Republic of Seychelles

National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

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Acronyms

COP	Conference of Parties
CRT	Cathode Ray Tube
EEE	Electrical & Electronic Equipment
EPA	Environment Protection Act
EMPS	Environment Management Plan of Seychelles
FAO	Food Agriculture Organisation
GHG	Green House Gases
HCH	Hexaclorocyclohexane
HCB	Hexachlorobenzene
HCC	Hazardous Chemicals Committee
LWMA	Landscape & Waste Management Agency
MEE	Ministry of Environment & Energy
MOH	Ministry of Health
NIP	National Implementation Plan
NMVOC	Non Methane Volatile Organic Compounds
PBB	Poly Brominated Biphenyl
PCA	Pesticide Control Act
PCB	PolyChlorinated Biphenyl
POP	Persistent Organic Pollutant
PCDD	Poly Chlorinated Dibenzo Dioxins
PCDF	Poly Chlorinated Dibenzo Furan
PBDE	Poly Brominated Diphenyl Ether
PUC	Public Utilities Corporation
SAA	Seychelles Agricultural Agency
SAICM	Strategic Approach to International Chemicals Management
SEPEC	Seychelles Petroleum Company
SBS	Seychelles Bureau of Standard
SFRSA	Seychelles Fire Rescue Services Agency
SLA	Seychelles Licensing Authority
SPHL	Seychelles Public Health Lab
SSDS	Seychelles Sustainable Development Strategy
UNEP	United National Environment Programme
UNIDO	United Nations Industrial Development Organization
UNISEY	University of Seychelles
UPOPs	Unintentionally Produced POPs
WHO	World Health Organization

Foreword

Produced seven years after the Seychelles submitted its first National Implementation Plan under the Stockholm Convention on Persistent Pollutants, this second NIP seeks to introduce, through a coherent framework measures address the challenges that the expanded list of Persistent Organic Pollutants pose for the country. It follows to a large degree principles established by the conference of Parties for communicating countries' intended actions under the convention but also makes provision for tailored approach that best suits the Seychelles context as a small island developing state with limited financial and human resources.

The process of updating of the NIP provided a ready opportunity to take stock of the situation of POPs management in the country. It revealed that much efforts and resources, obtained from local and international sources have been brought to bear on the POPs situation during the past period through direct interventions and also regulatory measures, but also showed that the range of possible interventions have been tempered by limitation on human, technical and financial resources. Seychelles remains positive nonetheless that it shall be able to meet the obligations of the convention in the time that remains for compliance.

Going forward, the areas that require attention have been expounded in very clear language in this second generation NIP. Many of the targets such as legislative updates, limitation of unintentional production and import bans can be easily achieved. The task that remains is for all partners to align their programs so as to provide direct contribution and efficiently use available resources. Indeed this NIP can be a demonstration of coordination between multiple stakeholders working to achieve common targets.

At the conclusion of the process for preparation of this NIP, it is opportune to thank those organizations and persons who have contributed towards the preparation of the final document. Notable is the support received from UNIDO and its experts as well as the dedicated support of local actors who have been willing and able to deal with the exigencies of the new listings. The engagement of all shall remain crucial to successful implementation of these measures and it is our expectation that the long standing involvement of all parties shall continue under this new NIP framework

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Executive Summary

The Stockholm Convention on Persistent Organic Pollutant is a chemicals convention that addressses production, use import and export of POPs chemical at the global level. It opened for signature on 23rd May 2001 and came into force on 17th May, 2004.

The main aim of the Stockholm Convention is to eliminate or- where appropriate reduce the releases of 23 Persistent Organic Pollutant (POP's) into the environment. From the initial 12 chemicals, the Stockholm Convention has added nine new chemicals in 2009, and two more since (Endosulfan in 2011 and DCBD in 2013).

The Republic of Seychelles signed the Stockholm Convention on 25th March 2002 and acceeded on 3rd June 2008. In 2007, the Seychelles completed its National Implementation Plan (NIP) with support from UNIDO. This "previous" NIP is being reviewed in view of recent additions of 11 as mentioned new chemicals to the convention. The new chemicals are pesticides and industrial chemicals that are flame retardants.

The revised NIP is presented in two parts; Part I is the 'inventory' of POPs chemicals in the Country. It was carried out by three technical working groups comprising of several organisations. The groups considered all aspect of importation, manufacturing, use, stockpile and contaminated areas of these chemicals in the country. Information for the inventory was collected from primary sources (interviews with professionals and companies dealing with pesticides, field visits, etc) and secondary sources (review of documentations from customs, agriculture health and other bodies.

It was found that obtaining quantitative data on POPs was quite difficult as lots of gaps were present. Nonetheless significant effort was made to procure and analyse the data that was available. Part II details the strategic actions that will address the findings of the assessment and enable the country to fully comply with the obligations of the Convention.

The project was implemented by the Wildlife & Environmental Permits (WEP) Division of the Ministry of Environment and Energy with support of the GEF and UNIDO. It was carried out in a transparent multi-stakeholder process inclusive of all stakeholders in chemicals management.

Result of country assessment

For POPs pesticides, it is concluded that there has been no importation, production or use of these chemicals or their by products or precursors in Seychelles. The last import dates back to 1993 however no stockpile, waste or sites contaminated by pesticidal POPs new or old were detected by the recent inventory (2014). The last stockpile comprising of 11.8 tons of obsolete pesticides (not POPs) which included 225kg of DDT were exported for disposal to the UK in 1998.

PCB in closed applications continue to be the main potential source of previous POPs in Seychelles. The PUC is continuing its programme to test old transformers and 89 samples was collected and sent overseas for testing. The result was that 45% tested positive for PCB with one sample having concentration above 50ppm. This translates into 265.71 kg of PCB present in all the transformers tested so far.

With regard to PBDE, it was found that there are significant amounts of commercial octa BDE in Seychelles (7.438 tons) the result of use in Electronics and Electrical Equipment. Similarly there was an estimated 168 kg of commercial penta BDE in the transportation sector. Most of the PBDEs were found in ELV and landfills; therefore as contaminated sites.

PFOS use was found to be restricted to firefighting foam where a significant stockpile was held at the Seychelles Petroleum Company (SEPEC) and the Seychelles Fire & Rescue Services Agency. Additionally there are PFOS contaminated sites at the SFRSA training grounds in Victoria. There was no evidence to suggest that there is PeCB and HBB in the country.

Dioxins and Furans calculated for 2013 was 11.8 TEQ g/a which has shown an increase compared to 5 g TEQ/a in 2004. The majority of emission was due to burning of waste being accidental fires at the landfill to the incineration of medical waste in the absence of fly ash management technologies.

Review of previous NIP

The fourth working group which focussed on regulatory and capacity building issues concluded that the previous NIP is still not properly implemented. Only one of 58 legislative changes were done and the other activities remains to be implemented.

There were several reasons put forward for this the most important being a) lack of financial resources especially since the NIP was formulated when the country was undergoing severe economic difficulties which fortunately rescinded in 2008 through an IMF programme, b) there was no institutional mechanism created linked in part to lack of funding, c) the NIP was not mainstreamed into the work programme of the various Ministeries that conceptualised the action plan and d) the document and subject matter is highly technical and the previous NIP difficult to follow for project managers.

The review also found that Seychelles is behind in its reporting to the Convention. This is due

to lack of funds to undertake independent reporting and absence of data that can be collated easily by the focal point. Given the workload of the focal point it is inconceivable that reporting can be done without assigning the work to a consultant.

These weaknesses has been properly assessed and the revised NIP now seeks to build upon lesson learnt so that the Seychelles continue to comply to the Stockholm Convention.

The revised strategy

The revised strategy re-assess activities and budgets to enable the Seychelles to address the most important issues first within an acceptable time frame. The most pertinent issue was with regards to chemicals and waste management; where it is felt that significant input is required.

The revised strategy calls for the development and enaction of a Hazardous Chemicals Act to regulate chemicals including POPs chemicals in the country. The Act will create an expanded Hazardous chemicals committee to replace the Pesticide Control Board whose current Act will be repealed. More importantly the Act will create a Hazardous Chemical Fund to which licenses and fees can be paid and into and for which the committee can use to implement specific activities. The Hazardous Chemicals Committee shall consist of professionals within the chemicals sector and other economic operators and nomination will not be for more than 2 years.

The strategy hinges on the ability to attract GEF funding for implementation of the revised NIP as projects. Activities in the previous NIP has been updated in view of recent developments and reformulated so that it can be implemented within existing framework.

Implementation arrangements

The implementation modality in the previous NIP which included a steering committee and staff was not implemented. It therefore necessitated a critical review of implementation arrangement in order to resolve implementation hurdles.

It is clear that with budgetary cuts and less staff allocated to Ministries, that the implementation of activities must be done as part of projects. It was suggested that the IMCM unit under the SSDS be the main institution to ensure that the NIP is implemented. Parallel to this would be the establishment of the Hazardous Chemicals Committee which would be the main stakeholders to drive forward implementation of the NIP and chemicals related agenda.

1. Introduction

1.1 Persistent Organic Pollutants

Persistent organic pollutants (POPs) are a group of synthetic chemicals that are resistant to degradation in the environment and accumulate in biological systems for their general high solubility in oil and fats. Because of this bioaccumulativbe property, annimals higher in the food chain tend to get a higher dose of these chemicals in the food chain (biomagnification).

POP's have been linked to adverse effects on human health and animals, such as cancer, damage to the nervous system, reproductive disorders, and disruption of the immune system. The Chemicals are transported by air and water across international boundaries and all populations around the globe are at risk.

Persistent organic pollutants are classed as a) pesticides b) industrial chemicals and c) unintentional by-products of industrial and combustion processes.

There are 14 pesticide POPs which are banned under the Stockholm convention for their persistancy and toxicity (see table 1). The chemicals were developed to fight insects and rodents but their persistency and impact on the environment and human health is most damaging. Most if not all countries has stopped production of these chemicals except for DDT which is the most effective compound against Mosquitoes and which is still widely used in Africa where malaria is the most prevalent.

Industrial POPs are chemicals that are either a) by-products of synthesis of pesticides, b) are flame retardants or water repellers used in products (HBB, PBDE, PFOS) or "inert" chemicals used in transformers (PCB). There are many congeners of these chemicals notably PBDE and PCB and there are varying effects by the various isomers. Flame retardants were widely used in the nineties in products such as foam mattresses (commercial Octa BDE), poly uretane foam in vehicles and computer appliances (Commercial penta BDE) to slow down easy combustion of plastic products. Hexa bromo biphenyl (HBB) was also used as flame retardant under the commercial name of firemaster. PFOS on the otherhand was used in fire fighting foam as flame retardant and also as a non polar liquid to keep products clean and allow easy washing. These included use in carpets and upholstery amongst others.

The unintentional POPs (UPOPs) includes the class of chemicals known as Polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) commonly referred to as Dioxins and Furans. Hexachlorobenzene (HCB) and recently Pentachlorobenzene (PeCB) has also been added to this list. These compounds serve no industrial or pesticidal use but are produced during synthesis of certain chemicals and during incineration of organic matter. PCB, Dioxins and Furans include many congeners, some of which are highly toxic and proven carcinogens.

1.2 The Stockholm Convention

The Stockholm Convention was adopted on May 23, 2001 and entered into force on May 17, 2004. The Seychelles signed the Convention in 2002 and acceded on 3rd June 2008.

The objective of the Convention is to protect human health and the environment from persistent organic pollutants (POPs) by reducing or, where appropriate, at eliminating releases to the environment.

The Convention provides for Parties to the Convention to take measures to reduce or eliminate releases from intentional and unintentionional production and use as well as measures to reduce or eliminate releases from stockpiles and wastes of such chemicals.

The chemicals subject to the provisions of the Convention are listed in the Annexes to the Convention.

Annex A (Part I) lists POPs pesticides which member States should eliminate and these include aldrin, chlordane dieldrin, eldrin, heptachlor, hexachlorobenzene, mirex, toxaphene and polychlorinated biphenyls (PCBs). Annex A (Part II) specifies measures relating to the elimination on the use of PCBs in equipment by 2025. Part III specifies what PBDEs are included in the Stockholm Convention. Part IV discusses the recycling of articles that are contaminated with or containing hexa and hepta BDE. Part V includes similar measures as Part IV for tetra and penta BDE.

Annex B (Part I) lists chemicals the production and use of which should be restricted and (Part II) relates specifically to the elimination of the production and use of DDT (Dichloro Diphenyl Trichloroethane. Part III of Annex B talks about the production and use of PFOS and PFOSF and introduces acceptable purpose and specific exemptions for these chemicals.

Annex C relates to the unintentional production of POPs chemicals, which include polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF), hexachlorbenzene (HCB) and PCBs.

Annex D determines the requirements and screening criteria for entering new chemicals in the list.

Annex E specifies information to be sought to determine the risk profile to evaluate whether a chemical is likely, as a result of its long range environmental transport, to lead to significant adverse effects to human health and/or the environment. Annex F specifies information on socio economic considerations to be sought to evaluate possible control measures fro chemicals under consideration for inclusion in the Convention

Table 1: List of chemicals regulated under the Stockholm Convention

No	Chemical	Abbreviation	Type	Annex
1	Aldrin	Aldrin	●	A
2	Endrin	Endrin	●	A
3	Di-Eldrin	Dieldrin	●	A
4	Chlordane	Chlordane	●	A
5	Toxaphene	Toxaphene	●	A
6	Mirex	Mirex	●	A
7	Dichlorodiphenyltrichloroethane	DDT	●	B
8	Heptachlor	Heptachlor	●	A
9	Hexachlorobenzene	HCB	●■	A & C
10	α-Hexachlorocyclohexane	α -HCH	●■	A
11	β-Hexachlorocyclohexane	β-HCH	●■	A
12	γ-Hexachlorocyclohexane	Lindane	●	A
13	Chlordecone	Chlordecone	●	A
14	Endosulfan and isomers	Endosulfan	●	A
15	Polychlorinated biphenyl	PCB	▲■	
16	Hexabromobiphenyl	HBB	▲	
17	Hexabromodiphenyl ether & Heptabromodiphenyl ether	PBDE	▲	A
18	Tetrabromodiphenyl ether & pentabromodiphenyl ether	PBDE	▲	A
19	Perfluoro octane sulfonic acid and salts	PFOS	▲	B
20	Perfluoro octane sulfonyl fluoride	PFOS-F	▲	B
21	Pentachlorobenzene	PeCB	●■▲	A & C
22	Polychlorinated dibenzo-p-dioxins	PCDD	■	C
23	Polychlorinated dibenzo furans	PCDF	■	C

● Pesticides

▲ Industrial chemical

■ Unintentional production or byproduct

1.3 The Seychelles National Implementation Plan

The National Implementation Plan (NIP) for the implementation of the Stockholm Convention in Seychelles was first completed within the project "Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants" in 2007. The project was financed by the Global Environmental Facility (GEF) and the United Nations Industrial Development Organisation (UNIDO) was the executing agency.

The update of the National Implementation Plan is also being funded by GEF with UNIDO as the executing Agency. The revision is required because the Stockholm Convention has recently added a new list of chemicals that are to be regulated under the Convention. These include brominated aromatic compounds and additional pesticides (Chlordecone, Lindane, HCH, Endosulfan) (see table 1, items 10-21)

The Seychelles previous NIP was a comprehensive document which addresses for the first time a complete inventory of POPs chemicals in Seychelles followed by a detailed strategy with indicative timeframe and budget. However the NIP was completed at a time where the country was experiencing severe economic difficulties and in the intervening years, in the absence of funding, the majority of the activities in the NIP were not implemented in a timely manner.

Other factors relate to inadequate institutional mechanism and in part the technical nature of the material as discussions with stakeholders revealed that the document is quite technical and difficult to translate into actions.

