5.8 Pentachlorobenzene (PeCB)

A. Baseline Situation

PeCB was used in PCB products, in dyestuff carriers, as a fungicide, a flame retardant and as a chemical intermediate, e.g. previously for the production of quintozene. PeCB might still be used as an intermediate. PeCB is produced unintentionally during combustion, thermal and industrial processes. It is also present as impurities in products such as solvents or pesticides.

B. Methodology

Not applicable.

C. Conclusion

PeCB is unlikely to be present in any quantity in Afghanistan, but measures taken to prevent the release of POPs from waste and unintentional production from combustion should also reduce any quantity that may exist.

The DABS stock of transformers needs to be surveyed for PCB oils. Kabul © Andrew Harvey, UN Environment

5.9 Gaps in the Inventory

Medical incineration	More information is needed on the technologies used to incinerate medical waste and the quantities processed. A joint survey by MoPH and NEPA should be carried out, using the form developed by the NCWG (Annex 1).
Mineral Production	No information was obtained on the quantities of cement, lime and glass. A survey of these processes needs to be made
Cremation	No information was obtained on the number of cremations per year.
Accidental Fires	No data are available for accidental vehicle fires.
Motor Fuel	No information was obtained on the consumption of diesel and heavy oil by engineering equipment. No information was obtained on the consumption of gasoline and diesel by private generators, domestic or industrial.
PCBs in Electrical Distribution Equipment	A full survey of pre-war transformers and capacitors held by DABS needs to be made. A joint NEPA/DABS mission, using the survey form developed by the NCWG should be made. (Annex 1)
Fire-fighting foams	No information has been obtained regarding fire-fighting foams. The Customs Service report no importation. The largest user is the aviation industry, but they may also be used by the Fire Service of the Ministry of Interior and by the Ministry of Defence. Large quantities would probably have been imported by the international forces and may have been handed over to the appropriate Afghan authorities. Further enquiries will be made.
Fire Retardants (HBB, PBDE, HBCD)	The available information on materials and products containing fire retardants is inadequate. The use of POPs for this purpose has been discontinued, but an unknown quantity must remain from the pre-war era. Building materials from countries retaining an exemption, such as Turkey containing expanded polystyrene should be regarded as a risk.
Industrial Production	More information is needed about the industrial sector: technologies used, materials (such as those used for finishing textiles, leather and paper, soldering and welding and as ingredients in cleaning products) imported and levels of production. Where materials are imported, checks need to be made as to their origin and whether they contain PFOS. Similarly, the origins of finished goods, such as paper, textiles, carpet, leather and plastics need to be known and whether they contain PFOS. There is also the possible use of PFOS in mining and oil drilling. This has the potential of releases to water and the ground at the production sites, resulting in contaminated sites.

6

CHEMICAL ACTION PLANS

CHEMICAL ACTION PLANS

The chemical action plans represent the actual means by which the government of Afghanistan will reduce or eliminate the production and release of POPs in the country. Separate plans have been developed for each group of chemicals requiring a similar approach, or, in some cases a single chemical. Each chemical action plan sets objectives, activities and results, identifies responsible agencies, sets a budget and timeline for each activity.

The actions to eliminate and reduce the release of POPs in Afghanistan will be implemented by the responsible agencies, acting through the National Chemical Working Group, under the mandate of NEPA.

NEPA will issue a regulation under the Environment Law to provide legal basis for preventing the importation of products and materials containing POPs except when an Acceptable Use has been approved. The Customs Service will have the responsibility of enforcing these regulations.

Certain actions, such as improvements in waste water treatment and municipal waste disposal, require heavy investment. Some of this is in process. Further assistance as necessary will be sought from the funds pledged by the international community to rehabilitate the country's infrastructure.

6.1 National POPs Policy Statement

The environmental policy of the Government of the Islamic Republic of Afghanistan is expressed in the National Environment Strategy (NES), whose vision is to improve the quality of life of the people of Afghanistan through conservation, protection and improvement of the country's environment. The aims of the policy are to:

- Secure a clean and healthy environment for the people of Afghanistan.
- Attain sustainable economic and social development while protecting the natural resource base and the environment of the country.
- Ensure effective management of the country's environment through participation of all stakeholders.

The NES asserts the commitment of the Government to accede to and meet its obligations under all relevant MEAs. It also addresses the fundamental causes of pollution through its Air Quality Strategy and Urban and Industrial Environmental Management Strategy.

Specific targets of these strategies include: reducing the use of air polluting bio-fuels for heating and cooking and vehicle emissions from low quality fuel, requiring and applying environmental assessments for developments, integrating environmental policies into urban planning and curbing the illegal trade in hazardous waste, raw materials and products.

The Environmental Strategy is supported by the Environmental Law (Official Gazette Issue No. 912, dated 25 January 2007), which mandates overarching authority to NEPA. Under the Environment Law, Article 9, NEPA shall implement bilateral or multilateral agreements to which Afghanistan is a Party and shall sign, on behalf of the government, agreements regarding the protection and rehabilitation of the environment.

NEPA strengthens its coordination role through regular meetings of the CEC and NEAC. These coordination bodies were established under the Environment Law to encourage cooperative environmental governance under the direction of NEPA. All relevant ministries and sub-national authorities are represented on the Committee. Ministerial participation in environmental coordination mechanisms, such as the Committee for Environmental Coordination, provide Ministries with the relevant information to draft appropriately their annual budget requests so as to comply with their environmental obligations.

