NATIONAL IMPLEMENTATION PLAN FOR GUYANA

UPDATED 2019

FOR THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS (POPS)

COOPERATIVE REPUBLIC OF GUYANA

PREPARED BY THE Pesticides and Toxic Chemicals Control Board

June 2025

GUYANA

UPDATED NATIONAL IMPLEMENTATION PLAN (NIP) (2019)

for the Stockholm Convention on Persistent Organic Pollutants (POPs)

Cooperative Republic of Guyana

National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

Prepared on behalf of the Government of the Cooperative Republic of Guyana in fulfilment of its obligations under the Stockholm Convention within the framework of the Project:

GEF 10154: Review and Update of the National Implementation Plan for Guyana under the Stockholm Convention on Persistent Organic Pollutants (POPs).

GEF Implementing Agency

United Nations Environmental Programme (UNEP)

GEF Executing Agency

Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean Region (BCRC Caribbean)

National Focal Point

Pesticides and Toxic Chemicals Control Board

Ministry of Agriculture

Guyana

Executive Summary

Guyana is the only English-speaking country on the northeastern coast of the continent of South America, with a population of 746,955 persons (population census 2012). The economy is agriculturally dominant, but it is now being overtaken by the oil and gas and service sectors.

The Pesticides and Toxic Chemicals Control Board, under the Ministry of Agriculture, serves as the focal point for the Stockholm Convention on Persistent Organic Pollutants (POPs). It is responsible for fulfilling national obligations under the Convention and developing the updated NIP for Guyana.

POPs are a group of chemicals that have been produced both intentionally for use as pesticides and industrial performance chemicals, as well as unintentionally through various industrial activities. Persistent Organic Pollutants (POPs) persist in the environment, bioaccumulate through the food chain, and cause adverse effects to human health and the environment. POPs not only pose threats to the regions in which they are produced and used, but they also threaten other regions where they have never been used or produced as they are transported via air and water, posing an even greater threat to the global population and environment.

The Stockholm Convention (SC) on Persistent Organic Pollutants (POPs) became effective on 17th May 2004 and was acceded to on the 12th September 2007 by the Cooperative Republic of Guyana. The Stockholm Convention implements an international ban on the production, use, and trade in persistent organic pollutants due to their impact on human health, the ecosystem, and the environment. The Convention list chemicals that exhibit the distinguishing and accepted characteristics of POPs. The chemicals listed by the Convention are placed under three Annexes: A (elimination), B (restriction), and C (unintentional production).

This updated NIP addresses the twenty-eight (28) POPs listed up to COP 8 in 2017 and includes their work plans and associated enabling activities. The objectives of the NIP are:

(i) To reaffirm the activities that Guyana has initiated regarding the reduction of the presence of POPs;
(ii) To recommend actions that Guyana will embark on to manage and eliminate POPs from entering the environment with consideration for the Stockholm Convention; and
(iii) To apprise the COP and Guyanese communities about national initiatives and projects designed to meet the requirements of the Stockholm Convention.

This updated NIP communicates the methodology Guyana will undertake to accomplish its obligations under the Stockholm Convention to eliminate or reduce POPs emissions and employ environmentally sound management practices of stockpiles of POPs contaminated wastes and contaminated sites that create elevated threats to human health and the environment.

This updated NIP is developed under the project entitled “Review and Update of the National Implementation Plan for Guyana under the Stockholm Convention on

Persistent Organic Pollutants (POPs)". This enabling activity under the Convention is implemented by UNEP and executed by BCRC-Caribbean and is wholly funded by the Global Environmental Facility (GEF). The NIP comprises three chapters:

(i) Chapter 1 provides an overview of the aims and goals of the NIP, as well as the process for the development of the NIP;
(ii) Chapter 2 outlines Guyana's demographic, political, and economic status, and it gives basic information on Guyana's status regarding the management of POPs; and
(iii) Chapter 3 presents an overview of recommended activities, strategies, and work plans. In addition, there is a budget related to the activities of the work plan.

The compilation of this NIP update allowed the authors to examine the situation of the listed POPs for Guyana. This involved conducting assessments, updating and developing inventories for listed POPs, and making determinations for improved management of the identified chemicals. The NIP also provides considerations for socio-economic analysis and gender policy assessment.

The Government has taken a conscious decision based on the detrimental impact of POPs on humans and the environment and has prohibited all POPs pesticides. All of the POPs pesticides listed under Annex A of the SC are prohibited through legal measures except chlordecone and pentachlorobenzene (PeCB), which do not have legislative support for their prohibition.

The POPs pesticide stockpile that was previously present has been exported and destroyed under a regional United Nations Food and Agriculture Organization (FAO) project. Therefore, the highest exposure risk of this waste POPs pesticides, formerly stored at these sites, has been eliminated.

There are no facilities present in Guyana to produce pesticides. Pesticides are imported for the management of pests and diseases in agriculture and other sectors, including household uses. However, there are not enough systems in place to sufficiently guide the safe use of pesticides. In general, there is insufficient compliance despite the increased dissemination of risk-related information to stakeholders associated with transportation and end-users. Additionally, suppliers and some end-users are unfamiliar with risk management procedures, particularly the use of PPE. The mixing of pesticides is generally practiced without knowing the specific risks and impacts to human health. However, there has been a trend towards using environmentally safer pesticides through restricting and prohibiting Class I chemicals in the country. Integrated pest management (IPM) and organic production are practiced in the agriculture sector.

DDT, listed under Annex B of the Convention, is restricted under the Pesticides and Toxic Chemicals Regulations. This chemical is no longer being used for the vector control programme and has been replaced by suitable alternatives. This chemical is recommended for prohibition.

PCBs

PCBs have been imported into the country as dielectric fluids in electrical equipment such as transformers and capacitors manufactured prior to the mid-1980s, and are mostly found in the electricity generation sector.

The assessment concluded that there are seventeen (17) pieces of electrical equipment in operation that contain PCBs, and there is possible contamination of soils within the locations containing the PCB equipment. The assessment was unable to conclude on the presence of PCBs in sealants and caulks, as well as paint and coatings.

SCCP

SCCPs are primarily used as plasticizers and flame retardants in polyvinyl chloride (PVC), rubber, and other plastics. SCCPs are also used in lubricants and metal working fluids as well as plasticizers and flame retardants in a variety of applications, including in paints, adhesives, and sealants, leather fatliquors, textiles, and polymeric materials. SCCPs carry an exemption for some of the uses proffered and were inventoried for the first time in Guyana.

The development of the inventory utilised Tiers I and II approach and follows the methodology recommended by the SCCP decision guidance document, and was supported by a number of other relevant documents, including research papers. The areas identified for examination were the two groups: PVC import and plastic and rubber, for the presence of SCCPs and MCCPs. The total estimated amount of SCCP imported in plasticized PVC to Guyana for 2018 and 2019 was 56.2 t and 33.8 t, respectively, and for MCCP for 2018 and 2019 was 56.2 t and 33.8 t, respectively. The total estimated amount of SCCP imported in rubber to Guyana for 2018 and 2019 was 3.1 t and 4.5 t, respectively, and for MCCP imported in plasticized rubber for 2018 and 2019, 72.4 t and 117 t, respectively. The emissions were estimated at 1.6 tonnes for SCCP and 13.4 tonnes for MCCP.

Industries possibly using SCCPs and CPs containing SCCPs are present in Guyana, including companies producing PVC products, paint manufacturers, and leather tanneries. In this preliminary inventory initial assessment of chemicals used by some of these companies has been made, but CPs were not discovered. A more detailed assessment of individual companies needs to be conducted.

There is no need for a legislative and regulatory framework for the management of SCCP in Guyana. This is applicable for restrictions to production, import, export, use, stockpile, disposal, and waste, as well as the determination of the amount present in consumer products.

All of the waste disposal sites are at risk of contamination from SCCPs. There is no data on uPOPs in the chlorinated paraffins imported in Guyana, which might increase the risk.

There is no requirement for any exemption for SCCP for Guyana, but a detailed assessment of industries potentially using SCCPs or CP mixtures containing SCCPs has not been conducted as yet.

There are several major gaps identified, primarily related to confirming, quantifying, and identifying the presence of SCCPs in imports, as well as determining their potential emissions and associated management practices aimed at mitigating health and environmental impacts.

PBDE

Polybrominated diphenyl ethers (PBDEs) are a group of industrial aromatic organobromine chemicals that have been used since the 1970s as additive brominated flame retardants (BFRs) in a wide range of consumer products such as plastics and polymers in electrical and electronic equipment (EEE), in vehicles, and in buildings. The PBDEs have some acceptable purposes and specific exemptions. This group of chemicals is being inventoried for the first time in Guyana.

The development of the inventory utilised Tiers I and II approach and follows the methodology recommended by the decision guidance document and supported by a number of other relevant documents. The areas identified for examination included the electrical and electronic equipment, the transport sector, and its associated waste generation, stockpiles, and contaminated sites.

The inventory total WEEE generated for 2019 under categories 3 (ICT equipment) and 4 (consumer equipment), containing most of the PBDEs (UNEP 2021), had an estimated content of 376 kg of hexaBDE/heptaBDE and a decaBDE content of 3,337 kg.

The assessments of POP-PBDEs in EEE in use/stock is estimated in total hexaBDE/heptaBDE content, at 1,726 kg and a decaBDE content of 12,296 kg.

The WEEE and plastic from WEEE are currently not recycled in Guyana and are not exported, but end up in landfills and dumpsites.

The total decaBDE presence in these imported vehicles is estimated to 8,414 kg, with an average content of 200 kg plastic/polymer per vehicle, providing a total volume of 35,727 tonnes of plastic/polymer.

The total number of vehicles in operation is estimated at 120,428, with a total decaBDE amount estimated at 3,758 kg. The polymer/plastic content of these vehicles is estimated at 24,086 tonnes.

End-of-life vehicles were estimated at 15,053 with a decaBDE content of 1,204 kg and a polymer content of 3,010 tonnes. Only the body of the vehicles (largely metal) are exported. However, the scrap metal exported is bulked with other metals originating from other activities; as such, there is a lack of data on the quantity of scrap vehicle exports. The plastic and other polymers from vehicles remain in Guyana and mainly end up in landfills and dumpsites.

The inventory found that there is no production of BFRs in Guyana, but rather from the import and usage of products that contain BFRs, and, arising from poor waste disposal management, there is possible contamination at existing and closed dumpsites.

There is no need for a legislative and regulatory framework for the management of PBDE in Guyana. This is applicable for restriction to production, import, export, use,

stockpile, disposal, and waste, as well as the determination of the amount present in consumer products.

There are a number of major gaps identified and they are mainly associated with the confirmation and quantification of the BFRs as waste and the associated management practices associated with this determination.

HCBD

Guyana is not a producer of HCBD and has no organochlorine production process where HCBD could be generated at levels where HCBD separation for intentional production is possible. There is also no import of HCBD as products, and no intentional use has been discovered in Guyana.

DDT

The use of DDT in Guyana has been terminated, and there is no DDT present in the country. DDT is legislatively restricted under the Pesticides and Toxic Chemicals Control Act (No. 13 of 2000). Guyana will not be seeking to extend the exemption for the use of DDT under the SC.

PFOS

PFOS and PFOA are identified as persistent and bioaccumulative substances in the environment and living organisms, posing several major health concerns. PFOS-related substances are listed in Annex B (2009) of the Stockholm Convention, with PFOA and its related substances listed in Annex A (2019). They both have some acceptable purposes and specific exemptions and are being inventoried for the first time in Guyana.

The areas identified for examination as part of the inventory include fire-fighting foam, sulfluramide, chromium, other plating materials, synthetic carpets, textiles, leather, paper, PFOS/PFOA stockpiles, and contaminated sites.

The Inventory found that there is no production or use of PFOS/PFOA in Guyana, but there are possibilities that PFOS/PFOA and its related substances could have been used in the past.

There is no requirement for any exemption for PFOS, with the exemption for PFOA to be assessed after the completion of the guidance materials.

There are no major gaps identified since there is no major confirmed use of PFOS in Guyana; however, the firefighting foam needs to be tested to confirm its status. Although this inventory could not determine the exact use of PFOS and PFOS-related materials, several sites may require testing for PFOS and PFOA contamination, such as the firefighting training areas and the dumpsite around the country. An additional activity was conducted under this project to support an update to the inventory to include sampling and analysis of firefighting foams.

uPOPs

The inventory of polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) was conducted taking into consideration all of the amendments to 2017 and the revision of the emission contained within the first NIP using the revised toolkit of 2013.

The initial emission was revised and revealed a reduction of 97 g TEQ, mainly due to the reduction of emission factors for open burning. They formed the baseline data for Guyana and will be used to measure progress for uPOPs reduction and minimization.

There were ten groups and 28 sub-groups identified as sources of emission for uPOPs in Guyana for this inventory. The waste emission was calculated using 2019 data. The emission for the year in review totalled 27.5 g TEQ. This was an increase of 4 g TEQ over the 2010 emissions calculated using the 2013 toolkit. The main source groups that contributed to this increase were medical waste incineration with 2.3 g TEQ and open burning with 1.0 g TEQ, respectively.

Several recommendations and alternatives were identified for the reduction of emissions in the open burning group, especially with waste and agricultural burning.

Guyana has ten regions, and in each region, there are earmarked dumpsites along with illegal dumpsites, which are scattered throughout the country. None of the official dumping sites comply with international standards or are equipped with measures to avoid emissions of hazardous substances to the environment.

Dumping of waste results in emissions of hazardous substances to the environment, mainly air, soil, and underground water or nearby surface water sources. All the dumping sites and sites where these polymer fractions are disposed of have frequent open-burning activities, which result in releases of POPs present in the waste and the formation of uPOPs, including PCDD/Fs and brominated PBDD/Fs[1]. Over time, these sites and the surrounding soils can become contaminated with these POPs[2].

There has never been any study conducted to evaluate the health and environmental impact of POPs in Guyana. There is also no country-specific monitoring and evaluation carried out for any POPs chemicals.

The recommendation is for all the sites assessed for all the groups to confirm the presence of POPs, quantifying each, and develop a management plan to cater for remediation and other practices to reduce the impact on human health and the environment. Further to this, some of the storage sites previously used need to be assessed, along with fire fighters' training site, in the case of PFOS.

The Government of Guyana has reaffirmed its commitment to meeting the objectives of the Stockholm Convention to protect human health and the environment from

[1] Gullett BK, Wyrzykowska B, Grandesso E, Touati A, Tabor DG, Ochoa GS (2010) PCDD/F, PBDD/F, and PBDE emissions from open burning of a residential waste dump Environ Sci Technol. 44(1):394-399.