Based on these findings the revised Implementation Plan attempts a different and hopefully more pleasing presentation to appeal to project developers and managers that are not necessarily knowledgeable in chemicals to take on specific components and implement the action plan. The other important change has been the update of activities and budget to not only take into account new POPs but also address weaknesses in the activities with regards to old POPs. This will be achieved through a comprehensive change in the law relating to the manufacture, use, export and disposal of chemicals.

The Ministry of Environmental and Energy is the national focal point for the Convention and the NIP update project in the Seychelles. Various local experts including representatives of government ministries, private institutions, non-governmental organisations as well as experts from UNIDO and private consultants participated in the setting up and implementation of the project.

2. Country Baseline

2.1 Country profile

The Seychelles is an archipelagic democratic Republic consisting of 125 islands located in the Western Indian Ocean 55.6 degrees east of Greenwich meridian and 5 degrees south of the equator. The total land area is 451km2 and the EEZ comprises of 1.3 million KM2 of ocean. 90% of the population lives on the mainland of Mahe, which consists of a number of reclaimed artificial islands along its eastern coast. The new islands are assisting to meet further development needs of the country and currently used for human settlements, higher end tourism accommodations and renewable energy, hosting seven wind turbines. Previous reclamations have been used to extend the width of the coast of Mahe allowing for a host of economic activity such as port infrastructure and industrial zones.
The population is 87,400 being the smallest in Africa and twelve smallest in the world. The population is tri plural in creole (native), English and French and is composed of a racial mix of Europeans, Asians and Africans. The islands were previously uninhabited and the human population is originally due to migration from other countries.

The populace elects a president who is head of state and Government for a period of 5 years and is constitutionally restricted to three terms in office. The Seychelles parliament comprises of 34 members of which 25 are elected by popular vote with nine seats appointed proportionally on votes received by each party. The other component of Government namely the judiciary functions separately to the executive and legislature. The Seychelles is ranked 4th on the Mo Ibrahim Index of African Governance out of 52 African countries (2012) and 46th world wide for human development with HDI rating of 0.806 (2013), being the highest in Africa.

2.1.1 Socioeconomic context

The country is currently under an extended IMF programme since 2008 to restructure its economy after decades of economic stagnation and high debt servicing. High debt has accrued due to capital-intensive infrastructures such as land reclamation, roads, schools, hospitals, district clinics, water and sanitation amongst others.
Economic growth in 2013 was 3.5% GDP an increase over 2012 (2.9% GDP) and inflation at end of December 2013 was 4.3%. The country still has a sizeable current account deficit although this has improved to 19% GDP in 2013 (22% GDP in 2012).

The Country's debt in 2013 was 69% GDP which although sizeable was a decrease over 2012 and 2011 figures (77% and 87% GDP respectively) . The country has recently committed to reducing debt to 50% of GDP by 2018 having successfully negotiated several important debt-restructuring agreements in 2012 and 2013.

Important progress has been attained from the start of 2013 including a new taxation regime with mandatory VAT registration at SCR 5 million turnover which the aim of going to SCR 3 million in 2014 and SCR 2 million turnover in 2015.
A new Corporate Social Responsibility tax of 0.5% on turnover with sales above SCR 1 million

has been introduced and a 0.5% tourism marketing tax on tourism establishments and other sectors benefiting from tourism e.g. banks and insurance.
The Seychelles Customs has upgraded to the ASYCUDA world web based programme, which is expected to facilitate trade operations and improve quality and accuracy of trade statistics.

The service industry representing 68% GDP for the country continued to perform well in 2013 with 11% increase in tourism arrivals which is an improvement over 2012 (7% growth).
Europe is the principal market representing 69% of arrivals however there has been a significant (53%) increase in the Asian market, which now accounts for 12% of total arrivals.
The increase is attributed to increased marketing and air coverage by international airlines over the last few years. Air transportation remain vulnerable to fuel costs and financial difficulties of the national airline (Air Seychelles) forced the development of a strategic partnership through a 40% equity sale in 2012 with gulf based Etihad Airways. Consequently there are no direct flights by Air Seychelles to Europe with all flights transiting in Abu Dhabi. In 2013, new destination was added (Hong Kong) and partnerships are underway to tap into the South American continent amongst others.

In 2012, the fisheries sector accounted for 0.9% GDP and the sector had contracted by 13% compared to 2011 notably for the artisanal and semi artisanal sub sector. The trend has been reversed in 2013
with 50% growth attributed to 65% rise in fish catch and increase in prices of fish. Piracy in the Indian Ocean had been impacting the sector negatively for a number of years and with increased international pressure, spearheaded by Seychelles, the number of cases has decreased to significantly and greater confidence now exists for fishing the EEZ.

The Agriculture sector has not shown growth in the last few years and contracted further in 2013.
Livestock production experienced the most difficulties and this was associated with the stiff competition from cheaper meat imports as well as increased costs.

The Seychelles provides free medicare at primary and secondary level.
Through a comprehensive health care programme, all Seychellois children are immunised at birth eliminating previously life strengthening or debilitating diseases such as polio.
There exist a number of private clinics complementing the work of free Government clinics some offering specialist treatments. Average life expectancy is 72.6 with females outliving males by at least 10 years.

Education at primary and secondary level is at nominal charges and a limited number of scholarships are available for tertiary education. Over 95% of children finish primary schooling and literacy rate are 94% , which is declining somewhat over previous years.
There exists post secondary institutions and students are able to pursue education at Advanced level and eventually at overseas universities through Government scholarship. Since 2010 Seychelles opened its very own University (University of Seychelles) and now offers courses

at degree level.

Housing poses a particular challenge in Seychelles in view of the land shortages, difficulty and cost of house ownership. Consequently most of the population relies on Government to build and rent houses in housing estates, the most prolific being on reclaimed Perseverance Island. Government is committed to building more houses to meet the increasing demand and vowed to build 5000 houses for the period 2006-2011. The target was not attained with just under 50% houses built reflecting the ever-increasing challenge for housing.

The country is covered throughout with telephone landlines and has two mobile telephone networks from two main telecom providers. In late 2012, Seychelles was connected to the global optical telecommunications network through undersea fibre optic cable and now enjoys fast telecommunications including Internet. Disruptions to the service in 2013 highlighted the need to maintain backup installations, the need for local operators to diversify the services with international providers and the need for alternative alternate fibre optic cable link.

2.1.2 Environment

The Seychelles is a biodiversity hotpot and has amongst the highest percentage of protected area in the world with over 50% of its land territory under legal protection. In 2010, the Government dedicated a further 93% of Silhouette Island, the third biggest island in the Seychelles archipelago towards conservation. The island is home to a range of endemic species and harbours unique ecosystems found nowhere else. The country has exceeded the Aichi biodiversity targets for protected area and is undertaking regular reporting to the CBD.

The country has recently formulated and is implementing its Sustainable Development Strategy SSDS (2011-2020) which ensures i harmonisation of the environment with the development of other sectors. Several challenges still remain in the environment sector, such as the threat of Invasive Alien Species, the sound management of chemicals and hazardous wastes improvements in the management of solid waste and sustainable supply of freshwater.

2.2 Institutional, regulatory and policy framework

2.2.1 Regulatory framework

As it stands now, the legal framework is not in compliance to the Stockholm Convention. This is because the update of the legal framework being a significant part of the previous NIP comprising of 58 distinct legislative changes (see table 2 below) was not implemented. The situation is same as it was in 2007 which is lack of adequate regulatory instruments with regards to POPs. This is now even more pronounced with the new POPs chemicals that has been added to the Convention.

Nonetheless the Seychelles did implement an important measure which was to list the POPs chemicals in the Imports prohibtion list under the Trade Tax Act. This means that anyone importing these chemicals would have been denied permission for imports. If it was a pesticide, then it would have been regulated by the existing pesticide board in view that the focal point to the Convention is also a member of the Pesticide Board.

Although far from being a comprehensive action with regards to legislative and regulatory framework, the action (imports prohibition list) above serves good for Seychelles since there are no production and use of these chemicals.

However this is not the case for the new POPs and therefore a complete re-think is required especially in the light that more chemicals are likely to be added to the Convention in the foreseeable future. It is recommended to develop a Hazardous Chemicals Act to replace the Pesticide Act so that all hazardous chemicals are regulated.

Table 2: Status of regulatory activities in the Seychelles NIP

Main activity	Status as of March 2014
1. Regulatory ban on Annex A chemicals (17 legislative changes)	X
2. Regulatory ban and restriction on PCB (15 legislative changes)	X
3. Regulatory ban and restriction on DDT (10 legislative changes)	X
4. New Pesticide and Industrial Chemicals Regulation and Assessment (2 legislative changes)	X
5. Reduction and elimination of unintentional releases of Annex C POPs (11 legislative changes)	X
6. Reduce or eliminate POPs releases from stockpiles and wastes (2 legislative changes)	X
7. Introduction of a pollutant release and transfer register (1 legislative change)	X

2.2.2 Institutional framework

There is no institution that regulates the importation of chemicals besides the Pesticides Board which controls the import and use of only pesticides. The Department of Environment also proposes substances to the Trade tax Imports prohibition list.

2.2.3 International environmental and chemicals related obligations

Seychelles is party to the following Multilateral Environment Agreements

Table 3: List of main MEA's Seychelles is party to

Conventions	Signatory	Ratified
Basel	11.05.93 (a)	11.05.93 (a)
Rotterdam	11.09.98	Not yet
Stockholm	25.03.02	03.06.08 (a)
Minimata	27.05.14	13.1.15
CBD	10.06.92	22.09.92
Kyoto Protocol	20.03.98	22.07.02
Cartagena Protocol	23.01.01	13.05.04
Nagoya Protocol	15.04.11	20.04.12
London Convention	29.10.84	29.11.84 (a)
UNCCD	14.10.94	26.06.97
CMS	26.05.05	1.08.05 (a)
CITES	8.02.77	9.05.77 (a)
Ramsar	22.11.04	22.03.05 (a)
Montreal Protocol	06.01.93	06.04.93 (a)
Marpol	28.11.90	18.03.91
IPPC	31.10.96 (a)	31.10.96 (a)

2.2.4 Enforcement

For pesticide POPs, enforcement is by default the Pesticide Control Board until reviewed, however since the POP's pesticide is not listed in Schedule 2, it means that no application was received for the importation of these chemicals. The same situation exists with regard to the new POPs pesticides chlordecone, Lindane and alpha & Beta HCH.

For industrial chemicals, there is as yet no enforcement agency defined, however customs officers are key players with regard to enforcement in view that all these chemicals and products are imported and not manufactured in Seychelles. The capacity for enforcement exist in terms of human resources however the new institutional framework being proposed (i.e. Chemicals Committee) will need to be operated by competent staff.

In the absence of the revised institutional framework it is the case that there is no agency or Minstry that is able to regulate all of the POPs chemicals under one legal framework. The Seychelles may in the interim add all these chemicals for imports prohibition under the Trade Tax Act but this is a short term measure since it does not satisfactoriy address in country production, management of stockpile and disposal of chemicals.

2.3 Assessment of POPs issue in the country

2.3.1 Assessment of POPs pesticides

The revised assessment as carried out by Technical Working Group 2 on Pesticides revealed that there was no production, import, export and use of POPs pesticides in Seychelles. The inventory was based on intensive information gathering and compilation. These included:

- List of Importation data from Custom Division
- List of Approved Pesticides Permits from Pesticides Control Board Registrar
- List of Approved Pesticides Permits from Import Permit Division
- Annual Report - Pesticides Control Board - 2013

The referral document for conducting the inventory on POPs pesticide was the 2007 NIP report however a number of difficulties and constraints were encountered during the process. The most pertinent difficulties were:

1. Access to documents and individual referred to in the NIP report for verified of facts.
2. Inconsistency methods of data entry by different organisation involved with importation of pesticides.
3. Reluctance by stakeholders to participate in inventory process.
4. Limited human capacity with the knowledge on POPs pesticides

2.3.1.1 Past and current use

Background information revealed a number of POPs pesticides namely: DDT; toxaphene; adlrin; dieldrin; and chlordane used in the past for the control of pests in agriculture, pest of public health importance and control of termites in the construction industry, the last importation in the country dated back to 1993 and that it is suspected that there could also have been some illegal imports of POPs pesticides which may have gone undetected in the past.

The regulation and phasing out of those which were used has come about through the action of the Pesticides control Board which is in line and governed within the current national legislation the “Pesticide Control Act 1996”. It regulates the manufacture, distribution, use, storage and disposal of pesticide for the protection of public health and the environment, but it does not apply to the POPs pesticides listed in Annex A of the convention. However, Seychelles has a list of restricted goods requiring an Import Permit and Authorisation for importation; these include all the POPs chemicals in Annex A and B of the Convention and this list need to be legalised under the Trades Tax Act.

The management of pesticide products fall under the Pesticide Control Board, with the collaboration of the Ministries for Health, Agriculture plus another five agencies. Monitoring of compliance measures on all products including policing against the entry of restricted pesticides are done by agencies being part of the Board. There is however a separation of responsibilities:

for example interception of imports depends heavily on action by the customs division whilst interventions in the field come mostly from Environment and Health.

Budgetary allocations for these activities derived from the resources of the respective agencies, despite the fact that the Pesticide Control Board originally had a budget allocation which came through the Ministry for Health. There was no monitoring of POPs pesticides in the environment or in humans in the country and this is largely due to a lack of resources and capacity to do so. Following the exportation of a load of obsolete pesticides to UK in 1996 for disposal by incineration no other Pesticides POPs had been found in Seychelles since then.

2.3.1.2 Imports and Exports

The previous NIP reports 32 licensed companies, registered with the Pesticide Board for importation of pesticides however the Pesticides Control Board annual report 2013 shows that this had now increased to 58 licenced companies. Accordingly the "Pesticides Control Act 1996" stipulates that all Pesticides importers should be registered with the Pesticides Board, however eventhough this is not the cases all importers formally requesting a permit for pesticides importation are being referred to the board for recommendation. Categorising the importers in terms of the highest importation volume is:

1. Retailers;
2. Hotels and private individuals;
3. Ministries, Departments and Parastatal Organisation
4. Pest Control Operators
5. Farmers

The study revealed that there were 86 requests that were recommended for import permit by the Pesticide Control Board and records from the Import Permit Division indicated that only 74 importers were given permission to import during the year 2013 this is a difference of 12 applications. This is probable because not all importers requesting import permit is importing the requested commodities at one go as they may or have imported the items at a later date since the import permit is valid for a certain period. Likewise maybe some request had also been refused by other referral agency. The total pesticides importers recorded at the port of entry by custom were 93; this would indicate that there are still a good number of unauthorised pesticide importers and the custom system is picking them through their routine activities. The NIP reported that record from the Trade Tax Department indicated that there were 442 pesticides importers during the year 2003; it is believed that there could have been an error as records from Import Permit and Custom Division shows that the number of pesticides importers to be just over 100. This figure could have been the number of products/items imported for that particular year. The inflow of pesticides had increase compared to the 2003 inventory; evidently this is a challenge for the Custom Division Service. It seems that they are now more efficient in coping with the increase in the imports and the handling of pesticides at the points of entry.

On the question of the possibility of re-imported and used of POPs Pesticides in the future all stakeholders interviewed regarding their views on the subject anonymously stated that as long as there are alternatives to POPs Pesticides this should not be an issue. However the Public Health Authority mentioned that in exceptionable event of an epidemic that would necessitate dealing with an eventuality for the protection of public health it could be considered.

For exports of POP pesticides, the situation is as that was made available in the 2007 NIP report. No additional information was obtained for export of POPs Pesticides.