By acceding to the Stockholm Convention, the Government of the Islamic Republic of Afghanistan commits itself to fulfilling the obligations to Parties as laid out in Article 5.

6.2 Chemical Action Plans

PESTICIDES (Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, HCH, HCB, Mirex, Toxaphene, Chlordecone, Technical Endosulfan & DDT)

OBJECTIVE:	• Eliminate the production, import, sale and use of Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, HCH, HCB, Mirex, Toxaphene, Chlordecone, Technical Endosulfan and DDT. • Identify and decontaminate former store sites of HCH.
BASELINE:	Under the recent Pesticide Law, MAIL has the power to regulate the importation, sale and use of all pesticides. • All organo-chlorine pesticides, which includes all the pesticide POPs, are already prohibited. • Inspectors from PPQD monitor the retail market and illegal products are seized. • PPQD is building and equipping a Pesticide Analysis laboratory (WB support) capable of analysing residues in soil. • PPQD has WB support for training to support pesticide regulation

PRIORITY ACTIONS:	AGENCY	TIME-FRAME
Further training of inspectors	MAIL/WB support	2018
Destruction of seized illegal pesticides	MAIL	2018
Analysis of Soil samples from contaminated hotspots	MAIL/NEPA/UNEP	2018
Decontamination of hotspots	MAIL/NEPA	2022

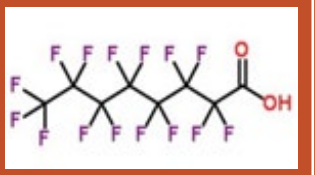
EXPECTED RESULTS:	• No imports of banned pesticides. • Banned pesticides removed from market. • Stocks of banned pesticides disposed of in environmentally safe manner. • No risk to health from pesticide residues in soil or groundwater around pesticide store sites.

HBB, PBDE & HBCD

OBJECTIVE:	To prevent the importation of materials and products containing HBB, PBDE, HBCD as fire-retardants and ensure that end-of-life materials and products containing them are disposed of in an environmentally sound manner.
BASELINE:	These materials are now largely banned and are not generally found in international trade. However, it is possible that some products containing them may still be on the market. The main problem that these chemicals pose is the end-of-life disposal of products and materials containing them. These tend to find their way into Municipal Solid Waste and, unless this is managed in an environmentally sound manner, will eventually result in their release into groundwater and waterways. Responsibility for policy on MSW lies with IDLG. Financial and operational responsibility lies with the municipalities.

PRIORITY ACTIONS:	AGENCY	TIME-FRAME
Regulation to ban products containing HBB, PBDE, & HBCD fire retardants	NEPA	2018
National Standards for consumer products and building materials ban HBB, PBDE, & HBCD fire retardants	ANSA	2020
Develop construction codes for MSW landfill	IDLG/NEPA	2020

EXPECTED RESULTS:	• No materials containing HBB, PBDE, HBCD are imported • Existing materials do not release them into the environment when they are disposed of at the end of their useful lives.

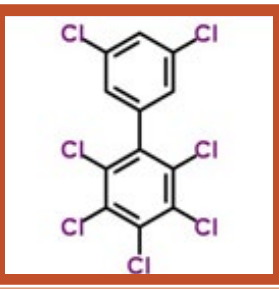


PFOS & PFOA

OBJECTIVE:	To eliminate releases of PFOS from plastics, paper products, synthetic carpet, textiles, paints and fire-fighting foams. Essential products covered by Acceptable Uses such as medical devices, aviation hydraulic fluid and fire-fighting foams, containing PFOS will continue to be permitted, provided they are disposed of in an environmentally acceptable manner.
BASELINE:	PFOS poses the most difficult challenge because of the many uses to which it has been put and the many materials and products in which it may occur and also because it is listed in Annex B (Acceptable Uses). Afghanistan must first decide whether it needs to permit any of these Acceptable Uses and then enact regulations to exclude the remainder. In addition, PFOS poses the same difficulty mentioned in relation to HBB, PBDE and HBCD, namely products and materials from before it was extensively banned being disposed of at the end of their useful life.

PRIORITY ACTIONS:	AGENCY	TIME-FRAME
Identify those products which may be permitted to contain PFOS	NEPA/MoPH/MoIA/ACAA	2019
Regulation to ban non-permitted products containing PFOS	NEPA	2019
National Standards for consumer products and building materials ban non-permitted products containing PFOS	ANSA	2020
Customs enforces import ban on non-permitted PFOS-containing products	Customs	2020
Improvements in Municipal Solid Waste disposal	Goods containing PFOS, are banned from import into Afghanistan, except those whose Acceptable Use is judged to be indispensable, e.g. medical devices, which are correctly disposed of.	

EXPECTED RESULTS:	Goods containing PFOS, are banned from import into Afghanistan, except those whose Acceptable Use is judged to be indispensable, e.g. medical devices, which are correctly disposed of.

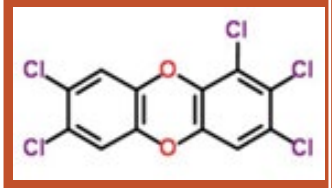


PCBs (INDUSTRIAL)

OBJECTIVE:	To dispose of Polychlorinated biphenyls (PCBs) in electrical equipment
BASELINE:	Afghanistan has a large number of pre-war transformers that are thought to contain PCB cooling oils. DABS is replacing old transformers but lacks the capacity to handle and dispose of PCB contaminated material. The disposal of PCB cooling oils and contaminated equipment is a major challenge that requires substantial international assistance.