[2] Petrlik J, Bell L, DiGangi J, et al. (2022) Review: Monitoring of Dioxins and PCB in Eggs as Sensitive Indicator for Environmental Pollution and Contaminated Sites and Recommendations for Reducing and Controlling Releases and Exposure. Emerg. Contam. 8, 254-279

persistent organic pollutants. The lead implementing agencies identified were the Pesticides and Toxic Chemicals Control Board (PTCCB) and the Environmental Protection Agency (EPA) of Guyana. These were proposed to be supported by several other agencies considered key institutional stakeholders, such as: Ministry of Agriculture, Ministry of Natural Resources and Environment, Ministry of Health, Ministry of Local Government and Regional Development, Guyana Energy Authority, Guyana Revenue Authority Customs and Trade Administration, representatives of the chemical's importers, Guyana Power and Light and the University of Guyana.

The work plan and activities for the management of POPs in Guyana are presented and include performance indicators, suggested time frames for implementation, and implementers, considering relevant and participating implementers and stakeholders. The work plans and specific activities have been developed to individually address the identified areas for the management of POPs in Guyana.

The following is a summary of the cost for implementing the work plans to address the priority areas of the NIP within the next five years. The total cost of the activities is estimated at seven million, one hundred and ten thousand dollars, and is shown in **Table 1**.

Table 1: Summary of the priority areas and cost of implementation in Guyana.

Activities	Description Of Priority Areas	Cost (US $)
1	Institutional, regulatory and technical strengthening measures;	545,000
2	Measures to reduce or eliminate releases from intentional production and use (Annex 3);	-
3	Measures to reduce production, import and export, use, stockpiles export, and waste of POPs pesticides (Annex A Part I Chemicals);	1,130,000
4	Measures to reduce production, import and export, use, stockpiles export, and waste of POPs chemicals - SCCP (Annex A Part I Chemicals);	305,000
5	Reduction and elimination of releases from intentional production and use PCBs and equipment containing PCBs (Annex A Part II Chemicals);	370,000
6	Measures to reduce production, import, export, use, stockpiles and waste of POP-PBDEs (Annex A Parts IV, V and IX), HBCD (Annex A Part I and VII) and HBB (Annex A Part I chemicals);	600,000
7	Measures to reduce production, import, export, use, stockpile and waste of Annex B POPs chemicals – DDT (Annex B Part II Chemicals);	10,000
8	Measures to reduce production, import, export, use, stockpile and waste of Annex B POPs chemicals – PFOS/PFOSF and its related substances and products containing them (Annex B Part III Chemicals);	505,000
9	Registration of specific exemptions and the continuing need for exemptions (Article 4);	80,000
10	Measures for the reduction or elimination of releases from unintentional production (Article 5);	1,650,000
11	Identification and management of stockpiles, waste and articles in use, including release reduction and appropriate measures for handling and disposal (Article 6);	500,000
12	Identification of contaminated sites (Annexes A, B and C Chemicals) and, where feasible, remediation in an environmentally sound manner (Article 6);	545,000
13	Undertaking information exchange and stakeholder participation (Article 9);	50,000
14	Public Awareness, information and education (Article 10);	40,000
15	Research, development and monitoring (Article 11); and	750,000
16	Technical and financial assistance (Article 12 and 13).	30,000
	TOTAL	**7,110,000**

Financial Resources

The NIP will be implemented through mobilisation of various finance resources such as state budget, bilateral grant aid, GEF grants, extended producer responsibility contribution, “polluter pays principle” contributions, loan, financing from organisations and individuals.

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Acronyms

A/C	**Alternating current**
BAT	**Best Available Technique**
BEP	**Best Environmental Practice**
CGPC	**Coordinating Group of the Pesticide Control Board of the Caribbean**
COP	**Conference of the Parties**
DDT	**Dichlorodiphenyltrichloroethane**
EPA	**Environmental Protection Agency**
EPR	**Extended Producer Responsibility**
EPS/XPS	**Expanded / Extruded polystyrene insulation**
FAO	**Food and Agriculture Organization of the United Nations**
g	**gram**
GEA	**Guyana Energy Authority**
GEF	**Global Environmental Facility**
GFC	**Global Framework on Chemicals**
GFS	**Guyana Fire Service**
GGMC	**Guyana Geology and Mines Commission**
GOG	**Government of Guyana**
GPL	**Guyana Power and Light Inc.**
Guysuco	**Guyana Sugar Corporation**
HCB	**Hexachlorobenzene**
HCH	**Hexachlorocyclohexane**
HFO	**Heavy fuel oil**
IADB	**Inter-American Development Bank**
IAST	**Institute of Applied Science and Technology**
ICC	**Inter-Agency Coordinating Committee**
ICCM	**International Conference on Chemicals Management**
IFI	**International Financial Institution**
kg	**kilogram**
l	**Litres**

LCCPs	**Long-chain chlorinated paraffins**
LEC	**Linden Electric Company Incorporated**
LFO	**Light fuel oil**
LPC	**Linden Power Company**
LUSCSL	**Linden Utility Services Cooperative Society Limited**
M&E	**Monitoring and Evaluation**
MCCPs	**Medium-chain chlorinated paraffins**
MLGRD	**Ministry of Local Government and Regional Development**
MNRE	**Ministry of National Resources and Environment**
MoA	**Ministry of Agriculture**
MoF	**Ministry of Finance**
MoH	**Ministry of Health**
MoH&W	**Ministry of Housing and Water**
MoLA	**Ministry of Legal Affairs**
MINTIC	**Ministry of Tourism, Industry and Commerce**
NAREI	**National Agricultural Research and Extension Institute**
NDS	**National Development Strategy**
NEAP	**National Environmental Action Plan**
NIP	**National Implementation Plan**
OP	**Obsolete Pesticides**
PCBs	**Polychorinated Biphenyls**
PCDD/F	**Polychlorinated dibenzo-*p*- dioxins and dibenzofurans**
PeCB	**Pentachlorobenzene**
PFOS	**Perfluorooctane sulfonic acid**
PFOS-F	**Perfluorooctane sulfonyl fluoride**
ppm	**Parts per million**
PRTR	**Pollutant Release and Transfer Register**
PTCCB	**Pesticide and Toxic Chemicals Control Board**
ROC-GRULAC	**Regional Organization Group of the Group of Latin American and Caribbean Countries**
SAICM	**Strategic Approach to Integrated Chemicals Management**

SEA	**Socio-economic assessment**
SCCPs	**Short-chain chlorinated paraffins**
SWM	**Solid Waste Management**
t	**Metric tonne**
TEQ	**Toxic Equivalent**
TJ	**Terajoule**
UG	**University of Guyana**
UNDP	**United Nations Development Program**
UNEP	**United Nations Environmental Programme**
WHO	**World Health Organization**
WWF	**World Wildlife Fund**

1. INTRODUCTION

Chapter 1 outlines the purpose and structure of the National Implementation Plan (NIP), including a summary of the Stockholm Convention (SC), its aims, and its obligations. It also describes the mechanism used to develop the NIP and the stakeholder consultation process. It further provides a synopsis of the Persistent Organic Pollutants (POPs) concerns and specifies the context and background outlining the chemicals, their uses, and the resulting complications.

1.1 OVERVIEW OF PERSISTENT ORGANIC POLLUTANTS (POPs)

1.1.1 Definition of POPs

Persistent Organic Pollutants (POPs) are carbon-based, highly toxic organic chemical substances that possess a combination of physical and chemical properties, which can resist photochemical and biological breakdown into non-toxic products. When released into the environment, they exhibit the following properties:

(a) remain intact for exceptionally long periods (many years);

(b) become widely distributed throughout the environment as a result of natural processes involving soil, water, and, most notably, air;

(c) fat-soluble, except for PFOS, which bioaccumulates in protein-rich tissues;

(d) accumulate in the living organisms, including humans, and are found at higher concentrations at higher levels in the food chain; and

(e) are toxic to both humans and wildlife.

1.1.2 Harmful Effects of POPs

POPs are chemicals of global concern due to their potential for long-range transport, persistence in the environment, ability to bio-magnify and bio-accumulate in ecosystems, as well as their significant negative effects on human health and the environment.

Due to the use and release of POPs over the last several decades, humans have been exposed to these chemicals in a variety of ways: indirectly based on the contamination of environmental media, our water resources, the air we breathe, and intake by living organisms that we in turn eat as food, but also directly through the use of chemicals in both the outdoor and indoor workplaces. Many products used in our daily lives may contain POPs, which have been added to improve product characteristics, such as flame retardants or surfactants. As a result, POPs can be found virtually everywhere on our planet in measurable concentrations.

Human exposure - for some compounds and scenarios, even to low levels of POPs - can lead to many acute and chronic health effects, including increased cancer risk,

reproductive disorders, alteration of the immune system, neuro-behavioural impairment, endocrine disruption, genotoxicity, and increased birth defects.

POPs are therefore a global issue for the environment and human health. There are no barriers to the impact of POPs, and as such, it requires unity in the fight against the impact of these chemicals, whereby a unified approach is needed for their management across all barriers.

1.1.3 Use and Management of POPs in Guyana

Historically, POPs have been used in Guyana within the industrial and agricultural sectors, including, until recently, the use of Dichlorodiphenyltrichloroethane (DDT) for the control of the malaria vector. Guyana has since discontinued the use of all identified POPs and the small quantities that remained in stockpiles, as obsolete from the seventies have been destroyed.

Guyana has placed management of the environment as a key component in its national development plans. Nationally, a number of conservation and protected areas have been earmarked. The development of the country is using a low-carbon development plan. Further, Guyana is a signatory to a number of MEAs that serve to protect the environment and reduce the impact of materials and chemicals that can pollute the environment.

The establishment of the Pesticides and Toxic Chemicals Control Board (PTCCB) and the Environmental Protection Agency (EPA) is the first step to meet the requirement for the management of POPs. However, Guyana, a developing country, is unable to provide the necessary infrastructure to manage POPs effectively. There are a number of national capabilities that need to be strengthened to allow for the proper management of these chemicals. As a responsible member of the international community, the legal infrastructure is there to facilitate the management of POPs to protect the population from the harmful effects of these substances, and to join the international efforts to protect all humankind from the impact of POPs chemicals. This led to Guyana acceding to the Stockholm Convention on Persistent Organic Pollutants (POPs).

1.2 Stockholm Convention on Persistent Organic Pollutants (POPs)

The Governing Council of the United Nations Environment Programme (UNEP) called for global action in its decision 18/32 that an international assessment process be undertaken to manage POPs in 1995. The Council defined POPs as "*chemical substances that persist in the environment, bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and the environment*".

This call led to the Intergovernmental Forum on Chemical Safety (IFCS) and the International Programme on Chemical Safety (IPCS) preparing an assessment of the initial list of twelve (12) worst offenders, which became known as the "dirty dozen".

Following decision 19/13C of the UNEP Governing Council, an Intergovernmental Negotiating Committee (INC) met five times between June 1998 and December 2000 to develop the Stockholm Convention as an international legally binding instrument for implementing international action on POPS, which was adopted in May 2001 in Stockholm, Sweden. The Convention was effected on 17th May 2004 with the main objective of protecting human health and the environment from the detrimental effects of POPs.

The Convention sets out obligations for countries covering the production, use, import, export, release, and disposal of POPs. The Convention also agreed on the process by which persistent compounds can be reviewed and added to the list of POPs, if they meet certain criteria for persistence and transboundary movement. Since the adoption of the Convention in 2004, the Conference of the Parties (COP) has amended the list of POPs to include the following twenty-two (22) chemicals in the Annexes:

- The first set of new chemicals added to the “dirty dozen” was agreed at the fourth meeting of the COP in Geneva on 8th May 2009, where nine (9) chemicals were added and referred to as the “nasty nine”.
- In 2011, the fifth meeting of the COP agreed to amend the Convention and added the 22nd POP, Endosulfan.
- The sixth meeting of the COP in 2013 listed hexabromocyclododecane (HBCD) as the 23rd POPs and the seventh meeting of the COP added three additional POPs – hexachlorobutadiene (HCBD), pentachlorophenol (PCP) and its salt and esters, and polychlorinated naphthalenes (PCN) - taking the total to twenty-six (26) listed POPs by 2015.
- The eighth meeting of the COP in 2017 added two further POPs – c-decaBDE and short-chain chlorinated paraffins (SCCP) - making the total number listed by the Convention 28.
- In 2019, PFOA and dicofol were listed, in 2022, PFHxS and related compounds were added, and in 2023, Dechlorane Plus, Methoxychlor, and UV-328 were included, resulting in a total of thirty-four (34) listed POPs or groups of POPs as shown in **Table 2**.

1.2.1 Summary of the Provisions of the Stockholm Convention

Each Party to the Stockholm Convention is required to follow the following provisions:

a) Prohibit and/or eliminate the production and use, as well as the import and export, of the intentionally produced POPs that are listed in Annex A to the Convention **(Article 3).**

b) Annex A allows for the registration of specific exemptions for the production or use of listed POPs, per that Annex and Article 4, bearing in mind that special rules apply to PCBs. The import and export of chemicals listed in Annex A can take place under specific restrictive conditions, as set out in Paragraph 2 of Article 3.

c) Restrict the production and use, as well as the import and export, of the intentionally produced POPs that are listed in Annex B to the Convention (**Article 3**).

d) Annex B allows for the registration of acceptable purposes for the production and use of the listed POPs, per that Annex, and for the registration of specific exemptions for the production and use of the listed POPs, in accordance with that Annex and Article 4. The import and export of chemicals listed in Annex B can take place under specific restrictive conditions, as set out in Paragraph 2 of Article 3.

e) Reduce or eliminate releases from unintentionally produced POPs that are listed in Annex C to the Convention (**Article 5**).

f) The Convention promotes the use of best available techniques and best environmental practices (BAT/BEP) for preventing releases of POPs into the environment.

g) Ensure that stockpiles and wastes consisting of, containing, or contaminated with POPs are managed safely and in an environmentally sound manner (**Article 6**).

h) The Convention requires that such stockpiles and wastes be identified and managed to reduce or eliminate POPs releases from these sources. The Convention also requires that wastes containing POPs are not transported across international boundaries without taking into account relevant international rules, standards, and guidelines.

i) To target additional POPs (**Article 8**).

j) The Convention provides for detailed procedures for the listing of new POPs in Annexes A, B, and/or C. A Committee composed of experts in chemical assessment or management - the Persistent Organic Pollutants Review Committee- is established to examine proposals for the listing of chemicals, by the process set out in Article 8 and the information requirements specified in Annexes D, E, and F of the Convention.

k) Other provisions of the Convention relate to the development of implementation plans (**Article 7**), information exchange (**Article 9**), public information, awareness and education (**Article 10**), research, development and monitoring (**Article 11**), technical assistance (**Article 12**), financial resources and mechanisms (**Article 13**), reporting (**Article 15**), effectiveness evaluation (**Article 16**) and non-compliance (**Article 17**).