2.3.1.3 Identified Stockpiles of POPs Pesticides and POPs Pesticide Waste

The inventory has not been able to confirm the identification of any stockpile or obsolete POPs pesticides. All surveyed importers, pest control operators, or private users had denied having import, export, sell, packed, distributed, or having done those activities in the past for any of the POPs pesticides. None of these importers claimed to have any stocks of these pesticides. This is most likely true as according to the NIP the last record of the use of POPs Pesticides in the Seychelles was in the early 1900s' and data from 2010 to end 2013 at the Custom Division does not have any record of POPs Pesticides importation.

Unidentified stock of pesticides was however found at a retail outlet, this was a liquid container without proper labelling and from a pesticide store 3 items were in foreign languages. Obsolete stocks of pesticides were found in at 3 different pesticides store. Site visits did not revealed any POPs Pesticides however batch of obsolete and unidentified stock pesticides found were:

- Public Health Authority Pesticide Store,
  - 500 litres TEMEPHOS (Organo phosphate pesticides)
- Michaud Pest Control Pesticides store
  - 45g Pyrethroid Granules
- SAA Pesticides store
  - Carbamate Granule –in plastic bag
  - Copper Hydroxide- liquid - 03/14 (next month)
  - Imidacloprid – liquid -2011

2.3.1.4 Present Management

As to the current practice for the management of POPs pesticides nationally, one major fact established is that there is a more or less well-controlled importation practice. All importers of pesticides had to request for an importation permit from the Import Permit Division; from there the request is circulated to referral agencies including the Pesticide Control Board and upon approval by all parties concerned the import permit is issued. Upon arrival in the country all commodities had to be verified by Customs at both ports of entry. The reason why there are discrepancies in the number importers and quantities of imported pesticides in the recorded data from Pesticide Control Board to that of the Import Permit Division and that of Custom Division could be of one or more of the following reasons:

- Not all the approved pesticides requested permission from the Pesticides Control Board is given import permit since it does not necessary means those other referral agencies had given their approval.
- The applicant had not proceeded with a particular request for importation.
- The Custom Division had intercepted importation which had not gone through proper channel at the ports of entry.
- The data collection or entries are not adequate.

The issue remained with the disposal of pesticides or their emptied container. Very few empty containers were noticed on the sites visited and the main types were plastic containers for rat bait and a few 1litre plastic containers of different type of pesticides. The country does not have the facilities to dispose of unwanted stock of pesticides or empty containers and it was mentioned that the latter are being dumped in the normal solid waste stream like any other waste.

Plate 1: Pesticide storage

Typical pesticide store

Batch of expired pesticides (TEMEPHOS)

2.3.1.5 New pesticides under Annex A

The assessment for new Pesticide POPs was conducted as part of the inventory for old POPs in view of same modality of imports, use and disposal. The stakeholders are pesticide importers and appplicators and they both require a special license.

The revised assessment which included site visits to most facilities, telephonic exchanges and analysis of the customs import data found that there were no imports of any of the new pesticides or their by products in the country under the period of review from 2003 to 2013. The absence of chemical manufacturing sector in the country eliminates the alpha and beta Hexachlorocyclohexanes which are by-products in the industrial manufacture of gamma hexachlorocyclohexane (lindane) and also chlordecone the intermediate in the synthesis of the pesticide Mirex.

Pentachlorobenzene (PeCB) was used particularly in industry to reduce the viscosity of PCB products in heat transfer applications, in dyestuff as carriers, as a fungicide, in flame retardant; and as a chemical intermediate e.g. production of quintozene (a soil fungicide).

In Seychelles there are of course no industrial processes and therefore industrial production or use is unlikely. We consider therefore that PeCB is not likely to be present in the country either as stockpiles, contaminated sites, or wastes. The chemical may be present in old PCB oil or intentional production but these are likely to be insignificant

2.3.2 Assessment of PCB (Annex A Part II)

Current local legislation bans the import of PCBs and PCB's equipment though it is allowed in closed systems. Since there is no production of PCB or PCB-containing equipment, the country does not export goods containing PCBs. The main source of PCB in Seychelles is in closed applications within the power production sector. PCBs are not manufactured locally and most PCBs are used in electrical equipment as dielectric oil in transformers, capacitors and switchgears by the only power generation company, Public Utilities Company (PUC).

2.3.2.1 Inventory of transformers

PUC has provided the following statistics on transformers as oF February 2014. The capacities of pole-mounted transformers are usually low and in the range of 5, 10, 25, 50, and 100 to 200 kVA, whereas those of sub-station-mounted transformers are relatively high in the range of 300, 315, 500, 800, 1000, 1600, 7500, 15000, 25000 to a maximum of 35,000 kVA

There are 552 transformers in use in Seychelles of which 127 and a suspected additional 24, (total 154) was manufactured before 1986 and is suspected to contain PCB. Of these transformers 71 had samples of their oil removed and sent to an overseas laboratory (Tanzania) for testing. Also two soil samples in areas where there had been leakage to ground was also sent for testing. At the time of writing the test results has not been received.

In terms of disposal, there were 36 drums of transformer oil comprising 7,488 liters which was disposed by incineration to an overseas facility from mid February 2012 to end of March 2014. There are notable technical and other challenges to sample all suspected equipment. It was mentioned that pole mounted transformers cannot be sampled as they need to be disconnected from the grid and the equipment brought down. This means of course that the older transformers can only be tested during schedulled maintenance. The organisation with the lead Agency being the Ministry of Environment & Energy have an ongoing PCB testing program in place developed under the NIP 2007 which is starting to bear fruit.

Table 4: Number of transformers at PUC

Location	Sub-Station-Mounted	Pole-Mounted	Total
Mahe	208	273	481
Praslin	34	39-40	74
La Digue	10	5- 0	10
(Spares stored in workshop on Mahe)	7	0	7
Old not in use(Mahe)	1	14	15
New not been used	7	23	30
Sub-total	267	350	617

2.3.2.2 Specification of transformer oil used by PUC

PUC Electricity is using only oils that are specified according to BS 148 for all its transformers and switchgears. Transformer oil is made from mineral oil. It has a boiling point between 250 and 300 °C. The refined oil is very pure and comprises only of liquid hydrocarbons. This oil is also used in switchgears such as circuit breakers. The main purpose of the oil is to act as an electrical insulator and also to conduct heat away from the active parts of the transformers/ circuit breakers to the surrounding or cooling radiator.

PUC uses ADNOC TRANSFORMER OIL BS 148 CLASS II for refilling its transformers.

The ADNOC LUBE Data Sheet specifies that this oil does NOT contain PCB.

It should be also noted that this oil is imported by the Seychelles Petroleum Company (SEPEC) from ADNOC in the United Arab Emirates

PUC consumes on average 208 litres per month around 6,000 litres of transformer oil for refilling. Most All of the oil from the transformers is disposed of by incineration at a small plant in the premises of PUC

Plate 2: PCB inventory & sampling

Getting access to transformer manufacture plate

Recording technical information

Preparing for laboratory test

Sampling

2.3.2.3 Assessment of PCB stock in transformers

A total of 89 transformers dating from 1963-1986 (see table 5) was sent for testing in 2014 at the PACE Analytical laboratory in the USA. The result is that one transformer had concentration exceeding 50ppm for Aroclor 1260 (174ppm) and Aroclor 1254 (157ppm). 40 out of 89 samples (45%) tested positive for PCB (Aroclor 1260) and the total amount of PCB present in all of these equipment were found to be **265.71kg**. The result is presented in table 6 and 7 below.

Table 5: Number of suspected PCB containing transformers

Group	Quantity	Remark
Group 1: Transformers manufactured in 1963-1986	223	Suspected to contain PCB (Target Group)
Group 2: Transformers manufactured in 1987-2003	185	Assumed to be PCB-free
Group 3: Transformers manufactured after 2003	147	PCB Free
Group 3: Transformers with year of manufacture not identified	40	To be investigated later when data are available
Total	595	

Table 6: Assessment of transformers at the PUC workshop (showing only those that tested positive)

Year of manufacture	Make	Location	Value in mg/l (ppm)	Oil volume in liters	Quantity PCB in Kg
1973	Bonar Long	Workshop	4.2	473	1.99
1998	NEI Cape Town	Workshop	1.6	150	0.24
1982	Bonar Long	Workshop	1.8	325	0.59
1972	Bonar Long	Workshop	2.3	773	1.78
1982	Bonar Long	Workshop	2	645	1.29
1971	Parsons Peebles	Workshop	5.8	112	0.65
1980	Brentford	Workshop	3.3	158	0.52
1974	Treforest Glamorgan	Workshop	3.1	267	0.83
1974	Treforest Glamorgan	Workshop	7.0	230	1.61
1976	Woden	Workshop	2.3	108	0.25
1975	Woden	Workshop	1.7	325	0.55
1967	Foster	Workshop	5.3	128	0.68
No info	No info	Workshop	8.1	No info	
Total					**10.97**

Table 7: Assessment of transformers on site (showing only those that tested positive)

Year of manufacture	Make	Location	Value in mg/l (ppm)	Oil volume in liters	Quantity PCB in Kg
1983	Treforest Glamorgan	L'exile	**174**	240	41.76
1970	Bonar Long	Roche Bois	**49.2**	445	21.89
1971	Parsons Peebles	NE Pointe	22	591	13.00
1970	Treforest Glamorgan	PIE	29.2	586	17.11
1971	Hackbridge Hewittc	China Emb	7.9	409	3.23
1974	Treforest Glamorgan	Hermitage Dental Clinic	7	1522	10.65
1982	Bonar Long	SBC Hermitatge	2.4	419	1.00
1979	Bonar Long	Anse Boileau	2.4	7800	18.72
1971	Bonar Long	Reef Hotel	1.9	886	1.68
1972	Treforest Glamorgan	Sheraton Hotel	2.8	1118	3.13
1979	Bonar Long	Sawmill	4.1	462	1.89
1978	Bonar Long	AR Polytechnic	2.3	692	1.59
1979	Bonar Long	Police Academy	5.6	462	2.59
1985	Midland transformer	CCI 2	5.5	336	1.85
1974	Treforest Glamorgan	Les Mamelles	3.6	582	2.10
1979	Woden	UCPS	1.7	750	1.28
1982	Woden	Food Pro	2.9	550	1.56
1972	Treforest Glamorgan	Beau Vallon Bay Hotel	2.6	9637	25.05
1980	Crompton Greaves	Bel Ombre Dan Zil	2	500	1.00
1974	Treforest Glamorgan	Electricity house	7.1	758	5.38
1971	Bonar Long	Roche Bois	3.8	113	0.43
1979	Bonar Long	Anse Boileau	2.6	7800	20.28
1979	Bonar Long	Victoria	6.2	7800	48.36
1978	Moris Awerbuch	Skychef	3.7	748	2.77
1980	Lindley Thompson	Valle De Mai Praslin	2.4	529.6	1.27
1980	Lindley Thompson	Fond Boffay Praslin	4.0	529.6	2.12
1979	Bonar Long	Baie st Anne Power st	6.6	462	3.05
Total					**254.74**

2.3.2.4 Maintenance of transformers & Switchgears

Transformers and switchgears are usually maintenance-free. Maintenance is carried out only in the case of an oil leak or at interval specified by the manufacturer. Every substation is inspected once a month according to an inspection schedule. A pole-mounted transformer is repaired when a leak is observed or when there is a failure on it. In case maintenance is required, the equipment is firstly isolated from the system, then removed and brought to the workshop where the oil is drained and tested. If the oil is found to be still in good condition, it will be re-used after cleaning in a filtration system otherwise it will be replaced with new oil, which is filled into the equipment. In case a top-up is only required, only new oil is used.

Oil samples are taken at specified interval, usually every 5 years, and tested.(to be clarified) Depending on the result of the test, an oil change may be carried out. Used oil collected from transformers is temporarily stored in drums and later disposed by incineration in a sludge incinerator. PUC consumes annually around 6,000 litres of transformer oil for refilling equipments (Transformers and switchgears).

Maintenance staffs are provided with safety gloves for handling transformer oil. Oil spillages are kept to an absolute minimum as they are cleaned immediately.

2.3.2.5 Conclusion of PCB inventory

A total of 595 pole-mounted and fixed transformers were inventoried and a fraction (89) of these were tested. The result are that the majority contain oils with PCB below detection limit or less than 50ppm of PCB. However one sample had 174ppm. Considering the volumes involved with transformers including those with concentration below 50ppm, there is total **265.71 kg** of PCB detected so far in the sampling programme.

It is possible that there are sites contaminated with PCB transformer oil as used oils collected from transformers are temporarily stored in drums and later disposed by incineration. Annually PUC consumes a total volume of 6,000 litres of transformer oil to refill equipment and all of these are PCB free mineral oil. However the method of refilling transformers may lead to cross contamination and this has to be addressed. PUC has the capacity to assess and implement measures regarding use of PCB since this area is known amongst its specialized staff. On the regulatory side, there is lack of capacity for the authorities to deal with PCB especially when it comes to specialization of inspectorate staff. PCB has not been part of normal field assignments for Environment or Health officers. There is a lack of knowledge on PCB amongst staff, particularly those who have not had higher education.

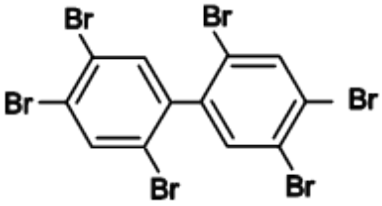
With regards to detection and evaluation, the Seychelles Bureau of Standards, with some additional technical upgrades, can leverage the capacity for laboratory assessments. Since PCB has not been a mainstream issue, none of the agencies have allocated budgets for dealing with the substance.

2.3.3 Assessment of POP-PBDEs and HBB

The new industrial chemicals listed under Annex A are Hexabromobiphenyl (HBB) and the Polybrominated Diphenyl Ethers (PBDE). These chemicals were used as flame retardants in products and are likely to have beein imported in Seychelles.

HBB

The HBB were used under the trade name: FireMaster BP-6 and FireMaster FF-1 in products in the 1970's.

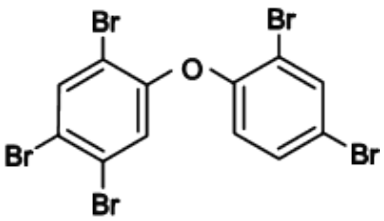


Hexa bromo Biphenyl (HBB)

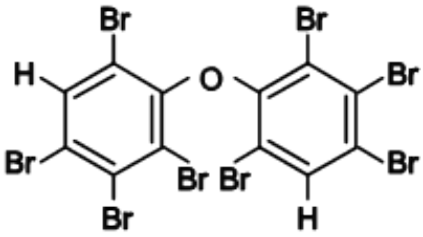
PBDE

The Poly Brominated Diphenyl Ethers consists of four different chemicals namely the tetra and penta BDE which are the main components of commercial penta BDE and the Hepta and Hexa BDE which are the main components of commercial Octa BDE.

The commercial penta BDE was used as flame retardant in Poly Uretane foam within the vehicle manufacturing sector and also for production of other seats. Commercial Octa BDE was used in as flame retardant in the production of electronics and electrical equipment (EEE) such as computer monitors, Cathod Ray Tube (CRT) televisions, radios amongst others.



Penta bromo diphenyl ether (Penta BDE)



Octa bromo diphenyl ether (Octa BDE)

2.3.3.1 Stockpile and use of PBDE

There is currently no production of EEE in Seychelles. The inventory carried out on PBDE in 2014 (see annex) revealed that there was significant PBDE products penetration in Seychelles especially within the Electronics and Electrical Equipment and the transportation sector. It was not possible to obtain data on EEE e.g. CRT vs flatscreen therefore a percentage was used.

It was calculated that there is **7,438** kg of commercial octa BDE present in stockpile and use in Seychelles and 168 kg of commercial penta BDE. Table 8 and 9 below shows the amount of the different BDE's per source category.