PRIORITY ACTIONS:	AGENCY	TIME-FRAME
Provide protective equipment, analytical capacity and training to DABS workshop	DABS	2018
Survey existing transformers	DABS	2019
Store waste oil in secure metal containers and incinerate in cement factory, if possible.	DABS	2018
Formulate project for disposal of oil and contaminated equipment in environmentally sound manner	DABS/NEPA/UNEP	2020
Ship contaminated equipment to facility for disposal in environmentally sound manner.	DABS	2025

EXPECTED RESULTS:	Removal of PCB contaminated electrical distribution equipment



DIOXINS, FURANS & PCBs (UNINTENDED PRODUCTION)

OBJECTIVE:	To reduce emissions Polychlorinated dibenzo furans (PCDF) and Polychlorinated dibenzo-p-dioxins (PCDD) by reducing atmospheric emissions from incomplete combustion of organic material. • Increase access to electricity • Promote natural gas as alternative to solid fuel • Develop and enforce regulation of industrial emissions • Feasibility study for wastewater treatment in 4 districts of Kabul
BASELINE:	The unintended production of dioxin-like substances from incomplete combustion is the main source of POPs released into the environment in Afghanistan. Incomplete combustion is also a main source of general air pollution. Managing this problem falls within the government's Air Quality policy, which is led by a high-level committee chaired by the Chief Executive. Dioxin-like substances also occur in the ash and other residue of combustion processes and may leach from them into wastewater and so are released into the environment by that route • the substitution of less polluting forms of household energy, such as natural gas and electricity, • regulation of emissions from factories and vehicles, • setting standards for fuel and machinery, • Installation of DEWATs for all government buildings, • Equip government hospitals with modern incinerators, • Provide wastewater treatment for 1.5m people in Kabul

PRIORITY ACTIONS:	AGENCY	TIME-FRAME
Construct hospital waste incinerator plant in Kabul and provide more incinerators in provinces	MoPH	2020
Improve design of brick kilns to reduce emissions	NEPA	2020
Improvements in Municipal Solid Waste disposal	See HBB, PBDE and HBCD	

EXPECTED RESULTS:	• Reduction of unintended production of dioxin-like substances from incomplete combustion, • Reduction in releases of dioxin-like substances through MSW and wastewater.

6.3. Gaps, Limitations and Required Resources

The plans for reducing the emissions of POPs in Afghanistan cannot be separated from the general problems of pollution, especially of atmospheric and water pollution. Many of the activities outlined above as baseline fall within the existing activities of ministries and agencies and so within their budgets.

The policies proposed by the Government to address these require very large investments at present beyond its budgetary resources. The Government is actively pursuing assistance from funds committed for the reconstruction of the Afghan economy and infrastructure for these purposes.

However, it is possible to identify gaps in these activities that relate specifically to POPs. GIRoA will seek assistance for the following activities necessary for the implementation of its plans to eliminate or reduce POPs emissions.

6.3.1 Capacity to Update and Maintain the POPs Inventory

As a party to the Convention, Afghanistan is obliged to update and maintain the inventory of POPs releases. This responsibility devolves on NEPA, which currently does not have the technical capacity for it. It needs sampling and laboratory equipment, staff training and an improved system of data management. This enhancement of capacity will also enable it to fulfil its responsibility for enforcing regulations to control pollution.

6.3.2 Control of Materials Containing POPs in International Trade

Although Afghanistan does not have a large industrial sector, it imports many materials and consumer goods that fall into categories known possibly to contain POPs. It must identify those with Acceptable Uses which it needs to permit and to put in place secondary legislation to exclude those which it needs to prohibit. Although parties to the Stockholm Convention undertake not to produce or export materials containing POPs, some may still remain on the market, either illegally or from countries not bound by the Convention. This is a highly technical area requiring specialist expertise. In addition, the Customs Service requires specialist training in relation to the control of goods containing POPs.

6.3.3 Sites Contaminated with HCH

The MAIL PPQD stores in Herat, Mazar and Kunduz were used to hold HCH (Lindane) for locust control before 1990. The possibility exists that the soil and groundwater at the sites remain contaminated. It is necessary to analyse samples from these to determine whether this is so. A WB project is providing PPQD with a pesticide analysis laboratory capable of this. It will be fully functional in 2018. Should significant residues be found, steps will have to be made to decontaminate the sites. The scale and cost of these will depend on the level and extent of contamination.

6.3.4 Training of MAIL Pesticide Inspectors

Under the WB agricultural inputs project, funding for training to support pesticide regulation is available.

6.3.5 Destruction of Illegal Pesticides

Obsolete pesticides are usually disposed of by incineration. To ensure that this does not produce additional toxic chemicals, it is important that the temperature of incineration is sufficiently high. This can be achieved in the furnaces of some designs of cement factories. Pesticides needing to be destroyed must also be packed and transported safely and their containers also destroyed or decontaminated. A cost estimate for this of US$100,000 has been made.