Guyana acceded to the SC on 12th September 2007, and the Convention entered into force in December 2007. In accordance with Article 7 of the Convention, Parties are required to develop a National Implementation Plan (NIP) to demonstrate how the country will implement its obligations under the SC. In compliance with this, Guyana endorsed and transmitted its initial NIP to the SC Secretariat on the 7th June, 2013, which addressed the initial dirty dozen, as well as the ten (10) “new” POPs included as of the 2011 amendment (COP-5) of the SC Annexes.

This updated NIP addresses all the POPs listed under the SC as of the eighth COP in 2017, comprising twenty-eight (28) chemicals.

Table 2 presents an overview of the POPs listed in Annex A, B, and C of the SC as of 2022. In the case of some POPs listed in Annexes A and B, the COP has adopted acceptable purposes and/or specific exemptions as presented in **Table 3**.

Table 2. List of POPs in Annex A, B, and C of the Stockholm Convention.

Annex A (Elimination)	Annex B (Restriction)	Annex C (Unintentional Production)
Parties must take measures to eliminate the production and use of the chemicals listed under Annex A. Specific exemptions for use or production are listed in the Annex and apply only to Parties that register for them.	Parties must take measures to restrict the production and use of the chemicals listed under Annex B in light of any applicable acceptable purposes and/or specific exemptions listed in the Annex.	Parties must take measures to reduce the unintentional releases of chemicals listed under Annex C with the goal of continuing minimization and, where feasible, ultimate elimination.
• Aldrin • Chlordane • Chlordecone • Decabromodiphenyl ether (deca-BDE) • Dechlorane Plus • Dieldrin • Endrin • Heptachlor • Hexabromobiphenyl (HBB) • Hexabromodiphenyl ether and heptabromodiphenyl ether • Hexabromocyclododecane (HBCD) • Hexachlorobenzene (HCB) • Hexachlorobutadiene (HCBD) • Alpha-hexachlorocyclohexane (HCH) • Beta-hexachlorocyclohexane (HCH) • Lindane (Gamma-HCH) • Methoxychlor • Mirex • Pentachlorobenzene (PeCB) • Pentachlorophenol and its salts and esters (PCP, its salts and esters) • Pefluorohexanesulphonic acid (PFHxS) • Perfluorooctanoic acid (PFOA) • Polychlorinated biphenyls (PCBs) • Polychlorinated naphthalenes (PCNs) • Short-chain chlorinated paraffins (SCCPs) • Tetrabromodiphenyl ether and pentabromodiphenyl ether • Toxaphene	• DDT • Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride (PFOS, its salts and PFOS-F)	• Polychlorinated dibenzo-p-dioxins (PCDD) • Polychlorinated dibenzofurans (PCDF) • Hexachlorobenzene (HCB) • Pentachlorobenzene (PeCB) • Polychlorinated biphenyls (PCBs) • Polychlorinated naphthalenes (PCNs) • Hexachlorobutadiene (HCBD)

• Technical endosulfan and its related isomers • UV-328		

Table 3. Acceptable purposes and/or specific exemptions for POPs listed in the Convention

Chemical	Annex	Specific exemptions / Acceptable purposes	Related (decision)
Decabromodiphenyl ether (commercial mixture, c-decaBDE)	A	**Production:** As allowed for the parties listed in the Register **Use:** Vehicles, aircraft, textiles, additives in plastic housings, polyurethane foam for building insulation, in accordance with Part IX of Annex A	SC-8/10
Hexabromocyclododecane	A	**Production:** As allowed by the parties listed in the Register of specific exemptions. **Use**: Expanded polystyrene and extruded polystyrene in buildings in accordance with the provisions of Part VII of Annex A	SC-6/13
Hexabromodiphenyl ether and heptabromodiphenyl ether (commercial OctaBDE)	A	**Production:** None **Use:** Articles in accordance with the provisions of Part IV of Annex A	SC-4/14
Lindane	A	**Production:** None **Use:** Human health pharmaceutical for control of head lice and scabies as second line treatment	SC-4/15 SC-9/1 (stop)
Pentachlorophenol and its salts and esters	A	**Production:** As allowed for the parties listed in the Register in accordance with the provisions of Part VIII of Annex A **Use:** Pentachlorophenol for utility poles and cross-arms in accordance with the provisions of Part VIII of Annex A	SC-7/13
Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride	B	**Production:** For the following **Use:** Acceptable purposes and specific exemptions in accordance with Part III of Annex B	SC-4/17 SC-7/1 SC-9/1 SC-9/4
Polychlorinated naphthalenes	A and C	**Production**: For the following **Use:** Production of polyfluorinated naphthalenes	SC-7/14
Technical endosulfan and its related isomers	A	**Production:** As allowed for the parties listed in the Register of specific exemptions **Use:** Crop-pest complexes as listed in accordance with the provisions of Part VI of Annex A	SC-5/3
Tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial PentaBDE)	A	**Production**: None **Use**: Articles in accordance with the provisions of Part V of Annex A	SC-4/18
DDT (1,1,1-trichloro-2,2-bis (4-chlorophenyl) ethane)		**Production**: Use of vector control against diseases in accordance with Part II of Annex **Use**: Use of vector control against diseases in accordance with Part II of this Annex	

1.2.2 Overview of the POPs under the Stockholm Convention

1.2.2.1 The Initial POPs

The twelve (12) initial POPs under the Stockholm Convention that were initially recognized as causing adverse effects on humans and the ecosystem are classified in three (3) categories: pesticides, industrial chemicals, and by-products.

The pesticides listed are: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, and toxaphene.

The industrial chemicals comprise hexachlorobenzene and polychlorinated biphenyls (PCBs).

The initial by-products were the following: hexachlorobenzene; polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans (PCDD/PCDF), and PCBs.

(a) Pesticides

i. **Aldrin – Listed under Annex A -** is an organochlorine insecticide that is used to kill soil insects such as termites, corn rootworm, and rice water weevil, among other insects. It was also used as a seed treatment. Aldrin can kill birds and fish and has been detected in dairy products and animal meats.

ii. **Chlordane** – **Listed under Annex A -** is a synthetic broad-spectrum insecticide used extensively on a range of crops and termites. Chlordane affects the human immune system and is classified as a possible human carcinogen, and is very toxic to aquatic organisms. There are alternatives to chlordecone that can be implemented inexpensively.

iii. **Dichlorodiphenyltrichlorethane (DDT**) – **Listed under Annex B** – is a man-made chemical used to control vector-borne diseases such as malaria and as an agricultural insecticide in cotton. The most commonly known toxic effect of DDT is egg-shell thinning among birds, especially birds of prey. The short-term acute effects of DDT on humans are limited, but long-term exposures to DDT and its breakdown by-products dichlorodiphenlyldichloroethylene (DDE) have been associated with chronic health effects such as breast cancer, diabetes, decreased semen quality, spontaneous abortion, and impaired neurodevelopment in children[3]. DDT has been detected in breast milk, raising serious concerns about infants' health.

iv. **Dieldrin** – **Listed under Annex A** – is a chlorinated hydrocarbon insecticide used principally to control termites and textile pests as well as insect-borne diseases and insects living in agricultural soils. Dieldrin is highly toxic to fish and other aquatic animals, particularly frogs, whose embryos can develop spinal deformities after exposure to low levels. Dieldrin residues have been found in air, water, soil, fish, birds, and mammals, including humans[4].

[3] Eskenazi B, Chevrier J, Rosas LG, et al. The Pine River statement: human health consequences of DDT use. Environ Health Perspect. 2009 Sep;117(9):1359-67. doi: 10.1289/ehp.11748. Epub 2009 May 4. PMID: 19750098; PMCID: PMC2737010.

[4] Singh, P, Hussain CM, Rajkhowa S. Management of Contaminants of Emerging Concern (CEC) in Environment. 2021. Elsevier Inc.

v. **Endrin** – **Listed under Annex A** – is an organochloride insecticide used as a foliar spray on cotton and grains as well as a rodenticide. It has a long half-life, persisting in the soil for up to 12 years. In addition, endrin is highly toxic to fish.

vi. **Heptachlor** – **Listed under Annex A** – is an organochlorine compound used as a non-systemic stomach and contact insecticide primarily against soil insects and termites. It had been used against cotton insects, grasshoppers, and malaria-carrying mosquitoes. Heptachlor is classified as a possible human carcinogen and is believed to be responsible for the decline in some wildlife species.

vii. **Hexachlorobenzene (HCB)** – **Listed under Annex A and Annex C** – is a chlorocarbon widely used as a seed treatment against insects and fungi. In high doses, HCB is lethal to some animals and, at lower levels, adversely affects their reproductive success. Mothers also passed HCB to their infants through the placenta and through breast milk.

viii. **Mirex** – **Listed under Annex A** – is chlorinated hydrocarbon used as a stomach insecticide mainly against leaf cutting ants, termites. Direct exposure to mirex does not appear to cause injury to humans, but studies on laboratory animals have caused it to be classified as a possible human carcinogen. In studies, mirex proved toxic to several plant species, fish, and crustaceans. It is considered to be one of the most stable and persistent pesticides, with a half-life of up to 10 years. The main route of human exposure to mirex is through food, particularly meat, fish, and wild game.

ix. **Toxaphene** – **Listed under Annex A** – non-systemic and contact insecticide that was used to control insects on cotton and cereal grains. It was also used to control ticks and mites in livestock. While the toxicity to humans of direct exposure is not high, toxaphene has been listed as a possible human carcinogen due to its effects on laboratory animals. It is highly toxic to fish.

(b) Industrial Chemicals

x. **Polychlorinated biphenyls (PCBs)** – **Listed under Annex A with specific exemptions and under Annex C** – are used as coolants and insulating fluids (transformer oil) for transformers and capacitors, especially in components of early fluorescent light fittings and electrical transformers, and as plasticizers in paints and cements, stabilizing additives in flexible PVC coatings of electrical wiring and electronic components.

The aforementioned hexachlorobenzene and mirex are also classified as industrial chemicals. HCB is also used to produce fireworks, ammunition, and synthetic rubber. Mirex has been used as a fire retardant in plastics, rubber, and electrical goods, as well as for other industrial purposes.

(c) Unintentionally produced POPs (uPOPs) or By-Products

xi. **Polychlorinated dibenzo-p-dioxins (PCDD)** – **Listed under Annex C** – Dioxins are not produced commercially. Dioxins occur as byproducts in the manufacture of organochlorides, in the incineration of chlorine-containing

substances such as PVC (polyvinyl chloride), in the bleaching of paper, and from natural sources such as volcanoes and forest fires. In addition, certain kinds of metal recycling and pulp and paper bleaching can release dioxins. Dioxins have also been found in automobile exhaust, tobacco smoke, and wood and coal smoke (UNEP, 2005). These have been detected in emissions from the incineration of hospital waste, municipal waste, and hazardous waste. Dioxins have been associated with several adverse effects in humans, including immune and enzyme disorders and chloracne, and they are classified as possible human carcinogens

xii. **Polychlorinated dibenzofurans (PCDF)** – **Listed under Annex C** - are a group of halogenated organic compounds. PCDFs tend to co-occur with polychlorinated dibenzodioxins (PCDDs), which are not produced commercially, and they have no known use. These compounds are produced unintentionally from the same processes that release dioxins, and they are also found in commercial mixtures of PCBs. Furans persist in the environment for long periods, and are classified as possible human carcinogens. Food, particularly animal products, is the major source of exposure for humans. Furans have also been detected in breast-fed infants.

The following aforementioned chemicals are also listed as byproducts:

- **Hexachlorobenzene (HCB)** – given that it is also a byproduct in the manufacture of industrial chemicals such as carbon tetrachloride, perchloroethylene, trichloroethylene, and pentachlorobenzene, and also exists as an impurity in several pesticide formulations. byproduct of the manufacture of certain industrial chemicals and exists as an impurity in several pesticide formulations.
- **Polychlorinated biphenyls (PCBs)** – some PCB congeners exhibit a dioxin-like toxicity and are an impurity in some industrial operations. PCBs are toxic to fish, killing them at higher doses and causing spawning failures at lower doses. Research also links PCBs to reproductive failure and suppression of the immune system in various wild animals, such as seals and mink.