Table 8: c-Octa BDE by source categories

Item	Total cOcta BDE / kg
Electronics & Electrical Equipment import	1,451
EEE Stockpile	4,652
Waste Electronics & Electrical Equipment	1,335
Total	7,438

Table 9: Penta BDE by source categories

Item	Total Penta BDE / kg
Vehicles in use	115.4
Imported	0
End of life vehicles	46.84
In landfills	5.54
Total	168

Taking into account the percentage composition of the hexa BDE and hepta BDE in commercial Octa BDE and of tetra BDE and penta BDE in commercial penta BDE, the amount of the various brominated diphenyl ethers was found to be as per figure 1 below. Clearly the two most common chemicals in Seychelles is the Hept BDE and Octa BDE used in the electronics sector.

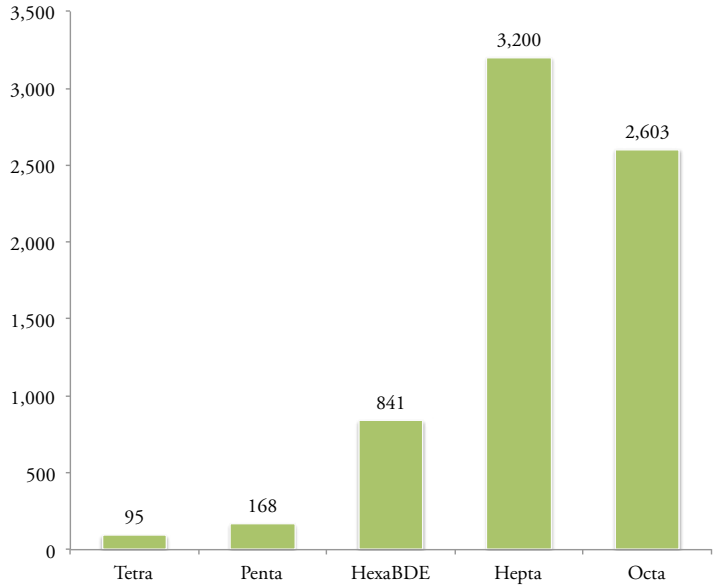


Figure 1: PBDE inventory by types

2.3.4 Assessment of DDT

The Assessment in relation to Annex B chemicals DDT was conducted together with that of POPS pesticides in Part 2.3.1 entitled: " Assessment with respect to Annex A, part I chemicals (POPs pesticides): historical, current and projected future production, use, import and export; existing policy and regulatory framework; summary of available monitoring data (environment, food, humans) and health impacts". All relevant information to POPS pesticides in general are therefore found in Part 2.3.1

2.3.5 Assessment of PFOS, its salts and PFOS-F

The PFOS represents a new class of fire retardants that are used within specialised industry and in products.

2.3.5.1 Production and use of PFOS

The UNEP guidance on PFOS identified six sectors where significant amount of PFOS was produced. These were assessed by the technical working group on industrial POPs and as per table 10 below, only four of the six categories were found to be relevant to Seychelles. These included products and articles containing PFOS/PFOS-F, aviation hydraulic fluid, firefighthing foam and insecticides. There is no production of this chemical in Seychelles.

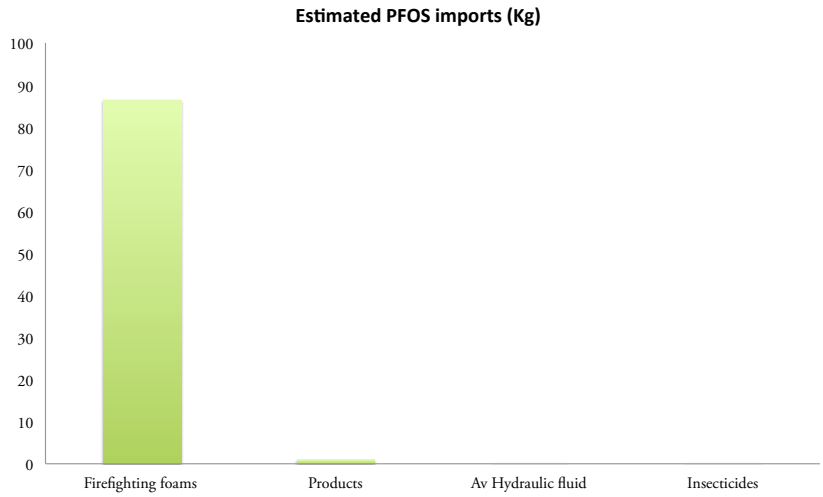
Table 10: PFOS categories applicable to Seychelles

	Summary of sectors	Applicable?
1	PFOS Production Sectors	X
2	Industrial Sectors	X
2.1	Photographic sector	X
2.2	Semiconductor sector	X
2.3	Electronics sector	X
2.4	Metal Plating	X
2.5	Mining industry	X
3	Products & Articles	✓
4	Aviation hydraulic fluid	✓
5	Firefighting foams /liters	✓
6	Insecticides	✓

Amongst these categories (for use), the assessment revealed that aviation hydraulic fluid are insignificant in view that only a small amount is maintained locally for minor maintenance involving topping up. Major overhaul for draining and replacing the fluids are done overseas.

Similarly the working group on pesticides could not identify the importation of PFOS/PFOS-F as pesticides. However the team identified significant use in firefighting foam. The Seychelles Petroleum Company (SEPEC) maintains a significant amount of fire fighting foam in case there is a fire at their facility and the Seychelles Fire and Rescue Services also maintains stock of fire figthing foam.

Figure 2:PFOS Amount (kg) by source categories



2.3.6 Assessment of releases of unintentional produced chemicals (Annex C chemicals)

The assessment for unintentional chemicals followed the UNEP toolkit. The toolkit lists 10 source categories for production of UPOPs and its relevance to the Seychelles was assessed as given in table 9 below. In view that there are no metal production industry in Seychelles or Chemicals and consumer goods production, these two categories were dropped from the inventory.

Within the source categories identified as relevant to Seychelles, there were subcategories which was also not relevant. Example in the Source category of Waste Incineration, the subgroup municipal waste incineration was dropped because lack of such facility. However the main contribution in this group is from medical waste incineration which is relevant to Seychelles. Table 11 shows the amount of UPOPs that is calculated to be release into the relevant three of the five different pathways identified in the toolkit. There was no emission to water and products.

Table 11: UPOPs release by source categories

	Source Categories	Relevant to Seychelles	Emission to air	Emission to land	Emission as residue
1	Waste Incineration	✓	2.718	0.0	0.5
2	Ferrous and Non-Ferrous Metal Production				
3	Power Generation and Heating	✓	0.007	0.0	0.0
4	Production of Mineral Products				
5	Transport	✓	0.007	0.0	0.0
6	Uncontrolled Combustion Processes	✓	4.582	0.2	0.0
7	Production and Use of Chemicals and Consumer Goods				
8	Miscellaneous	✓	0.001	0.0	0.0
9	Disposal	✓	0.00	0.0	3.8
10	Identification of Potential Hot-Spots	✓	0.00	0.0	0.0
	Sub Total (gTEQ/a)		7.3	0.2	4.3
Grand Total (gTEQ/a)			11.8		

The assessment concludes that Seychelles emits 11.8g TEQ/a with 60% being emission to air and the remainder as residue. The most important activities are uncontrolled burning processes namely accidental fires at the Providence landfill which lasted for more than 3 weeks in 2013 and other uncontrolled burning activities. The second biggest emiter to air is the medical waste incinerator which does not have fly ash management systems therefore they contribute significantly also to UPOPs to the bottom ash. Other contributors to residue is sewage treatment and disposal of waste by landfill.

Figure 3: UPOPs release pathways in the environment (2013)

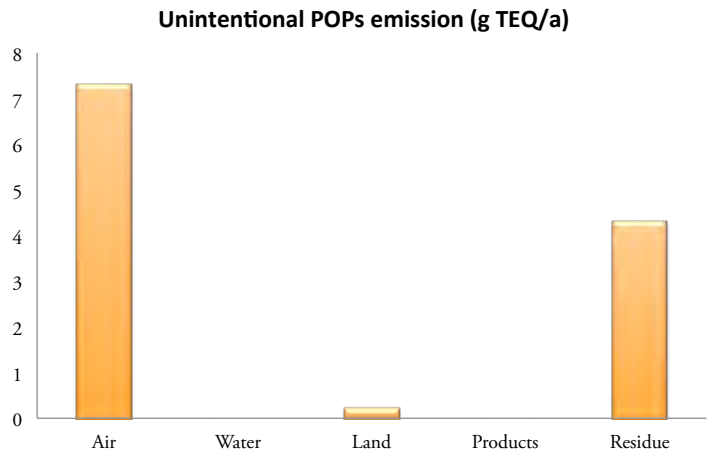
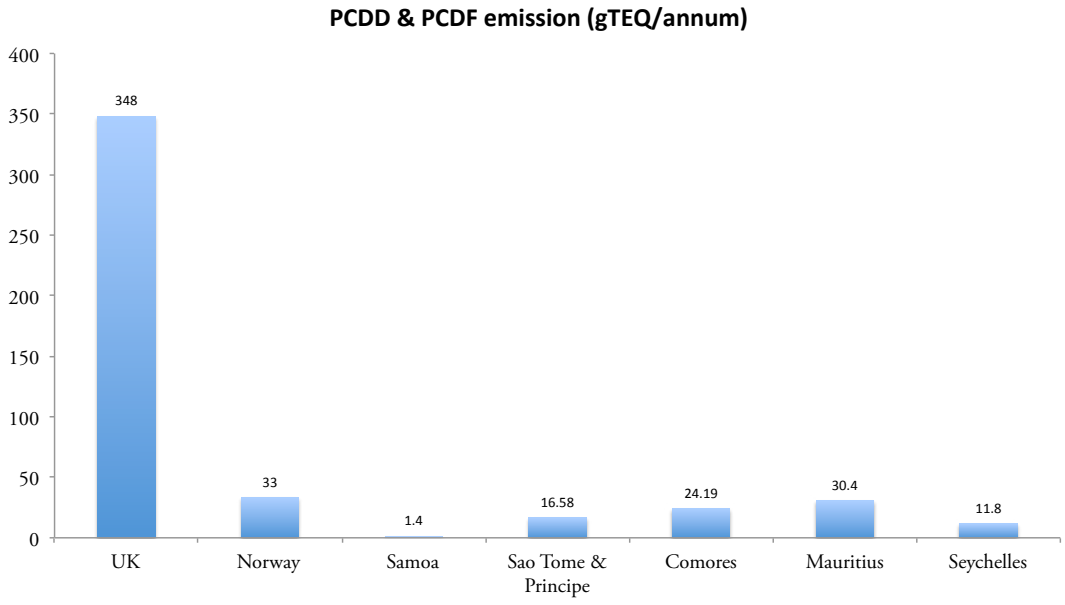


Figure 3 further details the contribution to the various pathways. If we compare this emission with those of other countries we see that the Seychelles is not in the medium or high category emitters. Nonetheless significant reduction can be achieved by controlling waste burning and improving the technology as can be afforded of the medical waste incinerator.

Figure 4: Comparison with other countries (2004 figures)



2.3.7 Assessment of stockpiles, contaminated sites and wastes

Contaminated sites identified in the first assessment in 2007 (see overleaf) remained valid during this update. The review however indicates that the site at Grand Anse is likely to stretch beyond the research station warehouse and has included plantations. As indicated in the previous NIP it is only through further testing on these sites that the non-contaminated status could be validated. In terms of the new POPs none of these areas are likely to contain the new pesticides POPs, however for PBDE and PFOS the landfills on Mahe, Praslin and La Digue remains the most credible contaminated areas.

Sites potentially contaminated with old POPs (see Plate 3 - 9)

- PUC Stockpile area (PCB)
- Huteau lane ex power station (PCB)
- Closed landfill at Barbarons and Roche Caiman (Pesticides, PCB)
- Providence 1 landfill
- Praslin landfill (Pesticides, PCB)
- La Digue landfill (Pesticides, PCB)

Potentially contaminated sites for the new POPs (see overlead Plate 7 - 9) are considered to be:

- Seychelles Fire & Rescue Services training grounds (PFOS)
- Sites of major fires (PFOS)
- Providence 1 landfill (PBDE, PFOS)
- Praslin landfill (PBDE, PFOS)
- La Digue landfill (PBDE, PFOS)

Plate 3 :Grand Anse Research Station on Mahe (Pesticides)

Plate 4 : Ex PUC power station at Huteau Lane on Mahe (PCB)

Plate 5 : PUC Waste Oil Stockpile area (PCB)

Before March 2014: Empty transformer dumped at ex PUC waste oil stockpile (PCB)

March 2014: construction of LPG distribution center in the area

Plate 6 : Roche Caiman ex-landfill site (Pesticides, PBDE, PFOS)

Plate 7 : Providence I landfill on Mahe (Pesticides, PBDE, PFOS)

Plate 8 : Praslin landfill (Pesticides, PBDE, PFOS)

Plate 9 : La Digue sanitary landfill (Pesticides, PBDE, PFOS)

For dioxins and furans fallout zones are to be considered contaminated which are areas downwind of large fires, especially those downwind of landfill fires and power generation. In the case on Mahe, these may be across the entire east coast.

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

Future production, use, import and export other than environmentally sound disposal is not expected for Annex A and B chemicals.

Exceptions are:

- PFOS, its salt and PFOSF. These chemicals have been found in firefighting foams, aviation fluids and have been suspected in consumer goods and articles. Seychelles will require an exemption for use of these chemicals in aviation and firefighting foams as acceptable purposes under the Convention.

- PBDEs can probably be found in the electrical and transport sectors. The recycling of articles containing and contaminated with these chemicals will not be allowed. Therefore exemptions will not be required as per Part IV and V of Annex A. Because there is a likelihood for import of used cars, trucks and buses produced before 2005, the amount of PBDE in Seychelles is expected to increase.

2.3.9 Existing programmes for monitoring releases and environmental and human health impacts, including findings

There are very limited programmes for monitoring releases and impacts of POPs on the environment and human health. The main POPs program is for PCB whereby the transformer oils and suspected contaminated sites are being tested for PCB. There has been discussions with the Ministry of Health in the past to join the global monitoring progamme on POPs in breast milk but they have shown little interest.

2.3.10 Current level of information, awareness, and education among target group

There is generally limited awareness of POPs in Seychelles amongst the population. In the last quarter of 2014, several training workshops were held with Customs officials on POPs which was organised by the NGO Lions Club of Seychelles. It was seen that there was no knowledge of POPs prior to the training. Over 100 individuals were trained and made aware of POPs and the stockholm convention requirements. The training was published in the local newspaper therefore increasing awareness.

2.3.11 Mechanism to report under Article 15 on measures taken to implement the provisions of the Convention and for information exchange with other Parties to the Convention

According to Article 15 country reporting shall be undertaken in every four years. The first reporting of Seychelles is under preparation.

Paragraph a (v) of Article 5 requests Parties to the SC to review every five years of their strategies in achieving continuous release reduction of Annex C POPs and such reviews shall be included in reports submitted pursuant to Article 15. The review of UPOPs release reduction was undertaken the first time in 2014. The conclusion is that UPOPs releases have been increased since the first NIP despite all efforts of the Government.

Paragraph g of Part II of Annex A of the SC requests Parties to provide a report every five years on progress in eliminating PCBs and submit it to the Conference of the Parties pursuant to Article 15. The first report is under preparation.

Seychelles does not use DDT, therefore DDT related reporting is not applicable.

As per paragraph 3 of Part III of Annex B each Party that uses and/or produces PFOS and related chemicals shall report on the progress it made to eliminate PFOS, its salts and PFOSF and submit information on such progress to the Conference of the Parties pursuant to and in the process of reporting under Article 15 of the Convention. The periodicity of this reporting in every four years. PFOS related information is included in the NIP. This information will be provided to the Secretariat of the Convention in the next country report.