6.3.6 Industrial PCBs in the Electrical Distribution System

The disposal of PCB cooling oils and contaminated equipment is a major challenge that will require substantial international assistance. As DABS replaces its old transformers and capacitors in the electrical distribution system, it is confronted by the problem of the PCB oils that were originally used in them. The workshop where transformers are repaired and retro-filled needs safety equipment and basic testing capacity to determine the presence of PCBs in oils. The waste oils, at present stored in plastic containers, need to be repacked in metal drums. It may be possible to destroy them in the furnace of a cement factory, provided the operating temperature exceeded 1,0000C. A cost of US$100,000 is estimated for this.

Expert advice will be needed in the first instance to develop a plan for safe and effective management of contaminated equipment. A cost of US$50,000 is estimated for this.

Not only does the oil itself need to be disposed of in an environmentally sound manner, but so also does the contaminated equipment. It would need to be packed up and shipped in compliance with the Basel Convention[36] to one of the few facilities in the world with the necessary capacity. This would be a complex and costly operation. Estimating the potential costs of this, is difficult without a full technical survey, but assuming an approximate cost per ton of US$2,000 and a need to dispose of 10,000 tons, a possible budget of US$20 million might be required.

6.3.7 Incineration of Clinical Waste

Incinerators need to operate at a temperature of at least 1,0000C if dioxin-like substances are not to be produced. There are over 400 government hospitals in Afghanistan. At present, the government is equipping them with such incinerators at the rate of three per year. Each costs approximately US$100,000. To equip all hospitals would require US$50 million. In view of the lack of information on the technology currently being used, it may be the case that emissions from this source are much higher than estimated. It should therefore be regarded as a high priority for further investigation and action.

6.3.8 Resource Requirements for Chemical Action Plans

Technology and Capacity Building Needs	Finance Needs (US$)
Capacity to Update and Maintain the POPs Inventory	1,000,000
Control of Materials Containing POPs in International Trade	100,000
Sites Contaminated with HCH	250,000
Destruction of illegal pesticides	100,000
Industrial PCBs in the Electrical Distribution System	20,000,000
Incineration of Clinical Waste	50,000,000
TOTAL FINANCIAL RESOURCES NEEDED:	**70,450,000**

36. Preparation of a national environmentally sound management plan for PCBs and PCB-contaminated equipment in the context of the implementation of the Basel Convention. Training Manual. Basel Convention Series/SBC No. 2003/01

7

EDUCATION, OUTREACH, AND AWARENESS

EDUCATION, OUTREACH, AND AWARENESS

7.1 Academic Courses on Agriculture, Chemistry, Engineering, and Environment

NEPA places a strong emphasis on environmental education in order to train and prepare the next generation of environmental stewards. At present, environmental subjects are taught in primary and secondary level education (grades 1-12) to an estimated 9 million students in government and private schools.

In higher (tertiary) education, two environmental science faculties have been established at Kabul University and Kabul Polytechnic University, which provide undergraduate-level courses on environmental issues. In addition, Kabul university has a Faculty of Science (chemistry, biology), Faculty of Engineering (civil, mechanical, electrical), and Faculty of Agriculture (horticulture, plant protection) that provide bachelor degrees in topics relevant to POPs and their management. Similarly, Kabul Polytechnic University offers bachelor degrees in civil and environmental engineering, and chemistry. Outside of Kabul, Balkh University has faculties of engineering and science, and Herat University has faculties of agriculture, applied science, and engineering. There are universities in nearly all provinces, most of whom offer courses in agriculture.

7.2 Public Awareness and Participation in Chemical Management Activities

Public awareness and understanding of POPs and chemical management is low in Afghanistan; however, as more and more children attend school and are educated about environmental issues this information is expected to become more widespread across communities.

Since 2001, Afghanistan has also experienced a large growth in non-governmental organizations that are involved in awareness-raising, outreach, and capacity building on the themes of resilience, disaster risk, and the environment. Likewise, the number of media outlets across the country is rapidly growing – there are currently more than 150 radio channels, 70 television channels, and 1,000 print media actively working on issues ranging from politics, society, economics, culture, and the environment.

Increasing the involvement of these media outlets in public education about chemical pollution, health, and the environment will be an important step towards raising greater awareness about sustainable development and environmental management. This, in turn, will help generate greater momentum, political will, and pressure to address the country's POPs and chemical needs.

In 2017, NEPA developed a modular curriculum package on POPs for training technical staff from government institutions involved in the preparation and execution of the National Implementation Plan for the Stockholm Convention. This course was designed to build institutional capacity and enhance understanding about the scope of the obligations of the Stockholm convention.

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ANNEX I : SURVEY FORMS FOR POPS INVENTORY DEVELOPED BY NATIONAL CHEMICAL WORKING GROUP

1 BAKERY SURVEY

District	
Location	
GPS Coordinates	
Name of owner:	
Phone	

Kg flour/day	
Qty bread/day	
Type of Fuel used	
Quantity used per day	
Days worked per week	

*Note if the baker says there is different production on different days, e.g. Friday.