1.2.2.2 Overview of the sixteen (16) new POPs under the Stockholm Convention

The COP makes decisions to amend Annexes A, B, and C at each of its Meetings from the fourth to the eighth Meetings held between 2009 to 2017 to add sixteen new POPs to the initial twelve POPs. The amendments and additions are presented in the following brief descriptions of their former use and functions.

i. **Alpha hexachlorocyclohexane (α-HCH)** - **Listed under Annex A** – is an organochloride which is one of the isomers of hexachlorocyclohexane (HCH), which is a byproduct of the production of the insecticide lindane (γ-HCH) and is typically contained in commercial grade lindane used as an insecticide. Alpha-HCH is highly persistent in water in colder regions and may bioaccumulate and bio-magnify in biota and arctic food webs. This chemical is subject to long-range transport, is classified as potentially

carcinogenic to humans, and adversely affects wildlife and human health in contaminated regions.

ii. **Beta hexachlorocyclohexane (β-HCH)** – **Listed under Annex A** - is an organochloride which is one of the isomers of hexachlorocyclohexane (HCH), which is a byproduct of the production of the insecticide lindane (γ-HCH). Beta-HCH is highly persistent in water in colder regions and may bioaccumulate and bio-magnify in biota and arctic food webs. This chemical is subject to long-range transport, is classified as potentially carcinogenic to humans, and adversely affects wildlife and human health in contaminated regions.

iii. **Chlordecone** – **Listed under Annex A** – is a synthetic chlorinated polycyclic ketone that is chemically related to Mirex, which was mainly used as an agricultural insecticide in banana and other crops. Chlordecone is highly persistent in the environment, has a high potential for bioaccumulation and biomagnification, and based on physico-chemical properties and modelling data, chlordecone can be transported for long distances. It is classified as a possible human carcinogen and is very toxic to aquatic organisms.

iv. **Hexabromobiphenyl (HBB)** – **Listed under Annex A** – was an industrial chemical that has been used as a flame retardant in acrylonitrile-butadiene-styrene (ABS), thermoplastics for constructing business, machine housings, and in industrial and electrical products and in polyurethane foam for auto upholstery from 1970 to 1976. HBB is highly persistent in the environment, highly bio-accumulative, and has a strong possibility for long-range environmental transport, and is classified as a possible human carcinogen and has other chronic toxic effects. Inexpensive alternatives are available for all uses of hexabromobiphenyl.

v. **Lindane** – **Listed under Annex A** – is an organochlorine chemical variant of hexachlorocyclohexane that has been used both as an agricultural insecticide and as a pharmaceutical treatment. Lindane has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment, and against ectoparasites in both veterinary and human applications, including treatment of human lice and scabies. Lindane is persistent, bioaccumulates easily in the food chain, and bioconcentrates rapidly. There is evidence for long-range transport and toxic effects (immunotoxic, reproductive, and developmental effects) in laboratory animals and aquatic organisms. Alternatives for lindane are generally available, including its use as a human health pharmaceutical to control head lice and scabies. Therefore, the exemptions have been removed (Decision SC-9/1).

vi. **Hexabromodiphenyl ether and heptabromodiphenyl ether** – **Listed under Annex A** – are the main components of commercial octabromodiphenyl ether (c-OctaBDE). Octa-BDE was used in conjunction with antimony trioxide as a flame retardant in the housings of electrical and electronic equipment, mainly in the plastic acrylonitrile butadiene styrene, but also in high-impact polystyrene, polybutylene terephthalate, and polyamides until 2004. Commercial mixture of octaBDE is highly persistent,

has a high potential for bioaccumulation and food-web biomagnification, as well as for long-range transport. There are alternatives on the market.

vii. **Tetrabromodiphenyl ether and Pentabromodiphenyl ether** – **Listed under Annex A** - c-PentaBDE has been used as a flame retardant additive in flexible polyurethane foam for furniture and upholstery in the transport sector and in electronic equipment until 2004. It was also used in printed circuit boards. They are also used to some extent in specialized applications in textiles and in industry. Commercial mixture of pentaBDE is highly persistent in the environment, bio-accumulative, and has a high potential for long-range environmental transport. These chemicals have been detected in humans in all regions. There is evidence of its potential for toxic effects in wildlife, including mammals.

viii. **Pentachlorobenzene (PeCB)** – **Listed under Annex A and Annex C** – was used in PCB products, in dyestuff carriers, as a fungicide, a flame retardant, and as a chemical intermediate. PeCB is also produced unintentionally during combustion, thermal, and industrial processes. PeCB is persistent in the environment, highly bio-accumulative, and has a potential for long-range environmental transport. It is moderately toxic to humans and very toxic to aquatic organisms.

ix. **Perfluorooctane sulfonic acid (PFOS), its salts, and perfluorooctane sulfonyl fluoride (PFOS-F)** – **Listed under Annex A and Annex B** – PFOS is both intentionally produced and an unintended degradation product of related anthropogenic chemicals. The current intentional use of PFOS is widespread. PFOS uses include: firefighting foams, carpets, leather/apparel, textiles/upholstery, paper and packaging, coatings and coating additives, industrial and household cleaning products, pesticides and other insecticides, photographic industry, photolithography and semiconductor manufacturing, hydraulic fluids, and metal plating. PFOS is extremely persistent and has substantial bioaccumulating and biomagnifying properties, although it does not follow the classic pattern of other POPs by partitioning into fatty tissues, but instead binds to proteins in the blood and the liver. There are alternatives for some applications of PFOS; however, it is limited in some developing countries.

x. **Endosulfan** – **Listed under Annex A** - is a derivative of hexachlorocyclopentadiene and is chemically similar to aldrin, chlordane, and heptachlor. Endosulfan is an organochlorine insecticide and acaricide used in agriculture around the world to control insect pests, including whiteflies, aphids, leafhoppers, Colorado potato beetles, and cabbage worms. Endosulfan is toxic to humans and has been shown to have adverse effects on a wide range of aquatic and terrestrial organisms. Exposure to endosulfan has been linked to congenital physical disorders, intellectual disability, and deaths in farm workers and villagers in developing countries in Africa, Asia, and Latin America. Chemical and non-chemical alternatives to endosulfan are available in many geographical situations, both in developed and developing countries.

xi. **Hexachlorobutadiene (HCBD) – Listed under Annex A –** is a halogenated aliphatic compound most commonly used as a solvent for other

chlorine-containing compounds. Systemic toxicity following exposure via oral, inhalation, and dermal routes. Effects may include fatty liver degeneration, epithelial necrotizing nephritis, central nervous system depression, and cyanosis.

xii. **Pentachlorophenol (PCP) and its salts and esters – Listed under Annex A –** have been used as herbicide, insecticide, fungicide, algaecide, disinfectant, and as an ingredient in antifouling paint, and wood preservatives. People may be exposed to PCP in occupational settings through the inhalation of contaminated workplace air and dermal contact or with wood products treated with PCP. Short-term exposure to large amounts of PCP can cause harmful effects on the liver, kidneys, blood, lungs, nervous system, immune system, and gastrointestinal tract. Both chemical and non-chemical alternatives exist for PCP within applications for utility poles and cross arms, but an exemption is still granted for these uses.

xiii. **Polychlorinated naphthalenes (PCNs)** – **Listed under Annex A and C** – are used as effective coatings for electrical wires, as a wood preservative, as rubber and plastic additives, and in lubricants. Workers exposed to PCNs exhibit severe skin rashes and liver disease, that led to the deaths of workers. Chronic exposure increases the risk of liver disease. Increased cancer risks have been suspected, but so far not proven.

xiv. **Decabromodiphenyl ether (commercial mixture, c-DecaBDE)** – **Listed under Annex A** - is used as an additive flame retardant and has a variety of applications including in plastics/polymers/composites, textiles, adhesives, sealants, coatings, and inks. DecaBDE containing plastics are used in the housings of computers and TVs, wires and cables, pipes, and carpets. DecaBDE is highly persistent, has a high potential for bioaccumulation and food-web biomagnification, as well as long-range transport. Adverse effects are reported for soil organisms, birds, fish, frogs, rats, mice, and humans. A number of non-POP chemical alternatives are already on the market for the substitution of c-decaBDE in plastics and textiles.

xv. **Short-Chain Chlorinated Paraffins (SCCP)** – **Listed under Annex A** – are used as plasticizers in rubber, paints, adhesives, flame retardants for plastics, as well as an extreme pressure lubricant in metal working fluids. SCCPs are sufficiently persistent in air for long-range transport to occur and appear to be hydrolytically stable. Many SCCPs can accumulate in biota. It is concluded that SCCPs are likely, as a result of their long-range environmental transport, to lead to significant adverse environmental and human health effects. Technically feasible alternatives are commercially available for all known uses of SCCPs.

xvi. **Hexabromocyclododecane (HBCD)** – **Listed under Annex C** – is used as a flame retardant additive, providing fire protection during the service life of vehicles, buildings, or other articles. The main use of HBCD is in expanded and extruded polystyrene foam insulation, while the use in textile applications and electric and electronic appliances is smaller. HBCD has a strong potential to bioaccumulate and biomagnify. It is persistent in the environment and has the potential for long-range environmental transport.

It is very toxic to aquatic organisms. There are chemical alternatives to replace HBCD in high-impact polystyrene (HIPS) and textile back-coating.

1.2.3 Goals and Provisions of the Stockholm Convention

Under Article 7 of the Convention, Parties endeavoured to develop and implement their National Implementation Plan of their obligations within two years of the Convention entering into force for said party. Parties are also obligated to review and update their NIP, as required, and to address amendments as determined by the Convention.

The objectives of the NIP are as follows:

(i) To reaffirm the activities that Guyana has initiated regarding the reduction of the presence of POPs;
(ii) To recommend actions that Guyana will embark on to manage and eliminate POPs from entering the environment with consideration for the Stockholm Convention; and
(iii) To apprise the COP and Guyanese communities about national initiatives and projects designed to meet the requirements of the Stockholm Convention.

The NIP will also provide a description of the discharge of national obligations under the Stockholm Convention towards the reduction and elimination of POPs releases or emissions to the environment, and transmit environmentally-sound management of stockpiles of POPs contaminated wastes and sites that present imminent threats to human health and the environment.

The outcomes from the implementation of the NIP will include:

(a) Protection of the environment and the health of the people of Guyana from the effects of POPs;
(b) Structured framework for the life cycle management of POPs;
(c) Improved national capacity and capability to maintain and monitor the quality of the environment and human health; and
(d) Fulfilment of Guyana's obligations under the Stockholm Convention.

In consideration of the latest amendment of the Convention in 2017, Guyana is seeking to complete its requirement under Article 7 of the Convention with this project entitled "Review and Update of the National Implementation Plan for Guyana under the Stockholm Convention on Persistent Organic Pollutants (POPs)". This enabling activity under the Convention will be implemented by UNEP and executed by BCRC-Caribbean and is wholly funded by the Global Environmental Facility (GEF). The activities undertaken for the project are as follows:

(i) Strengthen the national coordination mechanisms;
(ii) Review and update the original POPs inventories;
(iii) Conduct inventories for the new POPs;
(iv) Assess the regulatory and policy frameworks to manage new POPs;
(v) Assess the institutional capacities to manage new POPs; and
(vi) Prioritize and draft action plans to reduce and phase out new POPs.

1.3 NIP Development Methodology and Activities

The NIP is consistent with the GEF initial guidelines for enabling activities for the SC on POPs, and the guidance for developing a NIP (UNEP and The World Bank Group), including strategies required under Articles 5 and 6 of the Convention.

The activities that have been conducted for the development of this NIP were:

1. *Establishing a coordinating mechanism* through the SC Focal Person and the Project Working Committee to guide the processes leading to the formulation and approval of the NIP.
2. *Training*. The task teams participated in different workshops and activities at the national level that were aimed at raising awareness on the obligations to the SC and helping build or strengthen human capacity to implement the Convention at a national level. A national training workshop on NIP development and inventory development has been conducted concerning the different areas covered by the SC, such as the basic POPs and newly listed POPs (until COP 7 in 2017), control and effects of unintentional POPs releases, PCBs, pesticides, legislation related to controlled substances, contaminated sites, etc. International expertise is engaged to conduct training to improve the local staff's capacity.
3. *Establishment of basic and new listed POPs inventories and assessment of national, legal, infrastructure, and institutional capacity to manage new POPs* has been executed. In order to assure a valid NIP, the development of the inventories of all POPs listed until 2017 was conducted within this NIP development. Staff got acquainted with the Stockholm Convention inventory guidance documents and the updated UNEP toolkit to elaborate inventories.
4. *An initial assessment of the potentially impacted population,* in particular workers and related families, has been conducted
5. *Monitoring and POPs management capacity*. A review of the capacity and the capacity needs to monitor POPs and other chemical pollution and potential POPs destruction capacity has been conducted.
6. *National Priority assessment and objective setting to accelerate the reduction and elimination of new POPs* to support the implementation of the SC;
7. *Development of action plans (Activities and Tasks) for implementation of the developed NIP.*

The Initial NIP would be examined for areas for continued validity and progress made to date. This would be used to provide an updated NIP as per the current situation in Guyana concerning chemical management, with particular emphasis on POPs and the requirements of the Stockholm Convention.

1.4 NIP Structure

The NIP comprises the following three chapters, considering the NIP guidance document (UNEP 2017)[5]:

(i) Chapter 1 gives an introduction to the SC and its goals and provisions. It describes the structure of the NIP. Overall, Chapter 1 provides an overview of the aims and goals of the NIP, as well as the processes utilised for the development of the NIP.

(ii) Chapter 2 outlines Guyana's demographic, political, and economic status. It elaborates on the environmental situation and the current status of the institutional, policy, and regulatory framework. This chapter also presents the results of the assessment of POPs, focusing on the import and export, production, current and future use, registration, release, storage, disposal, and the potential impact. The POPs mentioned in this chapter are: POPs pesticides including DDT, PCBs, newly added POPs, unintentional production POPs. The existing monitoring programmes, the information exchange, and awareness are also described in this chapter. Overall, it gives basic information on the country's status regarding the management of POPs;

(iii) Chapter 3 presents an overview of recommended activities, strategies, and action plans. In addition, there is a budget related to the activities of the action plan; and

(iv) The appendices contain information on stakeholders and other information relevant to this NIP.

1.5 Further Considerations

The process of addressing POPs management in Guyana undertook a socio economic and gender policy assessment to better provide for informed decisions when deliberating on the management of emissions and contamination.

1.5.1 Socio-Economic Assessment

A growing body of data on the links between pollution and health demonstrate the negative impacts, including contaminants from indoor exposure (e.g. heating/cooking, chemicals used indoor and chemicals in consumer products), outdoor air pollution, pesticide use, contaminants in food and drinking water, and contaminated sites with highest impact on health in developing countries with an estimated 12 to 14 million

[5] UNEP (2017) Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants. Secretariat of the Basel, Rotterdam and Stockholm Conventions, United Nations Environment Programme, Geneva.

deaths per year[6,7,8]. Open waste burning[9] and open biomass burning[9,10] contribute to the overall air pollution, including particulate matter (PM 10; PM 2.5), dioxins/uPOPs, polycyclic aromatic hydrocarbons (PAHs), and heavy metals with plastic as a relevant contribution to open burning in urban areas as a fuel source.[9] POPs, POPs-like chemicals,[11] and other toxic chemicals (including e.g., heavy metals) result in health effects like cancers, birth defects, and reproductive and other endocrine effects. Endocrine-disrupting chemicals, including POPs and their effects, are also the main contributors to health-associated costs in industrial countries[12,13,14]. A recent assessment suggests that environmental chemical exposures contribute costs that may exceed 10% of the global domestic product.[15] Therefore, a more critical assessment of the burden of pollution from chemicals, industrial, and other releases is needed.

References to socio-economic assessment can be found throughout the text of the Stockholm Convention.[16] These references indicate the importance of a socio-economic assessment when implementing the obligations under the Convention and when developing the updated NIP. GEF 2020 strategy suggests aligning global environmental objectives with the priorities of national and global socioeconomic development.

Annex F of the SC is entitled "Information on Socio-Economic Considerations" and provides an indicative list of items to be taken into consideration by Parties when undertaking an evaluation regarding possible control measures for chemicals being considered for inclusion into the Convention. The preamble to Annex F states that: "*An evaluation should be undertaken regarding possible control measures for chemicals*

[6] Prüss-Ustün A, Wolf A, Corvalán C, Bos R, Neira M (2016) Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks. WHO report. ISBN 978 92 4 156519 6

[7]The Lancet Commission on pollution and health. http://www.thelancet.com/commissions/pollution-and-health

[8] Other studies see these diseases as the major reason for death (Institute for Health Metrix & Evaluation; http://www.healthdata.org/gbd/publications)

[9] Kumar S, Aggarwal SG, Gupta PK, Kawamura K (2015) Investigation of the tracers for plastic-enriched waste burning aerosols. Atmospheric Environment 108, 49-58.