2.3.12 Relevant activities of non-governmental stakeholders

There are very limited NGO participation in chemicals related topics. Only one NGO namely Lions Club of Seychelles, was interested to undertake activities in chemical related areas in 2014 as mentioned under 2.3.10.

2.3.13 Overview of technical infrastructure for POPs assessment, measurement, analysis, research and development

There exists two laboratories in Seychelles (SBS and SPHL) which is capable of analysing some POPs and indeed the SBS has undertaken testing for some POPs as part of a regional project (Wiolab). However there has been no training and ongoing programmes for laboratory personnel and therefore this is required in order to maintain capacity for assessment. There are no research programmes for POPs and assessment is limited to PCB testing.

In terms of analytical capacity, laboratories are ranked in four different tiers from Tier 1 which is fully equipped to Tier 9 least equipped.

- Tier 1: = "Golden standard"; Instrumentation capable to analyze PCDD/PCDF and dioxin-like PCB in addition to the basic POPs:high-resolution mass spectrometer in combination with a capillary column
- Tier 2: Instrumentation capable to analyze all POPs (some at high concentrations only):
- mass-selective detector (low resolution mass spectrometer) or a combination of two and in combination with a capillary column
- Tier 3: Instrumentation capable to analyze all POPs without PCDD/PCDF and dl-PCB: electron capture detector in combination with a capillary column
- Tier 9: Instrumentation not sufficient to analyze POPs: neither mass selective or ECD or no capillary column is present (packed column or HPLC + ECD or FID or any combination thereof)

According to the UNEP report[1] on Capacity for POP analysis, it was evident that not all countries have capacity to analyse all POP's, least so the developing countries. The Seychelles being a Small Island Developing States is unexpectedly short of capacity and no local laboratory is listed on the UNEP database of 252 Laboratories Analyzing Persistent Organic Pollutants "POPS Laboratory Databank"[2].

1 UNEP, 2008; Assessment of existing capacity and capacity building needs to analyse POPs in Developing countries at http://www.chem.unep.ch/Pops/laboratory/Final%20report%20POPs%20Lab%20Cap_text.pdf

2 At http://212.203.125.2/databank/Laboratory/Search.aspx

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

This section considers the economic and social implications facing the Seychelles with regard to the new POPs. In this regard, in contrast to the old (intentional) POPs which were centered more on pesticides and PCB, new non pesticide POPs are flame retardants that has been used in other sectors including the household consumer. In view that all these chemicals has already been phased out of production for use in articles, there is not likely to be a significant impact to the social and economic sector for Seychelles.

Table 12: Likely socioeconomic impact of new POPs

No	Name & Type	Sectors	Impact		
			Low	Medium	High
Pesticides					
1	Chlordecone	Agriculture	X		
2	Endosulfan	Agriculture	X		
3	PeCB	Agriculture	X		
4	HCB	Agriculture	X		
5	α-HCH	Agriculture	X		
6	β-HCH	Agriculture	X		
7	γ-HCH (Lindane)	Agriculture	X		
Industrial chemicals					
8	HBB		X		
9	Tetra & Penta BDE	Transport Waste mgmt		X	 X
10	Hexa BDE & Hepta BDE	EEE WEEE		X	 X
11	PFOS & PFOS-F	Aviation Fire fighting Products		X	 X X

Table 12 above shows that the impacts of new POPs are likely to be for PFOS and PFOS-F where new alternatives must be bought and existing stocks destroyed. The SFRSA and SEPEC store a large quantity of fire fighting foam. The other significant consideration is stockpile of PBDE within the electronic and electrical sector and at the main waste disposal site.

In Seychelles there are three landfill sites located each on the main granitic islands of Mahe, Praslin and La Digue which accommodates 95% of the population. There are significant cost consideration for treatment of contaminated site at these landfills.

The Providence landfill I (see figure 5 below demarcated red) is the most significant contaminated site which will require rehabilitation and closure. As can be seen below, the area comprises of 6.3 hectares. Taking this into consideration, an estimate of rehabilitaiton can be made based on earlier feasibility studies undertaken in Seychelles. This is presented in table 13 below.

Figure 5: GIS Map of Providence landfill I (red) and Providence landfill II adjacent

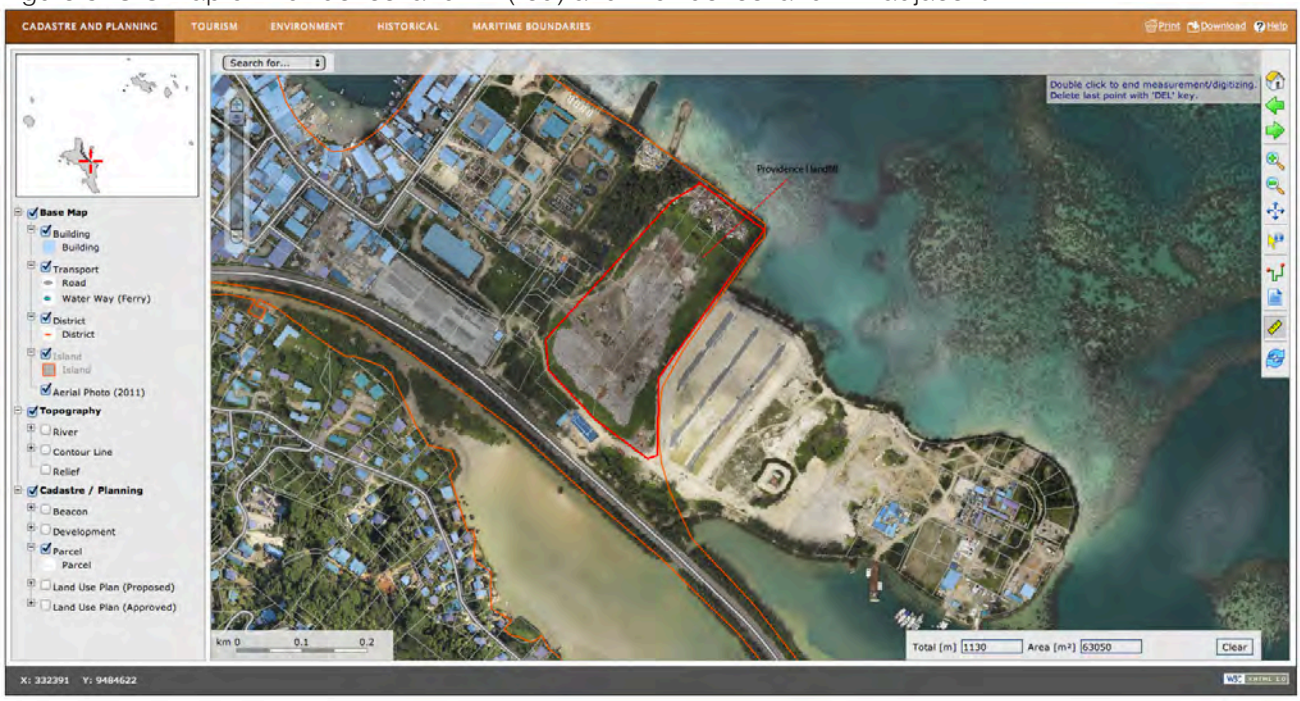


Table 13: Cost for rehabilitating Providence I landfill

Closure and Restoration	Amount	Unit	Unit cost	Unit	Total
Fill layer (0.8 m coral)	6.30	ha	25,000	€/ha	157,500
Top soil layer (0.2 m)	6.30	ha	13,000	€/ha	81,900
Planting	6.30	ha	8,000	€/ha	50,400
3. LF-Gas collection drains, pump and network	1.00	lump sum	150,000	€	150,000
3. LF-Gas flares, incl. Monitoring system		1.00	lump sum	450,000	€ 450,000
Subtotal				SCR 14,681,700	€ 889,800

Estimates for rehabilitation of Praslin landfill is SCR 9 million and SCR 500,000 for the much smaller La Digue landfill; These costs are expenses which the country would have done anyway in order to secure these sites and extract gas.

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

There are no established in country process for assessment of new chemicals. Assessment is done on case by case basis within the resources available. The Institutional changes being made under this updated NIP intends to address this shortcoming.

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

There are no systems for assessment and regulation of chemicals already in the market.

3. Implementation Plan

3.1 Policy statement

The Seychelles has been at the center of environment protection and sustainable development for the last 30 years. Although constaint by size and economic prowess, the Seychelles is signatory to all major environmental conventions and has taken significant steps towards improving the quality of its environment and health of the population. As such there exists notable political commitment towards implementing Multilateral Environment Agreements especially since the last two presidents were at one point former Ministers for Environment.

The Country continues to commit itself towards meeting its international obligation and has made the required changes to allow the successful implementation of this action plan in order to enhance compliance to the Stockholm Convention.

3.2 Implementation strategy

The revised strategy for NIP implementation has taken into account shortcomings in implementing the previous NIP. The main issues were found to be a) the structure of the NIP document itself, b) funding and c) capacity issues.

Firstly with regard to the NIP, it is noted that the topic, i.e. chemicals management, is not simple for SIDS which suffer from general lack of trained manpower. In this regard the Stakeholders has decided on a more simplistic and natural NIP presentation that is in line with its incountry programming format which at the same time can meet the requirement of the Stockholm Convention. This is meant to make the document more friendly to decision makers and those involved in policy as well as facilitate project initiation and management.

Secondly, whereby the previous NIP relied upon project style implementation which was not successful due to lack of external funding and limited opportunity to mainstream within existing programmes, the revised NIP will be implemented under a new multisectoral institutional framework that will be created under legislation supported by relevant main line Ministeries such as the Department of Environment & Energy and the Ministry of Health. In line with this the revised strategy allows the creation of a trust fund into which can be used for specific actions in connection to coordination, implementation and reporting.

Finally the revised NIP focusses on diversifying implementation capacity to resolve the shortage of human resources within line Ministeries making use of the ever expanding local consultancies environment that exists to assist with specific tasks including NIP update and reporting amongst others.

3.3 Activities, strategies and action plans

3.3.1 Policy & institutional measures

The main strategy for policy and institutional framework is to put in place a new Hazardous Chemical Act to replace the Pesticide Control Act. The Act will list all chemicals that are restricted or banned in Seychelles thereby bringing the country in line with all the requirements of the Stockholm Convention.

The Act will also create the necessary institutional framework viz. the Hazardous Waste Committee which will overseee the implementation of key activities in connection to POPs. It will also establish a financial instrument that can further support the implementation of the action plan.

Activities	Responsibility	Timeframe
O.1. Improved domestication of the Stockholm Convention		
3.1.1 Development of Hazardous Chemicals Act	MEE	2015
3.1.2. Include ban on the manufacture, importation, use and export of Annex A chemicals	MEE	2015
3.1.3. Ban the use of PCB equipment in closed applications by 2025 and ensure recovered PCB are treated	MEE	2015
3.1.4 Ban on manufacture, importation use and export of PBDE	MEE	2015
3.1.5 Restriction on use of PFOS and PFOS and PFOS-F	MEE	2015
O.2. Regulations with regard to institutional mechanism		
3.1.6 Creation of a Hazardous Chemical Committee	MEE	2015
3.1.7 Repeal of the Pesticide Act	MEE	2015
O.3. Regulations that provide finance for chemicals management		
3.1.8 Establishment of Hazardous Chemical Trust Fund	MEE	2015
O.4. Institutional mechanism for implementation of the NIP		
3.1.9 Creation of chemical committee under the SSDS institutional mechanism	MEE	2015

Budget	Unit cost (USD)	No	Annual Budget (USD)	Total for five years
1.Project coordination			**57,000**	**273,800**
1.1 Staff fees				
1.1.2 Coordinator	1500	12	18,000	90,000
1.1.3 Desk Officer	1250	12	15,000	75,000
1.1.4 Financial Administrator	1500	12	18,000	90,000
1.2 Equipment				
1.2.1 Laptop computer (2)	1000	2	2,000	2,000
1.2.2 Camera (1)	800	1	800	800
1.3 Quaterly meetings	800	4	3200	16,000
2. Development of Hazardous Chemicals Act			**28,000**	**28,000**
2.1 Fees for legal consultant (drafting of the Act)	250	60	15,000	15,000
2.2 Fees for technical consultant (drafting of schedule)	250	40	10,000	10,000
2.3 Meetings and workshops	1000	3	3,000	3,000
3. Develop waste incineration regulations under the EPA			**12,000**	**12,000**
3.1 Consultant fees				
3.1.1 Legal expert	250	30	7,500	7,500
3.1.2 Technical expert	300	15	4,500	4,500
3.2 Meetings and workshops				
Total			**97,000**	**313,800**

3.3.2 Measures to reduce or eliminate releases from intentional production and use

Activities addressing Article 3 of the Stockholm Convention are elaborated in the previous chapter.

3.3.3 Measures with regards to Pesticide POPs

The principal measure for pesticides POPs is to regulate as required under the Convention and this will be done within the scope of the new Hazardous Chemicals Act. Secondly, capacity building and awareness raising is required for importers, operators, users of pesticides in general. Finally there is still no means of disposal of expired pesticides. In this regard a central storage location for hazardous waste is planned to be constructed and bilateral agreement are planned for the shipping and disposal. Seychelles is not planning to support hazardous waste disposal operations on its territory.

Activities	Responsibility	Timeframe
O.1. Regulatory ban the importation, manufacture, use and export of POPs pesticides		
3.2.1 Include under HCA, a ban on the manufacture, importation, use and export of Annex A chemicals	MEE	2014
O.2. Increased capacity to detect and analyse POPs pesticides		
3.2.2 Training of Customs and Environment Officers in identification of POPs Pesticides and other chemicals	MEE	2015
3.2.3 Procure equipment for existing labs to detect and analyse chemicals	SBS	2017
3.2.4 Provide overseas internships for existing lab personnel	SBS	2018
3.2.5 Identify country with best disposal facility for pesticides	HCC	2015
3.2.6 Training of waste handlers and dispoers	HCC	2016
3.2.7 Training in remediation of pesticides contaminated area	MEE	2016
O.3.Improved education and awareness on Pesticides POPs		
3.2.8 Awareness program for decision makers	MEE	2016
3.2.9 Awareness program for Pesticide Operators and users	HCC	2015
3.2.10 Awareness program for chemical importers and retailers	HCC	2015
O.4. Safe management and disposal of obsolete pesticides		
3.2.11 Detailed inventory of all existing storage locations	HCC	2016
3.2.12 Purchase UN approved containers for storage of obsolete pesticides	HCC	2016
3.2.13 Construction of facility for storage of obsolete pesticides	MEE	2016
3.2.14 Identification and remediation of contaminated sites	MEE	2020

Budget	Unit cost (USD)	No	Annual Budget (USD)	Total for five years
4. Ban on import, manufacture, use and export of Pesticide POPs				
3.1 Draft regulations (see activity 2)				
5. Capacity building			**44,000**	**44,000**
5.1 Training of customs and environment officers	8,000	1	8000	8000
5.2 Procure equipment for existing lab to detect and analyse Pesticide POPs	10,000	1	10,000	10,000
5.3 Provide overseas internships for existing lab personnel	15,000	1	15,000	15,000
5.4 Identify county with best technology for disposal of POP pesticides	1000	1	1000	1000
5.5 Training of waste handlers and disposers	5,000	1	5,000	5,000
5.6 Training in remediation of pesticides contaminated areas	5,000	1	5,000	5,000
6. Safely manage and dispose of obsolete pesticides			**175,000**	**175,000**
6.1 Detailed inventory of all existing locations	5000	1	5000	5,000
6.2 Purchase UN approved containers for storage of obsolete pesticides	20,000	1	20,000	20,000
6.3 Equipment for compacting Pesticide contaminated containers and materials	20,000	1	20,000	20,000
6.4 Construction of facility for storage of obsolete pesticides	120,000	1	120,000	120,000
6.5 Identification and remediation of contaminated sites	10,000	1	10,000	10,000
Total			**219,000**	**219,000**

3.3.4 Measures with regard to PCB

The regulatory measure is to ban the importation, manufacture and use of PCB. PCB was found to be present in old transformers. One transformer exceeds 50ppm and will need to be replaced whilst there are others with low concentration but high oil volumes. The key activity is to continue the sampling program and locate the equipments that poses risk due to high concentration of PCB and also those with low concentration but with high oil volumes. These equipment will need to be decontaminated and the necessary measures taken to ensure that there are no cross contamination or soil contamination during servicing. There is a need to support the PUC through capacity building programmes to further this assessment so that there is data on the PCB status of all equipments. Finally there are sites that are contaminated with transformer oil and it is required to continue testing those sites for PCB contamination.