1.2 HOUSEHOLD ENERGY SURVEY

District	
Location	
GPS coordinates	
Address (if known)	
Name of householder	
Phone no.	
Number of adults	
Number of children	
Construction material	

Energy Supply	
Town electricity	Y/N
Generator (size)	
Bottled Gas appliances	Y/N
Bukhari (how many)	

Fuel used	Quantity (state units) per year:
Wood for bukhari	
Coal for bukhari	
Oil for bukhari (what type?)	
Petrol for generator	
Bottled gas	

ANNEX I : SURVEY FORMS FOR POPS INVENTORY DEVELOPED BY NATIONAL CHEMICAL WORKING GROUP

1.3 MINERAL PRODUCTION SURVEY

Record No.	
Date	
Inspector	

Place	
District	
GPS coordinates	

Type	**Check**
Cement	
Lime	
Brick	
Glass	
Asphalt mixing	

Furnace Type	**Number**	**Materials**
Rotary kiln		
Shaft kiln		
Tunnel furnace		

Type of Fuel	
Quantity of fuel/year	

Type of operation	**Check**
Batch (e.g., 100 kg per batch)	
Semi-continuous (e.g., 8 hours per day)	
Continuous (24 hours per day)	

Capacity (tons/year)	

Residues		**Disposal of these Residues**	
Generation of Bottom Ashes	t/a [ ]	Recirculation [ ]	Landfill [ ]
Generation of Fly Ashes	t/a [ ]	Recirculation [ ]	Landfill [ ]
Generation of (Waste)Water	t/a [ ]	Disposal	
Generation of Sludges (as dry matter)	t/a [ ]	Recirculation [ ]	Landfill [ ]

ANNEX I : SURVEY FORMS FOR POPS INVENTORY DEVELOPED BY NATIONAL CHEMICAL WORKING GROUP

1.4 POWER STATION SURVEY

Record No.	
Date	
Inspector	

Place	
District	
GPS coordinates	

Output	Check
Public Electricity supply	
Private Electricity supply	
Communal heating	

Type of Furnace/Combustor	Check
Boiler	
Process heater	
Flare	
Turbine (internal gas)	
Combustion engine (internal)	
Other (please specify)	

Fuel	Qty/year (tons)
Bituminous coal	
Anthracite	
Diesel	
Heavy Oil	
Natural Gas	
Other (specify)	

Residues		Disposal of these Residues	
Generation of Bottom Ashes	t/a [ ]	Recirculation [ ]	Landfill [ ]
Generation of Fly Ashes	t/a [ ]	Recirculation [ ]	Landfill [ ]
Generation of (Waste)Water	t/a [ ]	Disposal	
Generation of Sludges (as dry matter)	t/a [ ]	Recirculation [ ]	Landfill [ ]

ANNEX I : SURVEY FORMS FOR POPS INVENTORY DEVELOPED BY NATIONAL CHEMICAL WORKING GROUP

1.5 PESTICIDE SURVEY

District	
Location	
GPS Coordinates	
Name	
Phone	

PESTICIDES

Name	Active Ingredient	Conc	Country of origin

ANNEX I : SURVEY FORMS FOR POPS INVENTORY DEVELOPED BY NATIONAL CHEMICAL WORKING GROUP

1.6 MEDICAL WASTE INCINERATION SURVEY

District	
Location	
GPS Coordinates	
Name	
Phone	

Quantity (tons) per year	
Fuel (type & quantity per year)	
Any air pollution control (e.g. filters)	

Class	Description	Check
Class 1	includes very small and simple, small box type incinerators operated intermittently (in which waste loads are ignited and left) with no secondary combustion chamber, no temperature controls and no air pollution control equipment.	
Class 2	applies to all medical waste incinerators with controlled combustion and an afterburner, but still operated in a batch type mode.	
Class 3	includes controlled batch□type plants, with good APC systems in place, e.g., ESPs or preferably baghouse filters.	
Class 4	includes highly sophisticated medical waste incineration plants that are capable of complying with an air emission 0.1 ng TEQ/Nm³ (at 11% O_2). Whether these plants are continuous or batch type operations is not relevant when they are preheated with oil or natural gas to achieve a furnace operating temperature of usually well above 900°C or higher before medical waste is introduced into the furnace.	

1.7 PCB SITE INSPECTION FORM

SECTION A Record Number _____

Record No.	
Date	
Inspector	

Place	
District	
GPS coordinates	

ANNEX I : SURVEY FORMS FOR POPS INVENTORY DEVELOPED BY NATIONAL CHEMICAL WORKING GROUP

Functioning Electrical Sub-station	
Former or damaged Electrical substation	

Type of company / industry type / production at specific site:	
Name of company	
Public or private company?	
Name/position of contact:	
Phone:	
E-mail:	
Location: Industrial zone	
Location: Other urban area	
Location: Rural area	
Total number of Transformers	
Total number of Capacitors	
Total number of Others	
Total electricity consumption at site	kWh / year
PCB elimination action plan in place? - action plan intended but not started? - previous disposal activities? - time frame for program?	(Use a separate sheet if necessary)

SECTION B Record Number _____

B	Information related to the potentially PCB-containing equipment (repeat this section on a separate Section B form for each additional piece of equipment)	
1	Name of manufacturer and country of origin	
2	Type (transformer, capacitor, etc.)	
3	Serial number	
4	Power rating (voltage)	
5	Date of fabrication	
6a	Equipment (dry weight in kg)	
6b	Oil / liquid (L or kg)	
6c	Total weight (kg)	
6d	Size of equipment (length, width, height in m)	
7	Name of liquid or insulating oil/coolant, etc.	
8a	PCB > 10 % PCB	
8b	PCB 0.05 % PCB or 500 ppm	
8c	PCB > 0.005 % or 50 ppm	
8d	PCB< 0.005 % or 50 ppm	
8e	PCB No PCBs present in liquid	