[10] Yadav IC, Linthoingambi Devi N, Li J, Syed JH, Zhang G, Watanabe H. (2017) Biomass burning in Indo-China peninsula and its impacts on regional air quality and global climate change-a review Environ Pollut. 227, 414-427.

[11] Scheringer, M., Strempel, S., Hukari, S., Ng, C.A., Blepp, M., Hungerbühler, K. (2012) How many Persistent Organic Pollutants should we expect? Atmospheric Pollution Research, 3, 383–391.

[12] UNEP & WHO (2013) State of the Science of Endocrine Disrupting Chemicals – 2012.

[13] Attina TM, Hauser R, et al. (2016) Exposure to endocrine-disrupting chemicals in the USA: a population-based disease burden and cost analysis. Lancet Diabetes Endocrinol. 4(12):996-1003.

[14] Trasande L, Zoeller T et al. (2015) Estimating Burden and Disease Costs of Exposure to Endocrine-Disrupting Chemicals in the European Union. J Clin Endocrinol Metab. 100(4), 1245–1255.

[15] Grandjean P., Bellanger M (2017) Calculation of the disease burden associated with environmental chemical exposures: application of toxicological information in health economic estimation. Environmental Health. 16:123

[16] UNEP (2007) Draft guidance on socio-economic assessment for national implementation plan development and implementation under the Stockholm Convention. UNEP/POPS/COP.3/INF/8.

under consideration for inclusion in this Convention, encompassing the full range of options, including management and elimination. For this purpose, relevant information should be provided relating to socio-economic considerations associated with possible control measures to enable a decision to be taken by the Conference of the Parties".

The Conference of the Parties (COP), in its decision SC-1/12 requested that the Secretariat of SC, in collaboration with other relevant organizations and subject to resource availability, to develop among others, additional guidance on social and economic assessment, and in doing so to take into consideration the particular circumstances of developing countries and countries with economies in transition. In response to that request, the Secretariat developed the draft guidance on socio-economic assessment for national implementation plan development and implementation under the Convention. According to the guidance, the Socio-Economic Assessment (SEA) is a systematic appraisal of the potential social impacts of economic or other activities such as the management of POPs in all sectors of society (including local communities and groups, civil society, private sector, and government). It is a means of analysing and managing the intended and unintended social impacts, both positive and negative, of planned interventions (policies, programs, plans, and projects) and any social change processes invoked by those interventions. Social impacts are the changes to individuals and communities that come about due to actions that alter the day-to-day way in which people live, work, play, relate to one another, organize to meet their needs, and generally cope as members of society.

In the context of managing POPs, social and economic impacts might include:

- contamination of air, water and soil and threat to food safety and drinking water safety;
- degradation of ecosystem services
- vulnerability arising from exposure to POPs;
- deterioration or improvement in health;
- loss or improvement in livelihoods;
- changes in cost of living;
- cost of contaminated site management and remediation;
- changes in employment, income, and workplace protection;
- changes in levels of equity of wealth distribution;
- opportunities for enterprise development (including Small and Medium Enterprises);
- changes in demand for public services, such as health and education.

The SEA assisted and will assist in taking actions that are appropriate and effective. It provides a basis for minimising the negative impact on the population and improving equitable outcomes for the most vulnerable groups. However, the SEA lacks information on external costs. The unknown external costs can bias decisions and need to be compensated by taking precautionary approaches.

The human resource capacity for a SEA in the country is rather limited and needs to be improved throughout the implementation of the updated NIP.

SEA can help at any phase of the development of the national implementation plan and during its implementation. If priorities have already been set in Phase I-III of the national implementation plan, then a socio-economic assessment can be used in order to gain insight into the impacts of mitigation measures already decided. In this case, a brief investigation may be conducted for Phase IV. The results will assist in developing NIP communication strategies and rule out the worst excesses of inequitable impact.

For Guyana, the following socio-economic considerations and cost-benefit analysis are highlighted as relevant. These key areas serve as a framework for implementation, avoiding the need for conventional socio-economic calculations that often require sophisticated single-stakeholder assessments and do not yield practical outcomes for developing countries lacking such information. At the same time, these areas are partly related to national priorities for Sustainable Development[17]:

a) Food and water safety (including POPs exposure of the population);
b) Exposure of vulnerable and highly exposed groups;
c) Management of chemicals and waste;
d) Cost of destruction and end-of-life management and treatment of POPs and other hazardous waste;
e) Cost of contaminated soil and site remediation.

The socio-economic considerations mentioned above are highlighted as most relevant. Improper chemical and waste management play a relevant role.

1.5.2 Gender policy in NIP development and implementation

Efforts to ensure sound management of chemicals, including POPs have important gender dimensions, because in daily life, men, women, and children are exposed to different kinds of chemicals in varying concentrations. Biological factors, notably size and physiological differences between women and men and between adults and children, influence susceptibility to health damage from exposure to toxic chemicals. Social factors, primarily gender-determined occupational roles, also have an impact on the level and frequency of exposure to toxic chemicals, the kinds of chemicals encountered, and the resulting impacts on human health.[18.]

These gender dimensions must be reflected at both the site and policy levels of interventions for sound chemical management. The gender analysis is used to identify, understand, and describe gender differences and the impact of gender inequalities in a sector or program at the country level. Gender analysis is a required element of strategic planning and is the basic foundation on which gender integration is built. Gender analysis examines the different but interdependent roles of men and women and the relations between the sexes. It also involves an examination of the rights and opportunities of men and women, power relations, and access to and control over resources. Gender analysis identifies disparities, investigates why such disparities

[17]Ministry of Natural Resources (MNR)

[18] United Nation Development Programme, Gender Mainstreaming. A Key Driver of Development in Environment and Energy, Energy and Environment Practice. Gender Mainstreaming Guidance Series;

exist, determines whether they are detrimental, and, if so, looks at how they can be remedied[19].

[19] United States Agency for International Development (2011), Tips for Conducting a Gender Analysis at the Activity and Project Level. Additional Help for ADS Chapter 201;

COUNTRY BASELINE

This chapter outlines Guyana's demographic, political, and economic status. It elaborates on the environmental situation and the current status of the institutional, policy, and regulatory framework relevant to the NIP. This chapter also presents the results of the assessment of POPs, focusing on the import and export, production, current and future use, registration, release, storage, disposal, and the potential impact. The POPs mentioned in this chapter are: POPs pesticides, PCBs, DDT, new POPs, and unintentionally produced POPs. The existing monitoring programmes, the information exchange, and awareness are also described in this chapter. Overall, it gives basic information on the country's status regarding the institutional and other capacity to address the management of POPs in Guyana.

1.6 PROFILE OF GUYANA

This subchapter provides a brief profile of Guyana, where summarised information is provided on geography and population, membership in regional and subregional organizations, the country's political and economic profile, profiles of potentially important economic sectors in the context of the POPs issue, and overall environmental conditions and priorities in the country.

1.6.1 Geography and Population

The Co-operative Republic of Guyana, commonly referred to as Guyana, is located on the north-eastern coast of the Continent of South America and lies north of the equator between latitudes 1^0 10' and 8^0 38' and 57^0 and 61^0 West Longitude. The name is derived from Guiana and comes from an indigenous Amerindian language and means "land of many waters".

Figure 1: Location of Guyana in context for South America.

Guyana is the eighty-fifth (85^{th}) largest country in the world and the third smallest in South America. The total area is 214,969 square kilometres, comprising 18,120 square kilometres of water.

It is bordered on the north by the Atlantic Ocean with 430 kilometres of coastline. Suriname to the east, Brazil to the south and southwest, and Venezuela to the west. Guyana is the only English-speaking country in South America, is considered part of the Anglophone-Caribbean sphere, and a founding member of the Caribbean Community (CARICOM) as well as a founding member of the Union of South American States (UNASUR). Guyana has strong cultural, political, and historical ties within CARICOM[20].

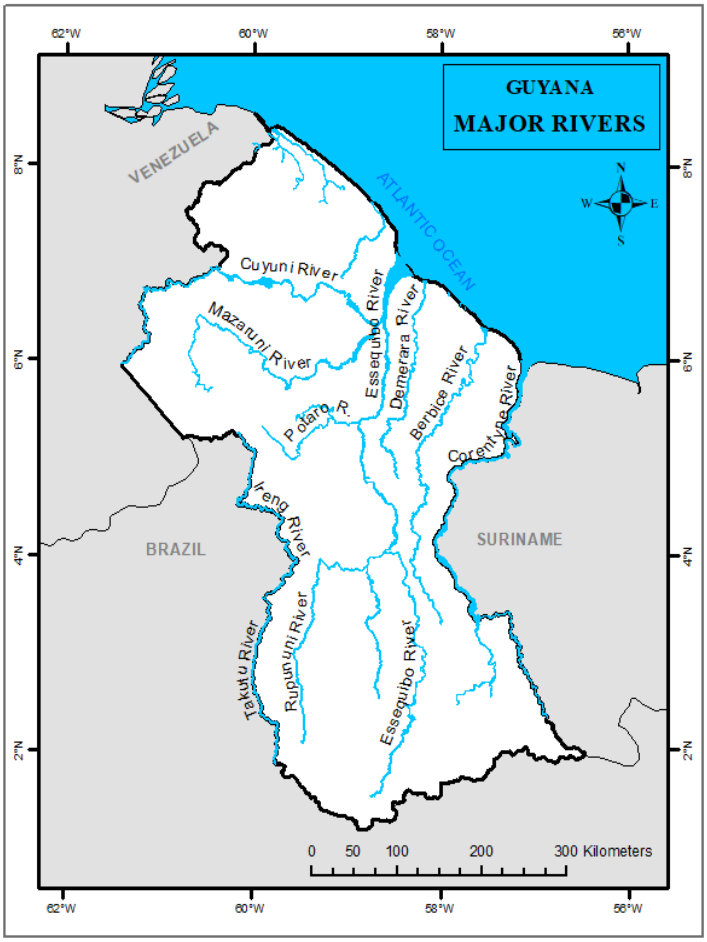

Figure 2: Map of Guyana showing the major rivers

Guyana is a water-rich country with most of the main rivers, Essequibo, Berbice, and Demerara, flowing northwards, draining into the Atlantic Ocean. However, the Kaieteur plateau, located in the western part of the country, drains eastward, flowing into the largest river of the country, the Essequibo. The rivers in the eastern part of the country – Demerara, Berbice, Mahaica, Mahaicony, and Abary - cut across the coastal zone, requiring bridges to provide continuity to east-west travel and provide limited access to inland locations.

There are a number of waterfalls present throughout the hinterland regions, which restrict river transport to the lower reaches of the rivers. Some of the waterfalls are spectacular, like the Kaieteur Falls on the Potaro River with a 226 metres single drop, along with the Orinduik Falls in Region 8 provide potential as a tourist attraction. These and other waterfalls are located inland, away from the populated areas, but provide enormous hydroelectric potential for the country.

Swamps and areas experiencing or areas that can potentially be flooded exist throughout the country, with some exceptions in the mountainous regions in the south of the country. The coastland is below sea level and is prone to flooding during the rainy season.

Guyana has five (5) established Protected Areas with a total area of 6900 square miles or 17,870 square kilometers:

[20] Guyana Second Voluntary National Review of the Sustainable Development Goals. 2023. Ministry of Finance. Government of the Co-operative Republic of Guyana.

(i) The Shell Beach Protected Area is located on the narrow coastal strip on Guyana's North shore between the Pomeroon and Waini Rivers. It was identified as a site for protection and national importance because of its unique and rich biological diversity. Four of the world's eight marine turtle species: Leatherback, Green, Olive Ridley, and Hawksbill turtles nest in the Shell Beach area.

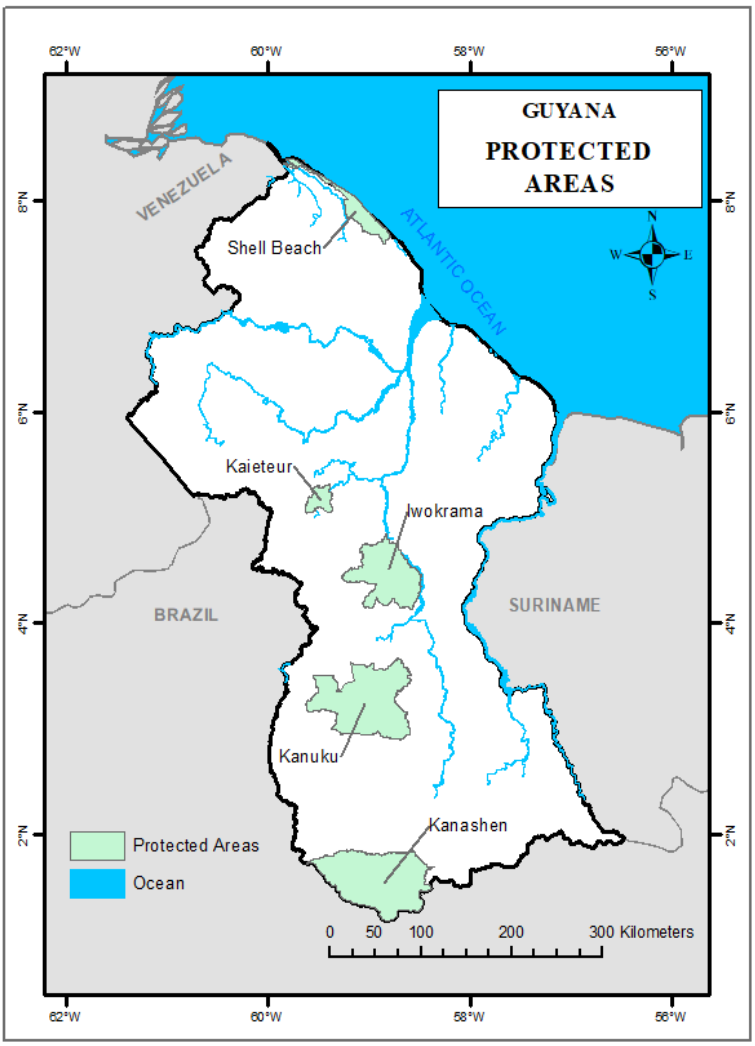

Figure 3: Map of Guyana showing protected areas.