Activities	Responsibility	Timeframe
O.1. Regulatory ban on PCB and PCB containing equipment		
3.3.1.1 Ban the use of PCB equipment in closed applications by 2025 and ensure recovered PCB are treated	MEE	2014
O.2. Capacity building for management of PCB		
3.3.1.2 Develop guidance document for customs control of PCB	MEE	2016
3.3.1.3 Develop control measures for movement, storage and incineration of PCB oil	MEE	2016
3.3.1.4 Training in remediation of industrial POPs contaminated area	MEE	2016
O.3. Assessment & remediation of PCB contaminated equipment & sites		
3.3.1.5 Identification & quantification of PCB in semi and open applications	MEE	2018
3.3.1.6 Testing all remaining equipments and sites for presence of PCB	PUC	2014-2018
3.3.1.7 Remove and dispose of all PCB containing equipment	PUC	2014-2025
3.3.1.8 Prevention of uncontrolled incineration of PCB containing oil	PUC	2014-2019
3.3.1.9 Remediation of PCB contaminated sites	PUC	2025

Budget	Unit cost (USD)	No	Annual Budget (USD)	Total for five years
7. Ban the use of PCB equipment by 2025 and ensure recovered PCB are treated				
7.1 Develop legislation to ban PCB equipment by 2025 (See activity 2)				
8. Capacity building for management of PCB			**8,500**	**8,500**
8.1 Propose control measures for movement, storage and incineration of PCB oil	2500	1	2500	2,500
8.2 Guidance document for customs control of PCB	1,000	1	1,000	1,000
8.3 Identification and quantification of PCB in semi and open applications	5,000	1	5,000	5,000
9. Assessment and remediation			**742,500**	**742,500**
9.1 Testing all remaining equipments for presence of PCB				
9.1.1 One day training session on sampling	1,000	1	1,000	1,000
9.1.2 Purchase L2000	6,000	1	6,000	6,000
9.1.3 Carry out sampling programme	2,000	1	2,000	10000
9.1.4 Label all PCB containing equipment	3,500	1	3,500	3,500
9.2 Remove and dispose of all PCB containing equipment	660,000	1	660,000	660,000
9.3 Phase out of PCB in semi and open applications	10,000	2	20,000	20,000
9.4 Remediation of contaminated sites	50,000	1	50,000	50,000
Total			**751,000**	**751,000**

3.3.5 Measures with regard to POP -PBDE and HBB

PBDE occurs in stockpiles around the country and mostly in landfills where old electronic and electrical equipments and poly uretane foam were disposed. As such there is need to update the law to the requirements of the Stockholm Convention, to pursue detailed studies of contaminated areas and rehabilitative activities. More importantly there is a need to educate the public and importers of products about these chemicals.

Activities	Responsibility	Timeframe
O.1. Regulatory ban on PBDE and phase out of PBDE containing products		
3.3.2.1 Ban the manufacture, import, use of PBDE	MEE	2014
O.2. Capacity building for management of PBDE		
3.3.2.2 Training in remediation of industrial POPs contaminated area	MEE	2016
O.3. Assessment & remediation of PBDE contaminated sites		
3.3.2.3 Identification & analysis of PBDE contaminated sites	MEE	2018
3.3.2.4 Remediation of PBDE contaminated sites	PUC	2025
O.4 Education and Awareness of PBDE in products		
3.3.2.5 Education of public with regards to PBDE	MEE	2015
3.3.2.6 Education and awareness of importers of EEE and transportation sector	MEE	2015

Budget	Unit cost (USD)	No	Annual Budget (USD)	Total for five years
10. Ban the manufacture, import, use of PBDE				
10.1 Develop legislation to ban PBDE (See activity 2)				
11. Building capacity to manage PBDE			**10,000**	**10,000**
11.1 Training in remediation of PBDE contaminated sites	10,000	1	10,000	10,000
12. Assessment and remediation of PBDE contaminated sites			**165,000**	**185,000**
12.1 Identification & sampling of PBDE contaminated sites	10,000	1	10,000	10,000
12.2 Remediation of PBDE contaminated sites / stockpile	150,000	1	150,000	150,000
13. Education and Awareness of PBDE in products				
13.1 Education of public with regards to PBDE	2000	1	2000	10,000
13.2 Education and awareness of importers of EEE and in the transportation sector	3000	1	3000	15,000
Sub total			**175,000**	**195,000**

3.3.6 Production, import and export, use, stockpiles, and wastes of DDT

No DDT identified, therefore there no action plan defined.

3.3.7 Measures with regards to PFOS

PFOS & HBB is a chemical presmued in Seychelles to be located in firefighting foam and aviation fluid (PFOS). It may also be located in products and articles within the consumer sector and therefore potentially very widespread in products and articles. The assessment could not within the available resources provide a comprehensive picture of the distribution of this chemical in the country as only estimates were made and no sampling was done.

Therefore besides regulatory measure the main strategy is to carry out a more indept assessment supported by testing of suspected products or articles and capacity building. Finally there may be other potential contaminated sites besides landfills that has been identified in the first assessment.

Activities	Responsibility	Timeframe
O.1. Regulatory ban on PFOS and phase out of PFOS containing products		
3.3.2.1 Ban the manufacture, import, use of PFOS	MEE	2014
O.2. Capacity building for management of PFOS		
3.3.2.2 Establish linkage with a specific international laboratory for testing	MEE	2016
3.3.2.3 Encourage importers to have signed agreement for disposal/ re-exportation of remaining substance back to source	MEE	2016

Budget	Unit cost (USD)	No	Annual Budget (USD)	Total for five years
14. Ban the manufacture, import, use of PFOS				
14.1 Develop legislation to ban PFOS (See activity 2)				
15. Building capacity to manage PFOS			**13,000**	**13,000**
15.1 Establish linkage with a specific international laboratory for testing	3,000	1	3,000	
15.2 Encourage importers to have signed agreement for re-exportation of remaining substance back to source	10,000	1	10,000	
Sub total			**13,000**	**13,000**

3.3.8 Register for specific exemptions and the continuing need for exemptions (Article 4)

See 2.3.8

3.3.9 Measures to reduce releases from UPOP's

There is still limited understanding of UPOPs and their hazards particularly within decision makers. This is thought to be the main impediment to implementing concrete actions to reduce UPOPs emission in Seychelles. Furthermore the Seychelles is contemplating waste to energy treatment processes that will generate significant amount of UPOPs and the country lacks the regulatory framework and facilities for treatment of UPOP contaminated ash. There are also no laboratories capable of detecting and analysing UPOPs.

The main strategy is to raise awareness amongst decision makers and improve capacity for analysis and remediative measures.

Activities	Responsibility	Timeframe
O.1. Regulate the synthesis and release of UPOPs		
3.41 Develop waste incineration regulations under the EPA	MEE	2015
O.2. Increase capacity for analysis of UPOPs		
3.42 Idenfity countries and labs with capacity to analyse samples (fly ash, bottom ash, sludge, leachate)	MEE	2016
3.43 Provide overseas internships and training for existing lab personnel in sampling and analyis of UPOPs	SBS	2017
3.44 Undertake sampling at suspected sites and send overseas for analysis.	MEE	2016
O.3. Increasing education and awareness on UPOPs		
3.44 Develop awareness and sensitisation program for decision makers and the public	HCC	2015
3.45 Conduct one day workshop on BAT/BEP every year	MEE	2016
O.4. Reducing UPOPs release into the environment		
3.47 Management measures for control of air pollution	MEE	2016-2025

Budget	Unit cost (USD)	No	Annual Budget (USD)	Total for five years
17. Regulate the synthesis and release of UPOPs				
17.1 Develop waste incineration regulations under the EPA (see activity 3)				
18. Increase capacity for analysis of UPOPs			**12,500**	**14,500**
18.1 Identify laboratories capable of analysing UPOPs (fly ash, bottom ash, sludge, leachate)	500	1	500	2,500
18.2 Overseas training for 2 persons on sampling, preparation and analysis of UPOPs	6,000	2	12,000	12,000
19. Increasing education and awareness of UPOPs			**10,000**	**50,000**
19.1 Development of public awareness and sensitisation programme on UPOPs	5,000	1	5,000	25,000
19.2 Conduct one day workshop on BAT/BEP every two years	5,000	1	5,000	25,000
20. Reducing UPOPs release into the environment			**25,500**	**127,500**
20.1 Collection of samples for lab analysis abroad	500	1	500	2,500
20.2 Cost of sample analysis at identified laboratory	15,000	1	15,000	75,000
20.3 Management measures for control of air pollution	10,000	1	10,000	50,000
Sub total			**48,000**	**192,000**

3.3.10 Measures to reduce releases from stockpiles and wastes (Article 6)

Measures addressing Article 6 have been discussed in the action plans of the particular chemicals

3.3.11 Identification of stockpiles, articles in use and wastes

Measures addressing Article 6 have been discussed in the action plans of the particular chemicals

3.3.12 Manage stockpiles and appropriate measures for handling and disposal of articles in use

Measures addressing stockpile management and disposal of POPs have been discussed in the action plans of the particular chemicals.

3.3.13 Measures with regards to contaminated sites and remediation

Activities	Responsibility	Timeframe
O.1. Regulate contaminated sites		
Develop liability and compensation legislation	MEE	2015
Develop public register of POPs contaminated sites	MEE	2016
O.2. Remediation of contaminated sites		
Identification and remediation of Pesticides contaminated area	SBS	2017
Identification and remediation of PCB contaminated area	MEE	2016
Identification and remediation of PBDE contaminated area	MEE	
Identification and remediation of PFOS contaminated area	MEE	
O.3. Training of personnel in remediation techniques		
O.4 Remediation of landfills		
Remediation of Providence II landfill	MEE	
Remediation of La Digue landfill	MEE	
Remediation of Praslin landfill	MEE	

Budget	Unit cost (USD)	No	Annual Budget (USD)	Total for five years
21. Regulate contaminated sites			**11,000**	**11,000**
21.1 Develop liability and compensation legislation	7,000	1	7,000	7,000
21.2 Develop public register of POPs contaminated Sites	4,000	1	4,000	4,000
22 Remediaiton of contaminated sites				
22.1 Identification and remediation of Pesticides contaminated area				
22.2 Identification and remediation of PCB contaminated area				
22.3 Idenfiticaition and remediation of PBDE contaminated area				
22.4 Identification and remediation of PFOS contaminated area				
23. Training of personnel in remediation techniques				
24. Remediation of landfills			**2,015,141**	**2,015,141**
24.1 Remediation of Providence I landfill	1,223,475	1	1,223,475	1,223,475
24.2 Remediation of La Digue Sanitary landfill	750,000	1	750,000	750,000
24.3 Remediation of Praslin landfill	41,666	1	41,666	41,666
Sub total			**2,026,141**	**2,026,141**

3.3.14 Information exchange and stakeholder involvement

See action plan 3.3.1 and 3.3.15

3.3.15 Public awareness, information and education

This is where a lost of energy and resources is required as sadly the issue of chemicals and POPs are lost within a technically challenged population. Awareness raising has been incorporated in the activities of all types of POPs as different target groups are required for the different types of POPs. This part will not repeat the sensitisation activities already planned for the different POPs

Activities	Responsibility	Timeframe
O.1. Education and awareness programme		
Develop within national plan effective tools and activities for training		
Training of trainers		
3.5.3.1 Design and publish a webpage	HCC	2016
3.5.3.2 Establish information center for POPs.	HCC	2016
3.5.3.3 Regular survey every two years to evaluate knowledge on POPs	HCC	2016

Budget	Unit cost (USD)	No	Annual Budget (USD)	Total for five years
25. Education and awareness program			**55,100**	**55,100**
25.2 Develop within national plan effective tools and activities for training	1000	1	1000	1000
25.3 Training of trainers	15,000	1	15,000	15,000
25.4 Carry out training sessions with target groups	2,000	1	2,000	2,000
25.5 Awareness equipment (brochures, posters etc)	13,000	1	13,000	13,000
25.6 Prepare and broadcast media programmes	15,100	1	15,100	15,100
25.7 Design and publish a website	9,000	1	9,000	9,000
Sub total			**55,100**	**55,100**

3.3.16 Activity: Effectiveness evaluation

See 3.3.17

3.3.17 Reporting

The revised NIP makes provisions for reporting of the convention through the production of annual reports. It is recommended that reporting are sourced out to external consultant in view that the Ministry is short of staff. Reporting shall include effectiveness of the NIP implementation.

Budget	Unit cost (USD)	No	Annual Budget (USD)	Total for five years
31. Report to the Convention (every 2 years)				
31.1 Consultant fees	8,000	1	8,000	16,000
31.2 Meetings and workshops	2,000	1	2,000	4,000
Sub total			**10,000**	**20,000**

3.3.18 Research Development & monitoing releases and impacts

There are limited monitoring programme for POPs in Seychelles and limited understanding of impacts that these and other chemicals are having with regard to human health and the environment. The cost of monitoring and indeed laboratory facilities are expensive and often out of the range of small countries. Nonetheless there is scope for partnerships with other countries and organisations to carry out research programme and investigate the status of these chemicals in the country.

Activities	Responsibility	Timeframe
O.1. Increase capacity for research in POPs		
3.5.2.1 Purchase of laboratory equipment for monitoring programme	SPHL	2018
O.2. POPs monitoring programmes		
3.5.2.2 Establish a monitoring programme for POPs in human	HCC	2015
3.5.2.3 Establish a monitoring programme for POPs in the environment.	MEE	2016
3.5.2.4 Build capacity with personnel participation in the monitoring programs + purchase of sampling equipment	MEE	2015

Budget	Unit cost (USD)	No	Annual Budget (USD)	Total for five years
29. Equipment			**122,800**	**122,800**
29.1 Technical training for pesticides	13,000	1	13,000	13,000
29.4 Purchase of safe pesticides kits	12,000	1	12,000	12,000
29.5 GC Spare parts	6,000	1	6,000	6,000
29.6 Improvement of package for SBS	91,800	1	91,800	91,800
30. POPs monitoring programme			**10,000**	**10,000**
30.1 Monitoring of POPs in the environment	5,000	1	5,000	5,000
30.2 Monitoring of POPs in humans	5,000	1	5,000	5,000
Sub total			**132,800**	**132,800**

3.3.19 Technical & Financial Assistance

It is noted that the Convention Secretariat has done quite a lot to technically support countries with regard to POPs. There are now several guidance documents which can assist with the technicalities of implementing the Convention. In this regard several activities in the previous NIP was dropped as capacity has been aquired in the intervening years. However there are still gaps in certain areas and the continual need to update with new chemicals that are added to the Convention.

The main areas for technical assistance identified is in sampling and laboratory analysis of samples. In this regard the country do not have advanced laboratories and sufficient number of trained personnel. There are analysis that is best done overseas for lack of equipment and economic reasons and where the local scientists need to be trained in sampling for each particular test method.