8f	PCB content not known	
8g	Equipment emptied of liquid	
9	PCB analysis performed? If yes, which method and when?	
10	Source of the above information (e.g., a plaque or name plate on the equipment)	
11a	In use: yes / since	
11b	On stand-by	
11c	Decommissioned	
11d	Other	
12a	Condition: Leaking?	
12b	Condition: Immediate action needed?	
12c	Condition: Storage situation (e.g. open air, locked enclosure etc.)	
13a	Maintenance Retrofilled (Y?N) .Date of last fill	
13b	Maintenance by which company	
13c	Maintenance With which replacement liquid /insulating oil?	
13d	Maintenance Name of original liquid / insulating oil,	
13e	Maintenance	
14	Other observations:	

SECTION C Record Number _____

C	Information on wastes liable to contain PCB	
1	Nature of the wastes (e.g., transformer oil in drums or reservoirs)	
2	Estimated quantity	
3	Are containers leak-proof?	
4	Is the place of storage clearly marked to show the presence of PCB?	
5	Have soil or buildings been contaminated by leaking PCB? (indicate magnitude of problem if possible, e.g. tonnes or cubic metres of contaminated soil)	
6	Any previous remediation efforts, e.g., removal of PCB-containing equipment and waste PCB for disposal (when, by whom, where to, etc.)	
7	Other relevant information (e.g., results of any sampling and analysis already undertaken)	*(Use a separate sheet if necessary)*

ANNEX II : CALCULATION OF ANNUAL FUEL CONSUMPTION BY MOTOR VEHICLES

category	owner	number	diesel %	diesel no.	gasoline no	daily km	diesel yearly total km	gasoline yearly total km	litre/ 100km	total diesel litres	total diesel tons	total gasoline litres	total gasoline tons
lorries	govt	5,485	100%	5,485	0	60	98,730,000	0	30	3,291,000	2797.35	0	0
lorries	private	92,585	100%	92,585	0	60		0	30	55,551,000	47218.35	0	0
buses	govt	5,485	100%	5,485	0	50	82,275,000	0	20	4,113,750	3496.688	0	0
buses	private	92,585	100%	92,585	0	50		0	20	69,438,750	59022.94	0	0
cars	govt	23,492	27%	6,249	17,243	30	56,239,848	155,188,152	15	3,749,323	3186.925	10,345,877	7,759
cars/taxis	private	179,902	27%	47,854	132,048	60	861,370,776		15	57,424,718	48811.01	158,457,682	
cars/other	private	937,629	27%	249,409	688,220	30			15		127198.8	412,931,812	
Total 4-stroke													
m/c	govt	4,336	0%	0	4,336	30	0	39,024,000	3	0	0	13,008,000	9,756
m/c	private	234,060	0%	0	234,060	30	0		3	0	0	702,180,000	
rickshaw	private	14,849	0%	0	14,849	30	0	133,641,000	4	0	0	33,410,250	25,058
Total 2-stroke											0		
	TOTAL	**1,590,408**								**343,214,130**	**291,732**	**1,330,333,620**	

- Data on the number of motor vehicles registered during the year 1392 AH were taken from the CSO handbook “Statistical Information 2013-14”.
- Estimates on the proportion of petrol and diesel vehicles and daily use are taken from NEPA/ADB Kabul Air Quality Management Strategy (2007).
- Estimates of fuel consumption (litres/100km) are derived from the Ministry of Justice Annexes to Regulation on Fuel Consumption, Official Gazette Issue No:(1015).

ANNEX III : MUNICIPAL DISPOSAL OF SOLID WASTE AND WASTE WATER

province	Solid Waste (tonnes)	Waste Water (m^3)
Laghman	34,017	
Herat	288,000	24,000,000
Kandahar	503,592	1,536
Kundoz	156,319	720,000
Panjshir	1,652	450
Takhar	14,400	576
Juzjan	126,000	54,000
Ghazni	8,380	789
Wardak	4,067	800
Kapisa	11,982	600
Kabul	2,373,870	243,594
Konar	12,370	32,940
Balkh	381,265	*
Nangahar	307,300	*
TOTAL	**4,223,213**	**25,055,285**

Group 1: Waste Incineration

Class	Source Categories	Production	Annual Release					
		t/a	g TEQ/a Air	g TEQ/a Water	g TEQ/a Land	g TEQ/a Product	g TEQ/a Fly ash	g TEQ/a Bottom Ash
	Waste incineration							
	Municipal solid waste incineration	0	0.000	0	0	0	0.000	0.000
1	Low technol. combustion, no APCS		0.000				0.000	0.000
2	Controlled comb., minimal APCS		0.000				0.000	0.000
3	Controlled comb., good APCS		0.000				0.000	0.000
4	High tech. combustion, sophisticated APCS		0.000				0.000	0.000
	Hazardous waste incineration	0	0.000	0	0	0	0.000	0.000
1	Low technol. combustion, no APCS		0.000				0.000	0.000
2	Controlled comb., minimal APCS		0.000				0.000	0.000
3	Controlled comb., good APCS		0.000				0.000	0.000
4	High tech. combustion, sophisticated APCS		0.0000				0.000	0.000
	Medical waste incineration	9,215	26.955	0	0	0	0.035	0.180
1	Uncontrolled batch combustion, no APCS		0.000				0.000	0.000
2	Controlled, batch, no or minimal APCS	8,985	26.955				0.000	0.180
3	Controlled, batch comb., good APCS		0.000				0.000	
4	High tech, continuous, sophisticated APCS	230	0.000				0.035	0.000
	Waste wood and waste biomass incineration	0	0.000	0	0	0	0.000	0.000
1	Old furnaces, batch, no/little APCS		0.000				0.000	0.000
2	Updated, continuously, some APCS		0.000				0.000	0.000
3	State-of-the-art, full APCS		0.000				0.000	0.000
	Waste Incineration		26.955	0	0	0	0.035	0.180
							0.2	