(ii) The Kaieteur National Park is located in Region VIII, and it was established as a Protected area in 1929. The primary attraction is Kaieteur Falls, with a sheer drop of over 700 feet. The park has outstanding scientific and recreational values. There is high species diversity with many threatened and endangered species of birds, primates, and felines. The park also protects important watersheds of Upper Potaro and Kuribrong Rivers.

(iii) The Iwokrama International Centre for Rain Forest Conservation and Development is located in the center of Guyana, approximately half of the area is used as a wilderness preserve, with the remainder being used for the sustainable utilization of resources. The Centre promotes the areas of sustainable management of tropical forests, conservation and utilization of biodiversity, sustainable human development, forestry research, and information and communication.

(iv) The Kanuku Mountains Protected Area is located in the southwestern region of Guyana. This area was recommended for protection and conservation because approximately 60% of all bird species in Guyana could be found in the Kanuku. The Rewa River also supports a variety of large animals such as the Giant Otter, Giant River Turtle, Black Caiman, and the Arapaima (the largest neotropical freshwater fish).

(v) The Kanashen Community Owned Conservation Area is located in the far South of Guyana. It is the first and largest community-owned protected area. Kanashen is home to the Wai Wai people. The area is known for its virtually

untouched forests, is part of the High Biodiversity Wilderness Area of Amazonia and a key section of the Guianas Shield corridor. The origin of the Essequibo River can also be found in the Kanashen Area.

1.6.2 Geographical Zones

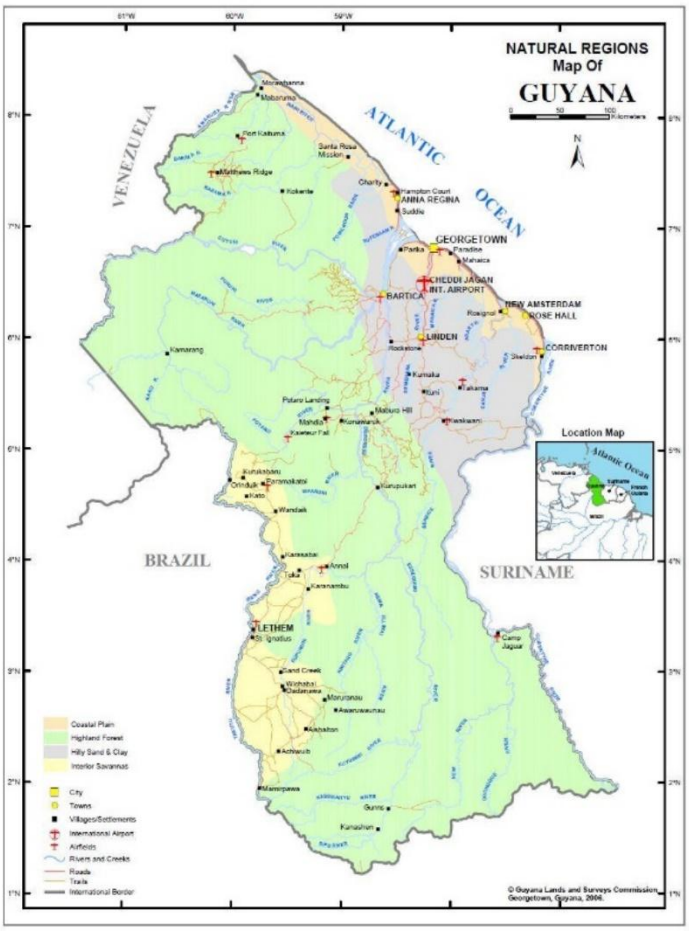

Figure 4: Map of Guyana showing the Natural Regions.

The FAO in 1966 categorized five physiographic regions using the soil composition, but this is not commonly used for the geographical classification. There are four major geographical or natural regions demarcated within the land mass of Guyana. The four major zones are: the low coastal plain, the hilly sand and clay regions, the interior savannahs, and the highland region.

1.6.2.1 Low Coastal Plain

The low coastal plain is home to more than 90 percent of Guyana's population and 80% of the agricultural land and occupies about 6% of the land mass. The plain extends from the Corentyne River in the east to Point Playa in the northwest, with a width ranging from 5 – 6 kilometres of land mass, with the seaboard border with the Atlantic Ocean ranging from 16 – 64 kilometres and a length of approximately 430 kilometres.

Guyana has no well-defined shoreline or sandy beaches. Approaching the ocean, the land gradually loses elevation until it merges with many areas of marsh and swamp. Seaward from the vegetation line is a region of mud flats, shallow brown water, and sandbars. Off New Amsterdam, Berbice, these mud flats extend almost twenty-five kilometres along the shoreline. The sandbars and shallow water are major impediments to shipping and the size of incoming vessels.

The coastal plain is part of the flat, low-lying coastal lands that extend along the coast of South America from the Amazon to the Orinoco. The soil comprised largely of alluvial mud swept out to sea by the Amazon River, carried north by ocean currents, and deposited on the Guyanese shores. This deposition led to the formation of a great

variety of soils developed from a variety of parent materials such as marine and fluvio-marine deposits with back-swamp organic soils. In general, the soils closer to the shore and along rivers are more fertile than the soils behind, which can have very low fertility and toxicity in some instances. Historically, due to flooding of the coastal plain during high tides, efforts to dam and drain this area have been ongoing since the 1700s.

A line of swamps forms a barrier between the white sandy hills of the interior and the coastal plain. These swamps, formed when water was prevented from flowing onto coastal croplands by a series of dams, serve as reservoirs from which water could be accessed during periods of drought.

1.6.2.2 Hilly, Sand, and Clay Region

The white sand belt lies south of the coastal zone and takes up approximately 25 % of the country's area. This area is 150 to 250 kilometers wide and consists of low sandy hills interspersed with rocky outcroppings. The white sands support a dense hardwood forest. These sands cannot support crops, and if the trees are removed, erosion is rapid and severe. Most of Guyana's reserves of bauxite, gold, and diamonds are found in this region.

1.6.2.3 Interior Savannahs

The interior savannahs account for almost 6% of the country's area and are vegetated mostly by grasses, scrub, and low trees. The human population is largely of the indigenous peoples living mostly in remote villages, with Lethem being the only town. Much of the interior savannahs, as the name suggests, consists of grassland. The largest expanse of grassland, the Rupununi Savannah, covers about 15,000 square kilometres in southern Guyana. This savannah also extends far into Venezuela and Brazil. The Rupununi Savannah is split into northern and southern regions by the Kanuku Mountains. The sparse grasses of the savannah in general support only grazing. Amerindian groups engage in agricultural cultivation in a few areas along the Rupununi River and at the foothills of the Kanuku Mountains.

1.6.2.4 Interior Highlands

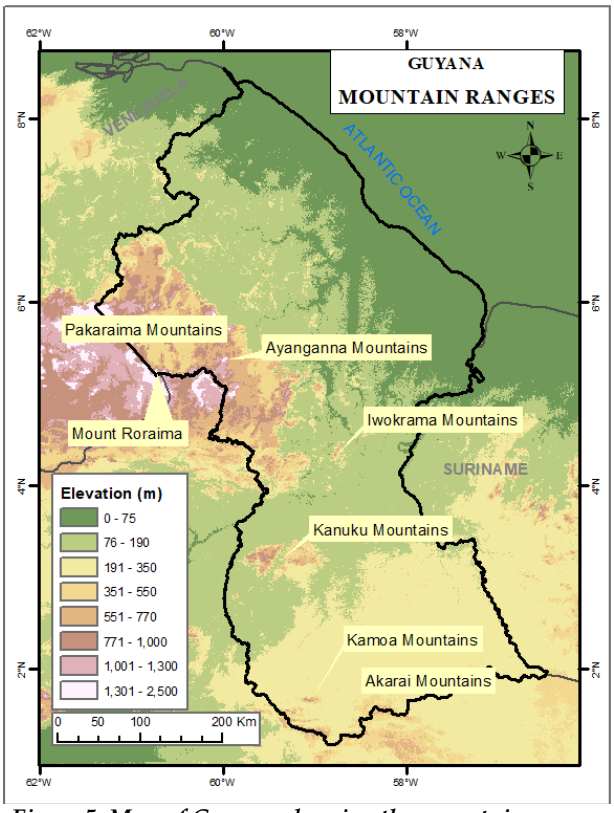

Figure 5: Map of Guyana showing the mountain ranges.

The largest of Guyana's four geographical regions is the interior highlands, a series of plateaus, flat-topped mountains, and savannahs that extend from the white sand belt to the country's southern borders and cover approximately 63 % of the country. The Pakaraima Mountains dominate the western part of the interior highlands. In this region are found some of the oldest sedimentary rocks in the Western Hemisphere. Mount Roraima, on the Venezuelan border, is part of the Pakaraima range and, at 2,762 metres, is Guyana's tallest peak. Farther south lies the Kaieteur Plateau, a broad, rocky area about 600 metres in elevation; the 1,000-metre high Kanuku Mountains; and the low Acarai Mountains situated on the southern border with Brazil.

1.6.3 Soil Types and Series

Information on the soil resources of Guyana is drawn from the FAO mapping conducted in the 1960s, which produced a soil map for the whole of Guyana. The map identified 18 soil types present in Guyana. The original FAO soil map is shown in **Figure 6**.

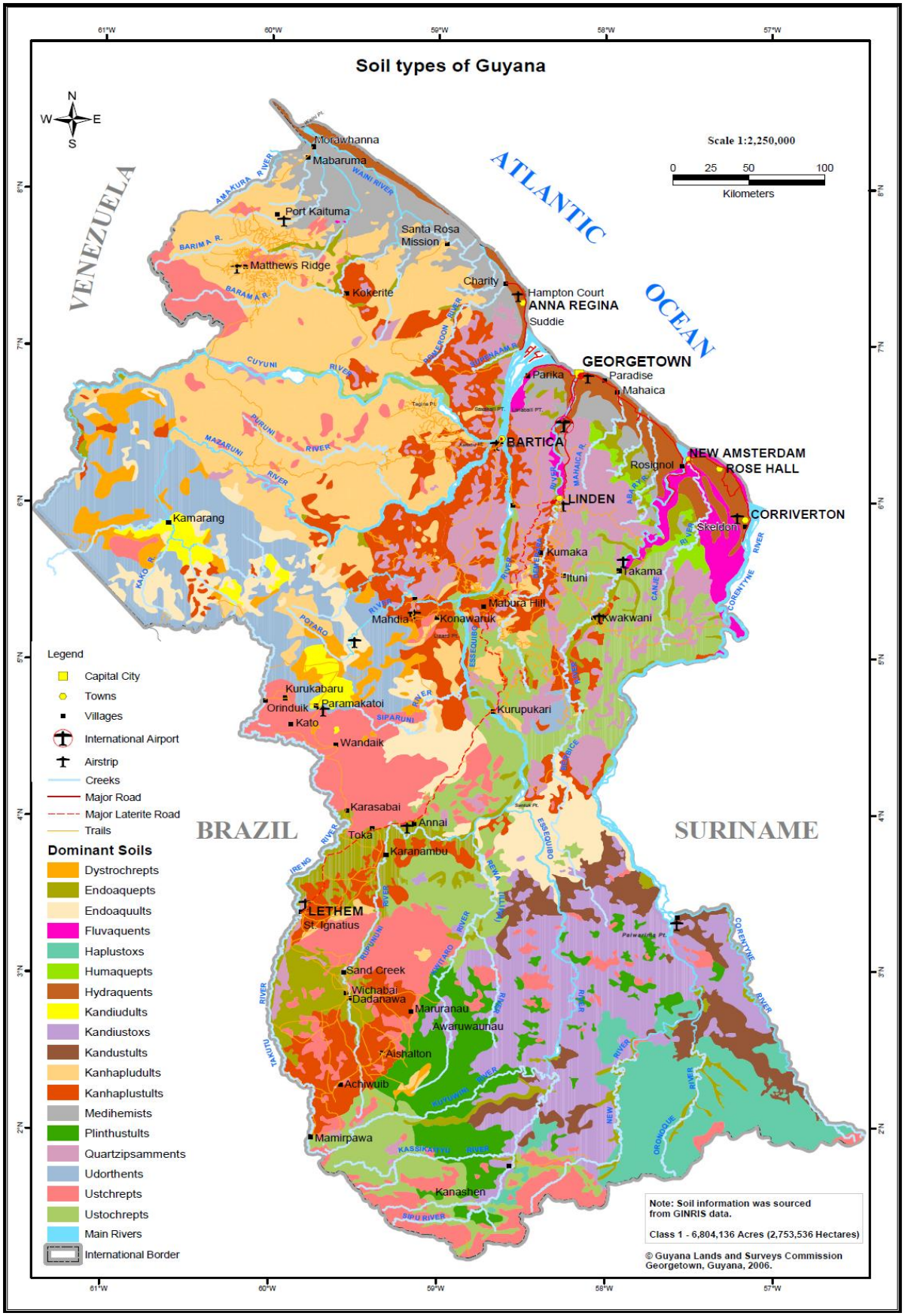

Figure 6: Soil Types of Guyana

1.6.4 ADMINISTRATIVE REGIONS

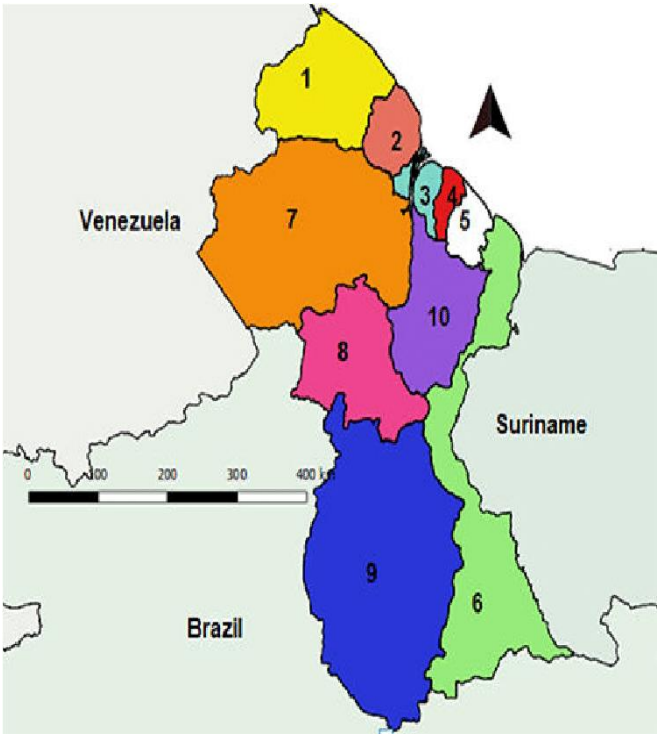

Figure 7: Administrative Regions in Guyana

In addition to the four natural regions, Guyana has ten (10) Administrative Regions in keeping with legislation enshrined in the Constitution of Guyana. Some regions are divided into sub-regions, while others are divided into Neighbourhood Democratic Councils to facilitate local governance.