Financial assistance is urgently required for implementation of the NIP. The Seychelles is a small developing island nation and therefore has limited resources. Action plans have to compete with others and more often those that are appealing to foreign donors are implemented. It is noticeably difficult to implement Conventions that do not have supporting financial mechanisms. It is the hope that this can be turned around at the international level as there are few if not any funding for chemicals related projects. Seychelles will continue to push for better access to resources for Small Island Developing States in pursuit of sustainable development.

3.4 Updated priorities for NIP implementation

The NIP consists of 31 main activities to be implemented within five years to bring the country to the exacting requirements of the Stockholm Convention. The activities are not all of same urgency and effort has to prioritise their implementation based on the assessment conducted under the NIP review process and also the potential for adverse impacts to human health and the environment.

It was found that the legislative measures are grossly inadequate and this requires urgent redress. Fixing this will also resolve pressing issues relating to establishment of a Hazardous Chemicals Commiteee and establishment of a Trust Fund that can be used to support chemical related activities.

The next level of priority is accorded to education and awareness as few people in the country really understands the issues with regards to POPs and other chemicals. There are no NGOs, working in this area or research institutions actively undertaking scientific monitoring. It is therefore required to integrate into existing research work such as the global monitoring programme and also monitor releases.

There is already a programme being undertaken for PCB but not for the other undustrial POPs, resources must therefore be made to implement measures with regards to these POPs

Contaminated sites remain a big problem for Seychelles in particular the need to rehabilitate landfill. There are old landfills that has been rehabilitated but not decontaminated of chemicals. These are now difficult to address at National level.

Finally there is a need to report to the convention as so far no reporting has been carried out.

Table 12: Prioritisation of POP management activities

Activities	Priority Rating
Policy & institutional framework	1
Education awareness & information exchange	1
Monitoring releases	1
Measures with regard to UPOPs	2
Measures with regard to PBDE	2
Measures with regard to PFOS, PFOS-F & HBB	2
Contaminated Sites	2
Reporting	2
Measures with regard to PCB	3
Measures with regard to pesticide POPs	3

1=No actions undertaken.
Urgent action required

2 = No actions undertaken.
Non-urgent action required

3= Some actions done.
Need to be sustained

4=Majority actions done.
Minor intervention required

5= All actions completed
No need for intervention

3.5 Timetable for implementation

	2015	2016	2017	2018	2019
Policy & Institutional					
1.Development of Hazardous Chemicals Act					
2.Include ban on the manufacture, importation, use and export of Annex A chemicals					
3.Ban the use of PCB equipment in closed applications by 2025 and ensure recovered PCB are treated					
4.Ban on manufacture, importation use and export of PBDE					
5.Restriction on use of PFOS and PFOS and PFOS-F					
6.Creation of a Hazardous Chemical Committee					
7.Repeal of the Pesticide Act					
8.Establishment of Hazardous Chemical Trust Fund					
9.Creation of chemical committee under the SSDS institutional mechanism					
Measures for POPs pesticides					
10.Include under HCA, a ban on the manufacture, importation, use and export of Annex A chemicals					
11.Training of Customs and Environment Officers in identification of POPs Pesticides and other chemicals					
12.Procure equipment for existing labs to detect and analyse chemicals					
13.Provide overseas internships for existing lab personnel					
14.Identify country with best disposal facility for pesticides					
15.Training of waste handlers and dispoers					
16.Training in remediation of pesticides contaminated area					
17.Awareness program for decision makers					
18.Awareness program for Pesticide Operators and users					
19.Awareness program for chemical importers and retailers					
20.Detailed inventory of all existing storage locations					
21.Purchase UN approved containers for storage of obsolete pesticides					
22.Construction of facility for storage of obsolete pesticides					
23.Identification and remediation of contaminated sites					

Measures for PCB	2015	2016	2017	2018	2019
24.Ban the use of PCB equipment in closed applications by 2025 and ensure recovered PCB are treated					
25.Develop guidance document for customs control of PCB					
26.Develop control measures for movement, storage and incineration of PCB oil					
27.Training in remediation of industrial POPs contaminated area					
28.Identification & quantification of PCB in semi and open applications					
29.Testing all remaining equipments and sites for presence of PCB					
30.Remove and dispose of all PCB containing equipment					
31.Prevention of uncontrolled incineration of PCB containing oil					
32.Remediation of PCB contaminated sites					
Measures for UPOPs					
33.Develop waste incineration regulations under the EPA					
34.Idenfity countries and labs with capacity to analyse samples (fly ash, bottom ash, sludge, leachate)					
35.Provide overseas internships and training for existing lab personnel in sampling and analyis of UPOPs					
36.Undertake sampling at suspected sites and send overseas for analysis					
37.Develop awareness and sensitisation program for decision makers and the public					
38.Conduct one day workshop on BAT/BEP every year					
39.Management measures for control of air pollution					
Measures for PBDE					
40.Ban the manufacture, import, use of PBDE					
41.Training in remediation of industrial POPs contaminated area					
42.Identification & analysis of PBDE contaminated sites					
43.Remediation of PBDE contaminated sites					
44.Education of public with regards to PBDE					
45.Education and awareness of importers of EEE and transportation sector					

	2015	2016	2017	2018	2019
Measures for PFOS					
46.Ban the manufacture, import, use of PFOS					
47.Establish linkage with a specific international laboratory for testing					
48.Encourage importers to have signed agreement for disposal/re-exportation of remaining substance back to source					
Contaminated sites					
49.Develop liability and compensation legislation					
50.Develop public register of POPs contaminated sites					
51.Identification and remediation of Pesticides contaminated area					
52.Identification and remediation of PCB contaminated area					
53.Identification and remediation of PBDE contaminated area					
54.Identification and remediation of PFOS contaminated area					
55.Remediation of Providence II landfill					
56.Remediation of La Digue landfill					
57.Remediation of Praslin landfill					
Education awareness and information exchange					
58.Develop within national plan effective tools and activities for training					
59.Training of trainers					
60.Design and publish a webpage					
61. Establish information center for POPs.					
62. Regular survey every two years to evaluate knowledge on POPs					
Research and development					
63.Purchase of laboratory equipment for monitoring programme					
64.Establish a monitoring programme for POPs in human					
65.Establish a monitoring programme for POPs in the environment.					
66.Build capacity with personnel participation in the monitoring programs + purchase of sampling equipment					
Reporting					
69. Reporting					

3.6 NIP implementation status

The Technical Working Group (TWG 4) concluded that in general the Country is behind in meeting its obligation under the Stockholm Convention. Of particular importance is the legal framework which was found to be still not fully compliant to the Stockholm Convention. This is because the update of the legal framework which is a significant part of the previous NIP comprising of 58 distinct legislative changes for full compliance to the Convention was not implemented. The new regulation on chemicals which is being proposed in the revised NIP will resolve fully this issue.

In terms of other POPs the bulk of the previous NIP focussed on PCB in closed application and here much was done. An MOU was signed with the Utility company (PUC) for testing of all its pre-1986 electrical equipment. Tests were and still is being carried out on these transformers which is expected to be completed over the longer term in view that the electrical company has to switch off electriciy to be able to take samples.
There was also a much publicised training workshop on sampling transformer oil for PCBs which were carried out in line with the NIP. This programme is still ongoing and is being carried forth in the revised strategy.

In terms of UPOPs, it was noted that the amount has increased from the previous NIP due to difficulties in applying BAT/BEP within the waste management and power producing sector. It was found that retroffiting incinerators is more costly than expected and a lot more education awareness and training is required in particular for proponents and operators of such machinery for BAT/BEP. This has been integrated in the revised strategy. Over the last few years there has been a decrease in the quality of monitoring and security at the Providence landfill which lead to several landfill fires thereby causing the ouput of UPOPs to increase significantly over the last assessment.

The Ministry of Environment & Energy has recently developed a revised waste policy and is currently undertaking a revision of waste management in the country intending to bolster the capacity of the Ministry and the Landscape and Waste Management Agency. The progression to the recently constructed sanitary landfill should ensure a more controlled waste disposal operation thereby preventing the occurrence of landfill fires.

3.7.Budget

Budget Lines	Amount/ USD
1. Strengthening the policy & institutional framework	**313,800**
2. Measures with regard to Pesticide POPs	**219,000**
3. Measures with regard to PCB	**751,000**
4. Measures with regard to UPOPs	**192,000**
5. Measures with regard to PBDE	**195,000**
6. Measures with regard to PFOS	**13,000**
7. Contaminated sites	**2,026,141**
8. Public Education, awareness and information exchange	**129,100**
9. Research and Development	**132,800**
10. Reporting	**20,000**
Total USD	**3,991,841**

ANNEXES

Annex A: Pesticide POPs data

Annex A1: Pesticide Storage Assessment

Importer	Structure	Storage Condition	Unidentified stock	POP's	Obsolete Pesticide	Reliable Control
Jacques Matombe	Satisfactory	Satisfactory	None	None	None	inventory record/ warning visible
L'union Estate	Satisfactory	Unsatisfactory		None	None	no visible inventory record/ warning
LG Supplies	Satisfactory	Unsatisfactory	1 Gallon without label	None	None	no visible inventory record/ warning
Charles Morel	Satisfactory	Unsatisfactory	none	None	None	no visible inventory record/ warning
Ephelia Hotel	Satisfactory	unsatisfactory	none	None	None	Mix storage
KHI (Sez) Limited	Satisfactory	unsatisfactory	none	None	None	Mix storage
Le Domaine De L'Orangeraie	Satisfactory	unsatisfactory	None	None	None	Mix Storage
Le Refuge Du Pecheur	Satisfactory	satisfactory	none	None	None	inventory record/ warning visible
Lemuria Resort	Satisfactory	unsatisfactory	none	None	None	Mix Storage
Ste. Anne Resort	Satisfactory	unsatisfactory	none	None	None	no visible inventory record/ Mix Storage
Eden Island	Satisfactory	Satisfactory	none	None	None	inventory record/ warning visible
Public Health Authority	Satisfactory	Satisfactory	none	None	500litres Temephos	warning visible/stock record available upon request
Baie Ste. Anne Hospital	Unsatisfactory	Satisfactory	none	None	None	no visible inventory record/ warning visible
Biochemist	Satisfactory	Satisfactory	none	None	None	No inventory record/ warning visible
Gill's Pest Control	Satisfactory	Satisfactory	none	None	None	inventory record/ warning visible
Michaud Pest Control (PIE)	Satisfactory	Satisfactory	none	None	45g Pyrethroid Granules	No inventory record/ warning visible
Michaud Pest Control (Eden)	Satisfactory	Satisfactory				
Pesta	Satisfactory	Satisfactory	none	None	None	No inventory record/ warning visible
PMG Pest Control	Satisfactory	Satisfactory	none	None	None	No inventory record/ warning visible
Al – Diji	Satisfactory	Satisfactory	none	None	None	Mix Storage
Apex Hotel Supplies	Satisfactory	Satisfactory	none	None	None	Mix Storage
Continental Stores LTD	Satisfactory	Unsatisfactory	none	None	None	Mix Storage
Fashion up	Satisfactory	Unsatisfactory	none	None	None	Mix Storage
Hospitality Supplies LTD	Satisfactory	Satisfactory	none	None	None	Mix Storage
Mohan Shopping Centre	Satisfactory	Unsatisfactory	none	None	None	Mix Storage
Sunset Import / Export	Satisfactory	Satisfactory	None	None	None	Mix Storage
Seychelles Agricultural Agency	Satisfactory	Satisfactory	Previter –Liquid - no expiry date Tequil 4 -Liquid - no expiry date Glycerol ether -no expiry date	None	Carbamate granule Copper OH Imidacloprid Flumethrin Tefulbenzum Antracole	Mix Storage

Annex B: PCB Assessment data

Annex B1: Result of site sampling with positive result

Year of manufacture	Make	Location	Value in mg/l (ppm)	Oil volume in liters	Quantity PCB in Kg
1983	Treforest Glamorgan	L'exile	174	240	41.76
1970	Bonar Long	Roche Bois	49.2	445	21.89
1971	Parsons Peebles	NE Pointe	22	591	13.00
1970	Treforest Glamorgan	PIE	29.2	586	17.11
1971	Hackbridge Hewittc	China Emb	7.9	409	3.23
1974	Treforest Glamorgan	Hermitage Dental Clinic	7	1522	10.65
1982	Bonar Long	SBC Hermitatge	2.4	419	1.00
1979	Bonar Long	Anse Boileau	2.4	7800	18.72
1971	Bonar Long	Reef Hotel	1.9	886	1.68
1972	Treforest Glamorgan	Sheraton Hotel	2.8	1118	3.13
1979	Bonar Long	Sawmill	4.1	462	1.89
1978	Bonar Long	AR Polytechnic	2.3	692	1.59
1979	Bonar Long	Police Academy	5.6	462	2.59
1985	Midland transformer	CCI 2	5.5	336	1.85
1974	Treforest Glamorgan	Les Mamelles	3.6	582	2.10
1979	Woden	UCPS	1.7	750	1.28
1982	Woden	Food Pro	2.9	550	1.56
1972	Treforest Glamorgan	Beau Vallon Bay Hotel	2.6	9637	25.05
1980	Crompton Greaves	Bel Ombre Dan Zil	2	500	1.00
1974	Treforest Glamorgan	Electricity house	7.1	758	5.38
1971	Bonar Long	Roche Bois	3.8	113	0.43
1979	Bonar Long	Anse Boileau	2.6	7800	20.28
1979	Bonar Long	Victoria	6.2	7800	48.36
1978	Moris Awerbuch	Skychef	3.7	748	2.77
1980	Lindley Thompson	Valle De Mai Praslin	2.4	529.6	1.27
1980	Lindley Thompson	Fond Boffay Praslin	4.0	529.6	2.12
1979	Bonar Long	Baie st Anne Power st	6.6	462	3.05
Total					**254.74**

Annex B2: Sampling of workshop transformers with positive result

Year of manufacture	Make	Location	Value in mg/l (ppm)	Oil volume in liters	Quantity PCB in Kg
1973	Bonar Long	Workshop	4.2	473	1.99
1998	NEI Cape Town	Workshop	1.6	150	0.24
1982	Bonar Long	Workshop	1.8	325	0.59
1972	Bonar Long	Workshop	2.3	773	1.78
1982	Bonar Long	Workshop	2	645	1.29
1971	Parsons Peebles	Workshop	5.8	112	0.65
1980	Brentford	Workshop	3.3	158	0.52
1974	Treforest Glamorgan	Workshop	3.1	267	0.83
1974	Treforest Glamorgan	Workshop	7.0	230	1.61
1976	Woden	Workshop	2.3	108	0.25
1975	Woden	Workshop	1.7	325	0.55
1967	Foster	Workshop	5.3	128	0.68
No info	No info	Workshop	8.1	No info	
Total					**10.97**

Annex B3: Sample of laboratory report

ANALYTICAL RESULTS

Project: PCB
Pace Project No.: 92231633

Sample: TB1 Lab ID: **92231633022** Collected: 11/06/14 11:02 Received: 01/02/15 09:30 Matrix: Non Aqueous Liquid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB	Analytical Method: EPA 8082 Preparation Method: EPA 3580							
PCB-1016 (Aroclor 1016)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 00:38	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 00:38	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 00:38	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 00:38	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 00:38	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 00:38	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 00:38	11096-82-5	
Surrogates								
Decachlorobiphenyl (S)	91	%	49-130	1	01/05/15 10:40	01/09/15 00:38	2051-24-3	