GROUP 3: Heat and Power Generation

Class	Source categories	Production	Annual release				
		TJ/a	g TEQ/a Air	g TEQ/a Water	g TEQ/a Land	g TEQ/a Product	g TEQ/a Residue
	Heat and Power Generation						
	Fossil fuel power plants	754	0.000	0	0	0	0.0
1	Fossil fuel/waste co-fired power boilers		0.000				
2	Coal fired power boilers		0.000				0.000
3	Peat fired power boilers		0.000				
4	Heavy fuel fired power boilers	34	0.000				
5	Oil shale fired power plants		0.000				
6	Light fuel oil/natural gas fired power boilers	720	0.0004				
	Landfill biogas combustion	0	0.000	0	0	0	0.0
1	Biogas-/landfill gas fired boilers, motors/turbines and flaring		0.000				
	Household heating and cooking - Biomass	931,778	93.178	0	0	0	3.1
1	Contaminated wood/biomass fired stoves		0.000				0.000
2	Virgin wood/biomass fired stoves	910,508	91.051				3.097
3	Straw fired stoves		0.000				0.000
4	Charcoal fired stoves	21,270	2.127				0.000
5	Open-fire (3-stone) stoves (virgin wood)		0.000				0.000
6	Simple stoves (virgin wood)		0.000				0.000
	Domestic heating - Fossil fuels	145,939	0.613	0	0	0	0.1
1	High chlorine coal/waste/biomass co-fired stoves		0.000				0.000
2	Coal/waste/biomass co-fired stoves		0.000				
3	Coal fired stoves	4,000	0.400				0.060
4	Peat fired stoves		0.000				
5	Oil fired stoves		0.000				
6	Natural gas or LPG fired stoves	141,939	0.213				
	Heat and Power Generation		**93.791**	**0**	**0**	**0**	**3.2**

Group 2 is not shown as there are no data.

GROUP 4: Production of Mineral Products

Class	Source categories	Production	Annual release				
		t/a	g TEQ/a Air	g TEQ/a Water	g TEQ/a Land	g TEQ/a Product	g TEQ/a Residue
	Production of Mineral Products						
	Cement kilns	0	0.000	0	0	0	0
1	Shaft kilns		0.000				
2	Old wet kilns, ESP temperature >300 °C		0.000				
3	Wet kilns, ESP/FF temperature 200 to 300 °C		0.000				
4	Wet kilns, ESP/FF temperature <200 °C and all types of dry kilns with preheater/precalciner, T<200 °C		0.000				
	Lime	0	0.000	0	0	0	0
1	Cyclone/no dust control, contaminated or poor fuels		0.000				
2	Good dust abatement		0.000				
	Brick	5,000,000	1.000	0	0	0.300	0.100
1	No emission abatement in place and using contaminated fuels	5,000,000	1.000			0.300	0.100
2	No emission abatement in place and using non-contaminated fuels; Emission abatement in place and using any kind of fuel; No emission abatement in place but state of the art process control		0.000			0.000	0.000
	Ceramics	0	0.000	0	0	0	0
1	Cyclone/no dust control, contaminated or poor fuels		0.000				
2	Good dust abatement		0.000				
2	Mixing plant with fabric filter, wet scrubber		0.000				0.000
4	**Production of Mineral Products**		**1.000**	**0**	**0**	**0**	**0.100**

GROUP 5: Transportation

Class	Source categories	Consumption	Annual release				
		t/a *	g TEQ/a Air	g TEQ/a Water	g TEQ/a Land	g TEQ/a Product	g TEQ/a Residue
	Transportation						
	4-Stroke engines	436,300	0.960	0.000	0.000	0.000	0.000
1	Leaded fuel	436,300	0.960				
2	Unleaded gasoline without catalyst		0.000				
3	Unleaded gasoline with catalyst		0.000				
4	Ethanol with catalyst		0.000				
	2-Stroke engines	561,450	1.965		0	0	0
1	Leaded fuel	561,450	1.965				
2	Unleaded fuel		0.000				
	Diesel engines	338,000	0.034	0.000	0.000	0.000	0.000
1	Regular Diesel	338,000	0.034				
2	Biodiesel		0.000				
	Heavy oil fired engines	0	0.000	0	0	0	0
1	All types		0.000				
Transport			**2.959**	**0**	**0**	**0**	**0**