The primary purpose of this division is to provide Guyanese with the opportunity to work for and share in the economic well-being of the respective Administrative Regions throughout the country. Guyanese are empowered to be involved in every stage of development, such as decision-making, planning, and implementation. This is meant to create confident, self-reliant, and productive communities managing their affairs. These independent administrative bodies perform functions in accordance with the associated policy decisions of the central government. The ten Administrative Regions, along with their maps and flags, are as follows:

1.6.4.1 BARIMA-WAINI – REGION I

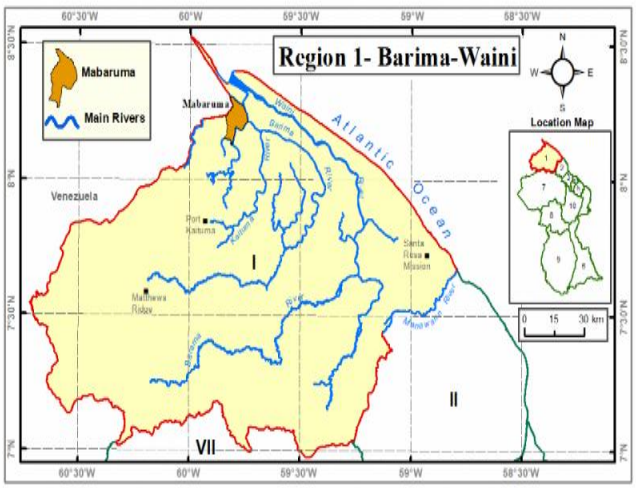

Figure 8: Map of Region 1** - Barima - **Waini.

The **Barima - Waini** region got its name from its two main rivers. The region is predominantly forested highland, bordered at the north by a narrow strip of low coastal plain and occupies an area of 20,339 km^2.

Approximately 18,590, who live mainly in Amerindian settlements, inhabit Region One.

Figure 9: Regional Flag of Barima - Waini

Logging is this Region's main economic activity. The largest logging operation is run by the Barama Company, which transports timber to Demerara to be processed into plywood. Many smaller timber operations exist in this Region, since the tropical rainforest yields vast amounts of many species of hardwood and other useful types of lumber.

Mining for gold and diamonds is also done in some of the forested areas, mostly with the use of dredges.

The coast of Region One is known for its beaches, particularly Shell Beach, the only beach in the world to host four species of sea turtles, including the “Giant Leatherback” (the world's largest turtle), during their nesting period, i.e. March to July each year. Among the sea turtles that visit Shell Beach is the “Olive Ridgley,” which is almost extinct. Shell Beach is home to the Turtle Conservation Project and is a protected site managed by the Protected Areas Commission. The Scarlet Ibis, the national bird of Trinidad and Tobago, is also a common sight on this beach.

1.6.4.2 POMEROON-SUPENAAM – REGION II

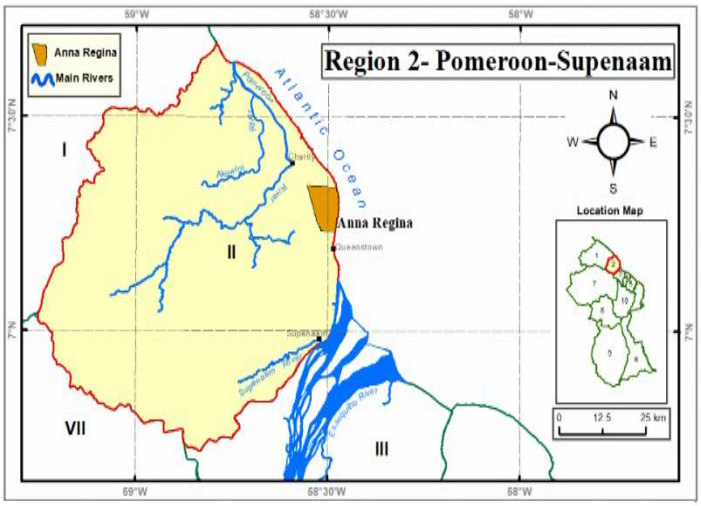

Figure 10: Map of Region 2 Pomeroon - Supenaam

The **Pomeroon - Supenaam** Region comprises forested highland and low coastal plain, in addition to a small portion of the hilly sand and clay region, and occupies an overall area of 6,195 km^2.

Approximately 42,769 people of this region live in established villages concentrated along the coast and in some Amerindian settlements. The town of Anna Regina, on the west bank of the Essequibo River, grew out of a government land development scheme and is made up of former plantations, including Henrietta, Lima, and La Belle Alliance.

Figure 11: Regional flag of Pomeroon - Supenaam

The Tapakuma Project in this Region links the Tapakuma, Reliance and Capoey lakes into one large conservancy, which supplies irrigation water for rice cultivation, this being the dominant agricultural/economic activity in Region Two.

Besides rice farming, some people cultivate coconuts and rear beef and dairy cattle. Timber production is conducted on a very small scale in this region.

1.6.4.3 ESSEQUIBO ISLANDS-WEST DEMERARA – REGION III

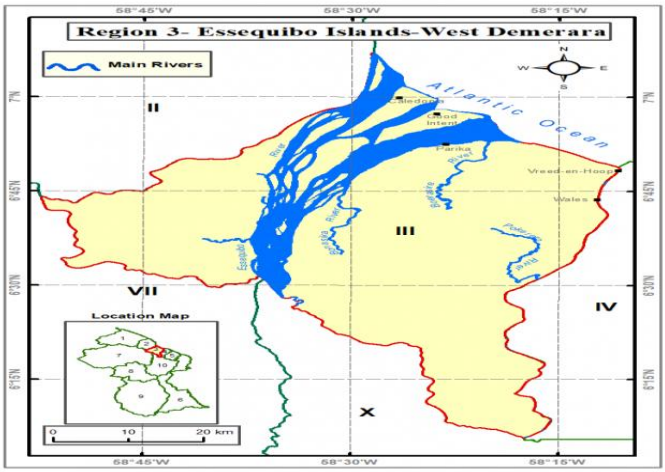

Figure 12: Map of Region 3 Essequibo Islands - West Demerara

The Essequibo Islands-West Demerara Region is made up of the islands in the Essequibo River, such as Leguan, Hogg Island, and Wakenaam, and the Western portion of mainland Demerara. It is made up of low coastland, hilly sand and clay, and a small portion of forested highland regions and covers an area of 3,755 km^2.

This Region has a population of approximately 91,328 people who live in established villages along the coastland. There is large-scale rice and sugar cultivation in this Region, with coconut cultivation being done to a minimal extent.

Figure 13: Flag of Essequibo Islands - West Demerara

The Boerasirie Extension Project converted the Boerasire Conservancy and the Canals Polder Conservancy into a single reservoir, thus resulting in thousands of hectares of land suitable for farming being reclaimed. The water from the conservancy is used during the dry seasons for irrigation purposes. Beef and dairy farming are also being done on a small-scale commercial basis.

1.6.4.4 DEMERARA-MAHAICA – REGION IV

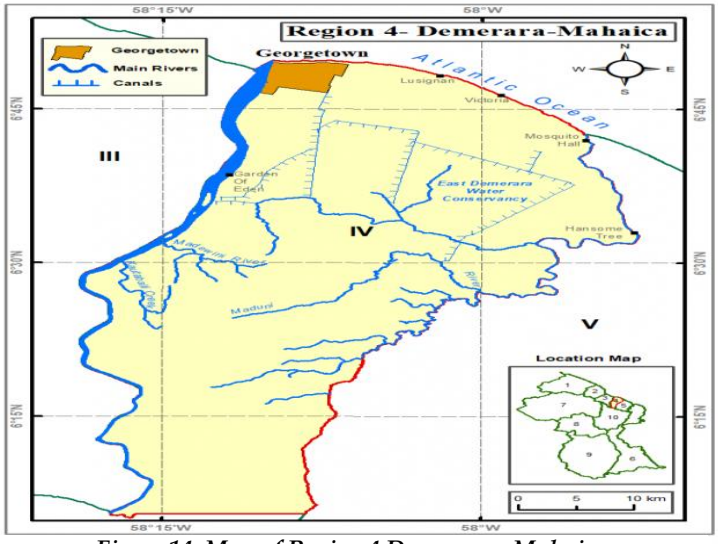

Figure 14: Map of Region 4 Demerara - Mahaica

The Demerara-Mahaica Region extends east of the Demerara River to the Western bank of the Mahaica River, and is predominantly a low coastal plain, with a small portion of the hilly sand and clay region further inland, and occupies an area of 2,232 km^2.

The population is concentrated along the coastland, particularly in Georgetown, Guyana's capital city, which has a population of approximately 56,095. The population of Region Four is approximately 297,162 persons concentrated in this Region, especially in and around Georgetown. Guyana's administrative and commercial activities

Figure 15: Regional Flag of Demerara - Mahaica

There are many sugar estates, such as Diamond, Enmore, and La Bonne Intention (LBI), owned and operated by the Guyana Sugar Corporation (GUYSUCO). Some residents of this region work on coconut plantations, while many engage in cash crop farming. Cattle are reared in small numbers for beef and dairy purposes.

1.6.4.5 MAHAICA-BERBICE – REGION V

The **Mahaica-Berbice** Region extends east of the Mahaica River to the west bank of the Berbice River. A large part of the region is a low coastal plain. Further inland lie the Intermediate Savannahs and hilly, sand and clay region, which covers an area of 4,190 km^2.

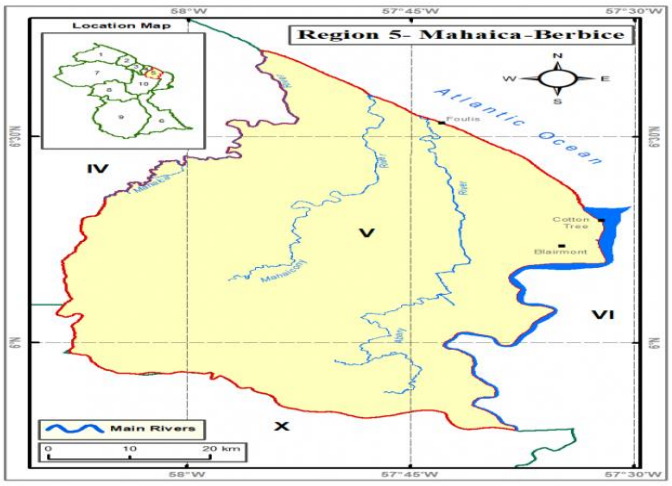

Figure 16: Map of Region 5 Mahaica - Berbice

Figure 17: Regional flag of Mahaica - Berbice

The population of Region Five is approximately 49,498.

Rice farming is the main economic activity of this region, followed by sugar cultivation, coconut farming, and beef and dairy cattle ranching. The Region has a water conservancy project aimed at improving the drainage and irrigation of the area. Massive dams were erected across the headwaters of the Mahaica, Mahaicony, and Abary Rivers to prevent flooding of the farmlands being drained by them during the rainy seasons. During the dry seasons, the dams are opened to allow the lands to be properly irrigated.

Amerindians living in inland settlements engage in the production of handicraft items, e.g., nibbi furniture, tibisiri baskets, which they sell to earn their living.

1.6.4.6 EAST BERBICE-CORENTYNE – REGION VI

Figure 19: Regional flag of East Berbice - Corentyne

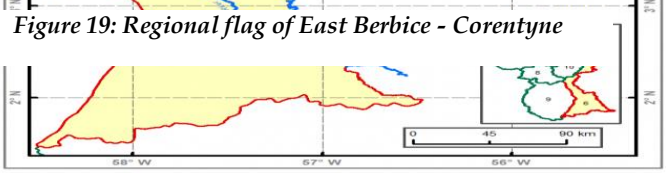

Figure 18: Map of Region 6 East Berbice - Corentyne

The **East Berbice-Corentyne** Region extends from the East Bank of the Berbice River to the West Bank of the Corentyne River. It is the only one to include parts of all four natural geographic regions i.e., coastal plain, intermediate savannah, hilly and sandy clay area, and forested highland, and covers an area of 36,234 km^2. It is also the only Region with three towns i.e., New Amsterdam, Rose Hall, and Corriverton. The population of the Region is approximately 142,839.

This Region, an important rice-producing, cattle-rearing, and sugarcane-producing area, is very difficult to drain and irrigate. Because of this, the Torani Canal was dug to join the Berbice River and the Canje Creek, thereby providing an adequate water supply for irrigating the agricultural lands.

The area of Black Bush Polder, which was formerly a large swamp, was established through a land development scheme. The Government of Guyana gave people land for housing and for cultivating rice and cash crops.

Herds of cattle are reared for beef and dairy in the Intermediate Savannahs. Many of the other resources of this Region are not fully exploited. Logging is only conducted on a small scale, although the seasonal and montane forests of this Region can yield a variety of timber.

1.6.4.7 CUYUNI-MAZARUNI – REGION VII

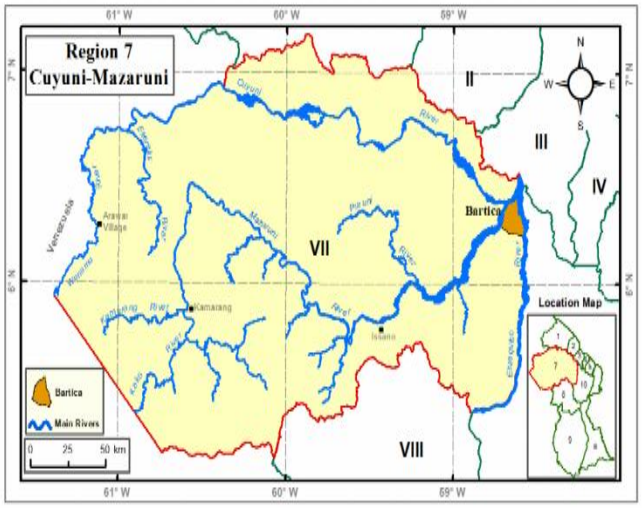

Figure 20: Map of Region 7 Cuyuni - Mazaruni

The **Cuyuni-Mazaruni** Region contains two of the four natural regions, i.e., forested highlands and a small portion of the hilly sand and clay region, and occupies an area of 47,213 km^2.