Sample: L Lab ID: **92231633023** Collected: 11/06/14 14:11 Received: 01/02/15 09:30 Matrix: Non Aqueous Liquid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB	Analytical Method: EPA 8082 Preparation Method: EPA 3580							
PCB-1016 (Aroclor 1016)	ND	mg/kg	25.0	25	01/05/15 10:40	01/09/15 10:56	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	mg/kg	25.0	25	01/05/15 10:40	01/09/15 10:56	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	mg/kg	25.0	25	01/05/15 10:40	01/09/15 10:56	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	mg/kg	25.0	25	01/05/15 10:40	01/09/15 10:56	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	mg/kg	25.0	25	01/05/15 10:40	01/09/15 10:56	12672-29-6	
PCB-1254 (Aroclor 1254)	157	mg/kg	25.0	25	01/05/15 10:40	01/09/15 10:56	11097-69-1	
PCB-1260 (Aroclor 1260)	174	mg/kg	25.0	25	01/05/15 10:40	01/09/15 10:56	11096-82-5	
Surrogates								
Decachlorobiphenyl (S)	0	%	49-130	25	01/05/15 10:40	01/09/15 10:56	2051-24-3	S4

Sample: SH Lab ID: **92231633024** Collected: 11/06/14 14:57 Received: 01/02/15 09:30 Matrix: Non Aqueous Liquid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB	Analytical Method: EPA 8082 Preparation Method: EPA 3580							
PCB-1016 (Aroclor 1016)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 01:19	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 01:19	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 01:19	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 01:19	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 01:19	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	mg/kg	1.0	1	01/05/15 10:40	01/09/15 01:19	11097-69-1	
PCB-1260 (Aroclor 1260)	2.9	mg/kg	1.0	1	01/05/15 10:40	01/09/15 01:19	11096-82-5	
Surrogates								
Decachlorobiphenyl (S)	109	%	49-130	1	01/05/15 10:40	01/09/15 01:19	2051-24-3	

REPORT OF LABORATORY ANALYSIS

Annex C: PBDE Assessment data

Annex C1: In EEE & WEEE

Imports of PBDE in EEE (2013)

Item	Number imported	Unit weight	Weight in Tons	Polymer fraction % by weight	C-Octa BDE content kg/ ton	Total OctaBDE
CRT computer monitors	31,564	0.025	789	30%	2.54	601
CRT TV	31,965	0.025	799	30%	0.87	209
Desktop computer	94,692	0.0099	937	24%	2.54	571
Laptop	41,350	0.0035	145	42%	0.225	14
Printer	4,586	0.0065	30	42%	0.225	3
Telephone	5,600	0.001	6	42%	0.225	1
Photocopier	10,691	0.052	556	42%	0.225	53
Hi fi	249,243	0.01	2492	24%	0.15	90
Radio	14,741	0.002	29	24%	0.15	1
Total			17,574		0	**1,451**

PBDE in WEEE (2013)

Type	number in use/ stockpile	Average weight/ ton	Amount use stockpile (ton)	Life in years	Amount of WEEE/ ton/year	Polymer fraction (% weight)	OctaBDE content; kg/ton	Total Oct BDE / kg
IT & Telecommunication equipment					**2,199**			**1036**
CRT computer monitors	157,821	0.025	26,303	5	789	30%	2.54	601
Desktop computer	473,462	0.0099	32,248	8	586	24%	2.54	357
Mobile phones	180,000	0.0001	18	3	6	42%	0.225	0.567
Laptop	206,751	0.0035	723	8	90.45	42%	0.225	8.547
Printer	22,931	0.0065	149	5	29.81	42%	0.225	2.82
Telephone	28,000	0.001	28	10	2.8	42%	0.225	0.264
Photocopier	53,454	0.052	2,779	4	694.9	42%	0.225	65.66
Consumer equipment					**3306**			**298.8**
CRT TV	159,825	0.025	26,637	5	799	30%	0.87	208.6
Hi Fi	1,246,217	0.01	12,462	5	2,492	24%	0.15	89.72
Radio	73,706	0.002	147	10	14.74	24%	0.15	0.53
TOTAL								**1,335**

PBDE on the market as EEE Stockpile (2013)

Item	Amount stockpile / on the market	Unit weight	Weight in Tons	Polymer fraction % by weight	C-Octa BDE content kg/ ton	Total OctaBDE
CRT computer monitors	157,821	0.025	3,945	30%	2.54	3,006
CRT TV	159,825	0.025	3,995	30%	0.87	1,043
Desktop computer	473,462	0.0099	4,687	24%	0.225	253
Mobile phones	180000	0.0001	18	42%	0.225	1.7
Laptop	206,751	0.0035	723	42%	0.225	68.4
Printer	22,931	0.0065	149	42%	0.225	14.08
Telephone	28000	0.001	28	42%	0.225	2.6
Photocopier	53,454	0.052	2779	42%	0.225	262.7
Hi fi	1,246,217	0.01	12,462	42%	0.15	785
Radio	73,706	0.002	147	42%	0.15	9.28
Total			16,323			4,652

Annex C2: In the Transportation Sector

Vehicles in current use	No:	Amount of pentaBDE/kg/ car	Regional factor	Total Amount of PBDE/Kg
Number of cars & trucks in use (manufactured before 2005)	23,777	0.16	0.05	190.216
Number of buses in use (manufactured before 2005)	175	1	0.05	8.75
Total				**198.966**

Imported vehicles for 2013	No:	Amount of pentaBDE/kg/ car	Regional factor	Total Amount of PBDE/Kg
Number of cars & trucks in use (manufactured before 2005)	0	0.16	0.05	0
Number of buses in use (manufactured before 2005)	0	1	0.05	0
Total				**0**

ELV	No:	Amount of pentaBDE/kg/ car	Regional factor	Total Amount of PBDE/Kg
Number of cars & trucks scrapped in 2013 (manufactured before 2005)	9000	0.16	0.05	72
Number of buses scrapped in 2013 (manufactured before 2005)	175	1	0.05	8.75
Total				**80.75**

In landfill	No:	Amount of pentaBDE/ kg/car	Regional factor	Total Amount of PBDE/Kg
Number of cars & trucks landfilled (up to 2005)	100	0.16	0.05	0.8
Number of buses landfilled (up to 2005)	175	1	0.05	8.75
Total				**9.55**

EEE & WEEE	Distribution homologues c-OctaBDE	POP-PBDE in import for 2013	POP-PBDE in Stocks for 2013	PBDE entering the waste stream 2013 (WEEE)	PBDE in recycled polymers	Total kg PBDE
c-OctaBDE		1,451	4,652	1,335	0	**7,438**
HexaBDE	11%	160	512	147	0	818
Hepta	43%	624	2,000	574	0	3,198
OctaBDE	35%	508	1,628	467	0	2,603

Transportation	Distribution homologues c-PentaBDE	POP-PBDE in vehicles currently in use in 2013	POP-PBDE in imported vehicles in 2013	POP-PBDE in ELV in 2013	PBDE disposed off in the past from transportation sector	Total kg PBDE
Inventoried POP-PBDE		198.966	0	80.75	9.55	**289**
Tetra BDE	33%	65.65	0	26.65	3.15	95
pentaBDE	58%	115.4	0	46.84	5.54	168
hexaBDE	8%	15.91	0	6.46	0.76	23
hepta BDE	0.50%	0.99	0	0.4	0.05	1

Annex D: PFOS Assessment data

Annex D1: Calculation for presence of PFOS in Seychelles

Summary table

Categories for PFOS	Amnt/kg
Quantities produced	0.0
Quantities exported	0.0
Quantity imported	6.3
Quantities in Products	6.0
Quantities in wastes/ contaminated site	80,988.3
Quantities in stockpiles	17.5
TOTAL	81,018.2

Firefighting Foam

Type	Material	Volume per year / liters	Density of foam (g/ml)	Weight/kg	PFOS content by weight	PFOS Amount Kg
Import	Firefighting foams	3,600	1.6	5,760	1.5%	86.4
Stockpile	Firefighting foams	54,000	1.6	86,400	1.50%	1296

Aviation Fluid

Type	Material	Volume per year /liters	Density (kg/l)	Weight/kg	PFOS content by weight	PFOS Amount Kg
Import	Aviation hydraulic fluid	negligible		0	0.10%	0
Stockpile	Aviation hydraulic fluid	negligible		0	0.10%	0

Insecticides

Type	Material	Amount imported per year /kg	PFOS content by weight	PFOS Amount in Kg
Import	Insecticides	0	0.10%	0
Stockpile	Insecticides	0	0.10%	0

Products & Articles

	Synthetic carpets	Leather products	Paper & paper board	Paint & varnish	Cleaning agents	Industrial & Household cleaning chemicals				Total
						Hair cleaner	Cleaning agents	Cosmetics & hand creams	Toner & ink	
Weight of items	2509.28	676.54	-	-	-	-	-	-	-	
PFOS content in item by weight	0.03%	0.05%	1%	0.01%	0.01%	0.10%	0.10%	0.10%	0.10%	
Total PFOS content/kg	0.753	0.338	0	0	0	0	0	0	0	**1.091**

Annex E: PCDD & PCDF data

Annex E1: Summary of PCDD & PCDF Emmission

Source Categories		Annual Release (g/TEQ)				
		Air	Water	Land	Product	Residue
1	Waste Incineration	2.718	0.0	0.0	0.0	0.5
2	Ferrous and Non-Ferrous Metal Production	0.0	0.0	0.0	0.0	0.0
3	Power Generation and Heating	0.0	0.0	0.0	0.0	0.0
4	Production of Mineral Products	0.0	0.0	0.0	0.0	0.0
5	Transport	0.0	0.0	0.0	0.0	0.0
6	Uncontrolled Combustion Processes	4.582	0.0	0.2	0.0	0.0
7	Production and Use 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	0.0	0.0	0.0	3.8
10	Identification of Potential Hot-Spots	0.0	0.0	0.0	0.0	0.0
	Total (1-10)	**7.3**	**0.0**	**0.2**	**0.0**	**4.3**
	Grand Total			**11.8**		

Annex E1.1: Emission from waste incineration

National Consumption 2013			Toolkit Group		
Activities	**liter**	**MT**	**Group**	**Cat**	**Class**
PUC waste oil incineration	565,784	509.21	1	b	2
Medical waste from the Hospital	63,498	63.5	1	c	2
Release to	**Air**	**Water**	**Land**	**Product**	**Residue**
Annual releases (g/TEQ)	2.718	0.0	0.0	0.0	0.5

Annex E1.2: Emission from power generation & heating

National Consumption 2012					Toolkit Group		
Activities	**Type**	**liter**	**MT**	**TJ**	**Group**	**Cat**	**Class**
Fossil Fuel consumed by PUC for electricity generation	HFO	69,303,545	65,353	2,626.55	3	a	4
	LFO	11,656,321	9,826	425.77	3	a	6
Kerosene used for cooking		86,080	67.49	3.02	3	e	5
LPG consumption for cooking	LPG		4403.6	208.33	3	e	6
Release to	**Air**	**Water**	**Land**	**Product**	**Residue**		
Annual releases (g/TEQ)	0.007	0.0	0.0	0.0	0.0		

Annex E1.3: Emission in the Transportation sector

National Consumption 2013		Toolkit Group			
Activities	**MT**	**Group**	**Cat**	**Class**	
Leaded gasoline	1855.81	5	a	1	
Unleaded gasoline	13,644.20	5	a	2	
Gas oil (diesel)	13,584.75	5	c	1	
Release to	**Air**	**Water**	**Land**	**Product**	**Residue**
Annual releases (g/TEQ)	0.007	0.0	0.0	0.0	0.0

Annex E1.4: Emission from uncontrolled combustion process

National Consumption 2013			Toolkit Group		
Type of waste	**No**	**Production t/a**	**Group**	**Cat**	**Class**
Rubbish	126	126	6	b	3
Debris	2	2	6	b	5
Documents	2	1	6	b	3
Bonfire	5	0.5	6	b	5
Cremation	9	0.63	8	b	1
Charcoal	2	4	6	a	1
Release to	**Air**	**Water**	**Land**	**Product**	**Residue**
Annual releases (g/TEQ)	0.0	0.0	0.0	0.0	0.0

National Consumption 2013			Toolkit Group		
Type of fire	**No**	**Production t/a**	**Group**	**Cat**	**Class**
Building/houses	25	50	6	b	2
Vehicles	15	15	6	b	4
Boats	5	5	6	b	4
Forest	0	0	6	b	4
Bush	103	103	6	a	5
Landfill fire at Providence	1	15,000	6	b	1
Release to	**Air**	**Water**	**Land**	**Product**	**Residue**
Annual releases (g/TEQ)	4.582	0.0	0.172	0.0	0.0

Annex E1.5: Emission from miscellanous sources

National Production 2013			Toolkit Group		
Type of waste	**No**	**Production t/a**	**Group**	**Cat**	**Class**
Rubbish	126	126	6	b	3
Debris	2	2	6	b	5
Documents	2	1	6	b	3
Bonfire	5	0.5	6	b	5
Cremation	9	0.63	8	b	1
Charcoal	2	4	6	a	1
Release to	**Air**	**Water**	**Land**	**Product**	**Residue**
Annual releases (g/TEQ)	0.001	0.0	0.0	0.0	0.0

Annex E1.6: Disposal

National Production 2013		Toolkit Group		
Type of disposal	**Production t/a**	**Group**	**Cat**	**Class**
Hazardous waste	0	9	a	1
Mixed waste	75,107	9	a	2
Domestic waste	0	9	a	3
Sewage	1,635	9	b	1
Release to	**Air**	**Water**	**Land**	**Product**	**Residue**
Annual releases (g/TEQ)	0.0	0.038	0.0	0.0	3.82

Annex F: Compliance of regulatory proposal

Annex F1: Compliance of new regulatory measure with previous NIP

Proposed legislative actions in previous NIP	Revised NIP / Comments
1. Amend to include a ban on production, use, re-use, import and export of Annex A POPs. Either of the following to be considered	New schedule to list banned & restricted chemicals
1.1 A prohibition inclusive of target dates when an outright prohibition would apply	
1.2 A negative list is to be included under the Schedule to the Act listing prohibited pesticides	
1.3 To cover research and to accommodate all research agencies, authorised by SBS or other national structure for regulating research	✓
2. The Act shall make provisions for reporting requirements (see Activity 3.3.15);	✓
3. The Act shall address other international obligations relating to POPs pesticides e.g. the POPs Protocol to the 1979 UNECE Convention on Long-Range Transboundary Air Pollution as well as actions on the disposal of all expiring or unwanted pesticides	✓
4. The legislation shall prohibit the recovery, recycling, reclamation, direct reuse or alternative use of listed chemicals	Covered under 1
5. The Act shall ensure that transportation across international borders shall not be undertaken without taking into account relevant international rules, standards and guidelines	✓
6. Export shall be limited only for purposes of disposing as per Para 2(b) i and ii. in the event of the following: additional waste materials; stocks of intercepted items and residues from cleanup of contaminated sites. There shall be no export to non parties;	✓
7. Provisions shall be made to include the list of Annex A POPs as restricted or prohibited goods under the Trades Tax Regulations as published in the Seychelles Nation on December 29th 2004	Covered under 1
8. Formalisation of regulatory ban on Annex A pesticides in EPA	Covered under 1
9. Amendment of the EPA hazardous waste section (Section 12) to cover environmentally safe disposal as precondition for export of waste and apply limits on recovery of certain types of wastes	✓
10. Creation of an expandable annex (through gazetting) of banned products under the EPA to cover all existing POPs and new additions	Covered under 1
11.Amend the Act to provide for waste handling and disposal issues, which will include the following:	✓
12.Disposal of Annex A POPs as per the Convention Art 6 (1)(d)	✓
13. Measures associated with analysis, storage, handling and disposal taking into account compliance with international/regional rules, standards and guidelines, particularly regarding emissions taking into account the exemptions	✓
14. Identification, monitoring and management of stockpiles, products, articles in use, wastes and contaminated sites	✓

End of document