GROUP 6: Open Burning Processes

Class	Source categories	Production	Annual release				
		t/a	g TEQ/a Air	g TEQ/a Water	g TEQ/a Land	g TEQ/a Product	g TEQ/a Residue
	Open Burning Processes						
	Biomass burning	3,170,670	95.120	0	31.707	0	0
1	Agricultural residue burning in the field of cereal and other crops stubble, impacted, poor burning conditions	3,170,670	95.120		31.707		
2	Agricultural residue burning in the field of cereal and other crop stubble, not impacted		0.000		0.000		
3	Sugarcane burning		0.000		0.000		
4	Forest fires		0.000		0.000		
5	Grassland and savannah fires		0.000		0.000		
	Waste burning and accidental fires	1,068	0.403	0	0.396	0	0
1	Fires at waste dumps (compacted, wet, high Corg content)		0.000		0.000		
2	Accidental fires in houses, factories	986	0.394		0.394		
3	Open burning of domestic waste		0.000		0.000		
4	Accidental fires in vehicles (per vehicle)	82	0.008		0.001		
5	Open burning of wood (construction/demolition)		0.000		0.000		
Open Burning Processes			**95.523**	**0**	**32.103**	**0**	**0.000**

Group 7 is not shown as there are no data.

GROUP 8: Miscellaneous

Class	Source Categories	Production	Annual release				
		t/a	g TEQ/a	g TEQ/a	g TEQ/a	g TEQ/a	g TEQ/a
	Miscellaneous		Air	Water	Land	Product	Residue
	Drying of biomass	0	0.000	0	0	0.000	0.000
1	Highly contaminated fuel (PCP treated)		0.000			0.000	0.000
2	Moderately contaminated fuel		0.000			0.000	0.000
3	Clean fuel		0.000			0.000	0.000
	Crematoria	0	0.000	0	0	0	0.000
1	No control (per cremation)	0	0.000				
2	Medium control or open air cremations (per cremation)	0	0.000				0.000
3	Optimal control (per cremation)	0	0.000				0.000
	Smoke houses	0	0.000	0	0	0	0.000
1	Contaminated fuels		0.000				0.000
2	Clean fuels, no afterburner		0.000				0.000
3	Clean fuels, afterburner		0.000				0.000
	Dry cleaning	0	0	0	0	0	0.000
1	Heavy textiles, PCP-treated, etc.						0.000
2	Normal textiles						0.000
	Tobacco smoking	1,098	0.0001	0	0	0	0.0001098
1	Cigar (per million items)		0.000				0.000
2	Cigarette (per million items)	1,098	0.000				0.000
	Miscellaneous		**0.000**	**0**	**0**	**0.000**	**0.000**

GROUP 9: Disposal

Class	Source categories	Production	Annual release				
			g TEQ/a Air	g TEQ/a Water	g TEQ/a Land	g TEQ/a Product	g TEQ/a Residue
	Disposal						
	Landfills, Waste Dumps and Landfill Mining	**4,229,725**	**0.000**	**2.115**	**0.000**	**0.000**	**211.486**
1	Hazardous wastes			0.000			
2	Mixed wastes	4,229,725		2.115			211.486
3	Domestic wastes			0.000			0.000
	Sewage/sewage treatment	25,200,365	0.000	0.250	0.000	0.000	0.000
1	Mixed domestic and industrial inputs	25,200,365		0.250	0	0	0.000
	No sludge removal	25,200,365		0.250			
	With sludge removal			0.000			0.000
2	Urban and industrial inputs	0		0.000	0	0	0.000
	No sludge removal			0.000			
	With sludge removal			0.000			0.000
3	Domestic inputs	0		0.000	0	0	0.000
	No sludge removal			0.000			
	With sludge removal			0.000			0.000
	Open water dumping	0	0.000	0.000	0.000	0.000	0.000
1	Mixed domestic and industrial wastewater			0.000			
2	Urban and peri-urban wastewater			0.000			
3	Remote environments			0.000			
	Composting	20,411	0.000	0.000	0.000	1.021	0.000
1	Organic wastes separated from mixed wastes	20,411				1.021	
2	Clean compost					0.000	
	Waste oil disposal	0	0.000	0.000	0.000	0.000	0.000
1	All fractions						
	Disposal/Landfill		**0.000**	**2.365**	**0**	**1.021**	**211.486**

ANNEX V : MEMBERSHIP OF TECHNICAL CHEMICAL WORKING GROUP

S.N	Name	Position	Organization
1	Ghulam Mohammad Saedi	Pesticide Analysis Manager	MAIL
2	Gul Rasool Hamdards	Technical Audit	DABS
3	M. Edris Toukhi	Environment Protection Director	Municipality
4	Nasrullah Sherzad	Head of Environment Standard	ANSA
5	Azizullah Alizay	Electrical and Engineering Managemen	(ACAA)
6	Abduk Shaker Zadran	Head of Laboratory	Customs
7	M. Anwar Paigham	Head of fighting with explosive material	MoIA
8	Abdul Malik Malik	Head Radiation Protection	MoPH
9	Prof.Asrarudin Gulzad	Professor of Chemical Technology	Polytechnic University
10	Mohammad Izhar	Head of Environmental Dept.	MUDHs
11	Sadudin Zubair	Air quality analysis expert	NEPA
12	Ahmad Shah Taheri	Adviser	MoCI
13	Ahmad Shah Rasekh	Chemical Expert	NEPA
14	Tamana Dawi	Chemical Expert	NEPA
15	Fatima Akbari	POPs Project Assistant	UNEP
16	M. Fahim Farhang	Director of waste management Division	AUWSSC
17	Sona Ghafari	Inspector, Monitoring and Inspection Division	NEPA

Building Environmental Resilience

تقویت تاب آوری محیط زیستی