This Region brings to mind the majestic Pakaraima mountain range. Mount Roraima (2,810 metres high, standing at the point where Guyana, Brazil, and Venezuela meet) and Mount Ayanganna are in this mountain range.

Most of the (approximately) 15,342 people living in this Region are involved in mining for gold and diamonds.

There are eight Amerindian settlements in the Pakaraimas area. The inhabitants of these settlements grow crops which they use internally as well as to supply the gold and diamond mining operations in the Region.

1.6.4.8 POTARO-SIPARUNI – REGION VIII

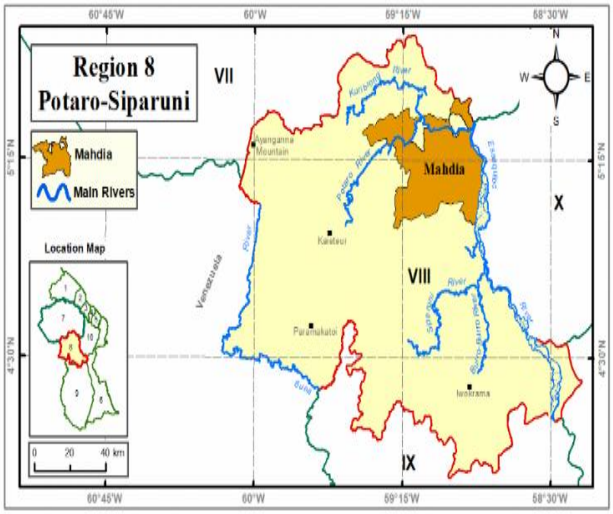

Figure 22: Map of Region 8 Potaro - Siparuni

The **Potaro-Siparuni** Region gets its name from the Potaro and Siparuni Rivers, which are tributaries of the Essequibo River.

Predominantly forested highland with a small portion of hilly sand and clay, this Region is home to the famous Kaieteur and Orinduik Falls, and covers an area of 20,051 km^2. The Kaieteur is one of the highest single-drop waterfalls in the world, and it is one of the premier tourist attractions in Guyana.

Figure 23: Regional flag of Potaro - Siparuni

The people of this region, merely 5,737 in approximation, are involved in gold and diamond mining and forestry. Mazda Mining Company Ltd has the largest mining operation in this Region.

The Iwokrama Rainforest Project is partly located in this Region. This Project studies how the rainforest can be utilised in the country's development (e.g., timber extraction) without the forests being depleted or destroyed.

1.6.4.9 UPPER TAKUTU-UPPER ESSEQUIBO – REGION IX

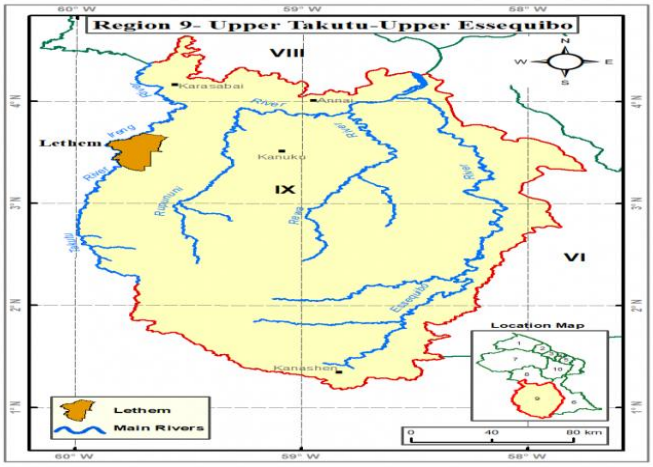

Figure 24: Map of Region 9 Upper Takatu - Upper Essequibo

The Kanuku and Kamoa highlands and the vast Rupununi savannahs make up the **Upper Takutu-Upper Essequibo** Region. The forested Kanuku Mountains divide this Region into two. The north savannahs are about 2,000 square miles in area, and the south savannahs are 2,500 square miles. The overall area of this region is 57,750 km^2.

Figure 25: Regional flag of Upper Takatu - Upper Essequibo

The population of approximately 15,087 people lives in scattered Amerindian villages and land settlement schemes.

The Rupununi, because of the grassy savannahs, is considered to be 'cattle country'. Most of the cattle are farmed to produce beef, while a small percentage is reared for milk. There exist large ranches at Aishalton, Annai, Dadanawa, and Karanambo. Much of the beef produced here is sold in neighbouring Brazil, because transportation costs to the other Regions of Guyana, especially Region Four, are very expensive.

The people of this Region also mine semiprecious stones among the foothills of the Kamoa Mountains and among the Marundi Mountains. A wide variety of handicrafts is produced in many of the seventeen Amerindian villages, and sold mainly to Brazil.

1.6.4.10 UPPER DEMERARA-UPPER BERBICE – REGION X

The inland region of Upper Demerara-Upper Berbice contains the largest portion of the hilly sand and clay area, and covers a total area of 17,040 km^2. Guyana's principal bauxite deposits are found in the White Sands area.

Approximately 39,106 people who inhabit this Region work mainly with bauxite companies, Linmine (at the Linden and Ituni locations), and Bermine (at the Everton and Kwakwani locations). The extracted bauxite is exported to be processed into aluminium.

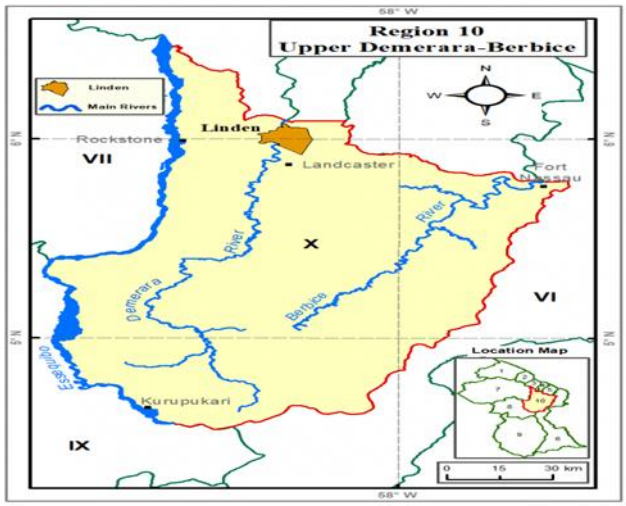

Figure 26: Map of Region 10 - Upper Demerara - Berbice

A small portion of the Iwokrama Rainforest Project is located in this Region. Cattle-rearing and forestry are also done on very small scales.

1.6.5 Language

The official language in Guyana is English, which is spoken mostly with a creole flavour. It is the language of education, commerce, and government. Hindus and Muslims ritually use Hindi, Urdu, and Arabic. The majority of Amerindians in the hinterland still adhere to one or more of the nine recognised tribal dialects namely, Akawaio, Arawak, Arecuna, Carib, Macusi, Patamona, Wai Wai, Warrau and Wapishana.

Figure 28: Regional flag of Upper Demerara - Upper Berbice

1.6.6 Population

REGION	NUMBER	PERCENT
Region 1	27,643	3.70
Region 2	46,810	6.27
Region 3	107,785	14.43
Region 4	311,563	41.71
Region 5	49,820	6.67
Region 6	109,652	14.68
Region 7	18,375	2.46
Region 8	11,077	1.48
Region 9	24,238	3.24
Region 10	39,992	5.35
TOTAL	746,955	100.0

Table 4: Population Statistics for Guyana by Regions (Population Census 2012)

The National 2012 Population and Housing Census (**Table 4**) shows that the population of Guyana is 746,955 comprising a total of 371,805 males and 375,150 females.

1.6.6.1 Population Distribution

The population is concentrated in Regions 4 and 6, with 41.71 and 14.68 percent, respectively, and accounting for 56.39 percent of the total population. Region 3 is the third most populous, with almost 14.43%. Nationally, females (375,150) outnumber males (371,805) by a small percentage (0.44). The sex distribution of

the population of the Regions is similar to the national distribution, with the exception of the hinterland regions -Regions 1, 7, 8, and 9 - where the proportion of males to females is slightly higher than the other Regions. The median range of the age of the population is 24.64 – 25.56 years.

1.6.6.2 Population Composition

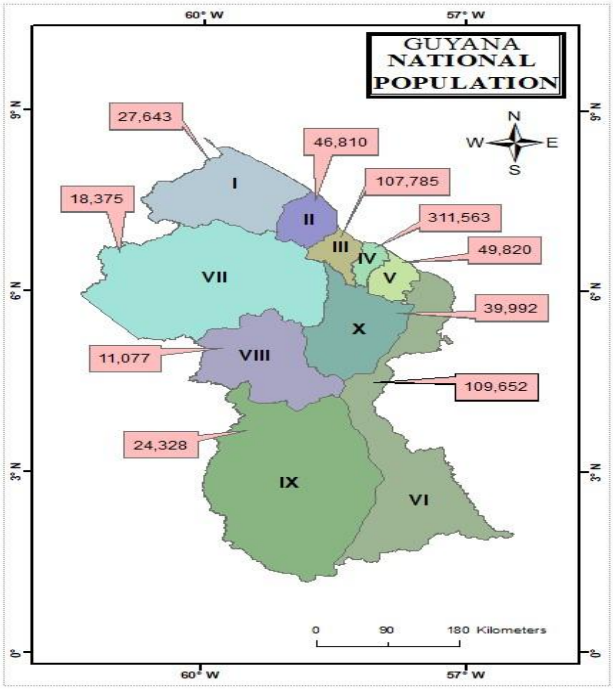

Figure 29: Guyana population distribution by region

The population of Guyana is ethnically heterogeneous, composed chiefly of a native Amerindian population together with the descendants of immigrants who came either as slaves or as indentured labourers. The population, therefore, comprises groups of persons with nationalities from Europe/Portugal, Africa, China, and India, with the Amerindians as the indigenous population (**Table 5**).

In addition to persons of at least five distinct nationality backgrounds, and the native Amerindian population, over the centuries, there have been intermarriages between the various ethnic groups resulting in the emergence of a group of 'mixed heritage'. This is now a significant and growing group within the population. Persons from this group are generically referred to as 'mixed'.

Table 5: Ethnic distribution of the population by regions

Regions	African	Amerindian	Chinese	East Indian	Mixed	Portuguese	White	Others	Total
Region 1	635	17846	14	472	8616	46	12	2	27643
Region 2	5891	8834	41	20861	11046	105	31	1	46810
Region 3	22774	2820	192	64183	17652	84	31	49	107785
Region 4	126378	7066	737	109105	66844	1148	192	93	311563
Region 5	16472	1270	44	27234	4740	41	16	3	49820
Region 6	23383	1801	178	72406	11727	73	60	24	109652
Region 7	2135	6833	25	1569	7514	223	9	67	18375
Region 8	858	8009	9	282	1838	76	5	0	11077
Region 9	353	20808	10	253	2708	73	29	4	24238
Region 10	19604	3205	127	1128	15847	41	30	10	39992
Total	218483	78492	1377	297493	148532	1910	415	253	746955

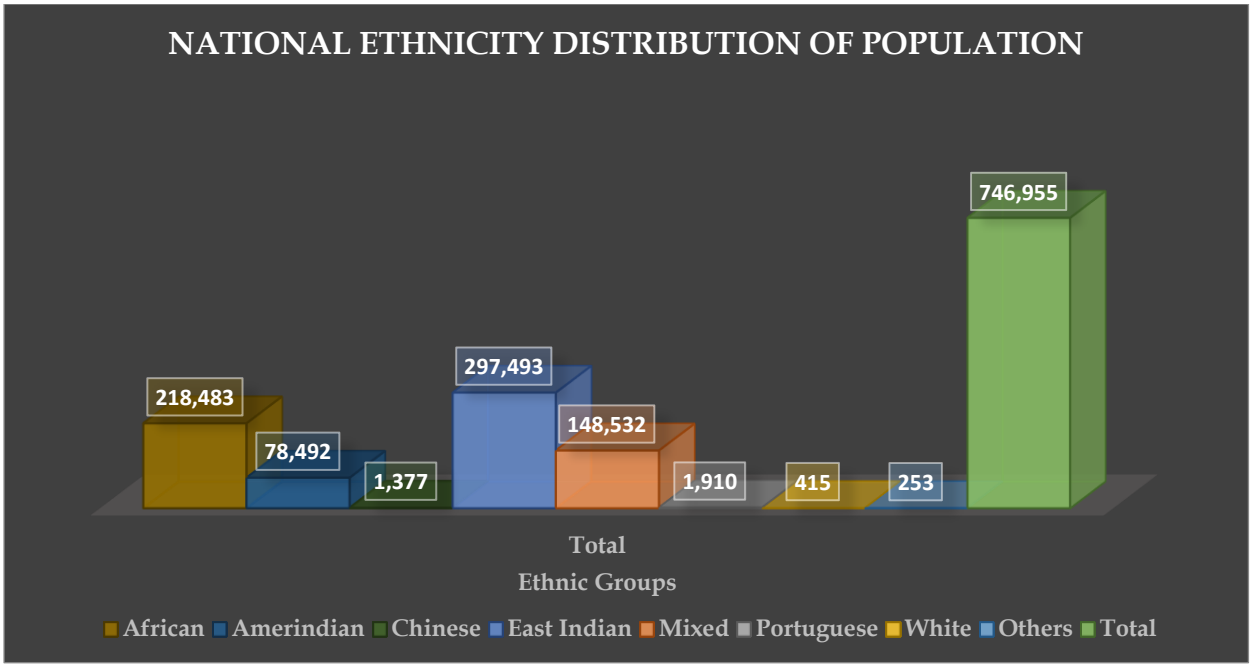

Figure 30: Ethnic distribution of Guyana population.

The East Indians are the largest ethnic group, and presently comprise 39.8 percent or 297,493 persons. They are followed by persons of African Heritage with 29.2 percent or 218,483 persons, followed by those of Mixed Heritage with 19.9 percent or 148,532 persons. The Amerindian group at present comprises 10.5 percent of the population, with 78,492 persons with Portuguese at 0.26 percent, with 1,910 persons, Chinese at 0.18 percent, with 1,377 persons, and Whites representing 0.06 percent, with 253 persons.

1.6.7 Life Expectancy

The life expectancy of Guyana is 68.49 years for males and females.[21]

1.6.8 Employment

The International Standard Industrial Classification (ISIC) was revised with the industrial divisions eighteen to twenty-two in 2012. The employments in Guyana are now represented based on the new classification and presented into three broad sectors formed as a result of the grouping: Primary, Secondary, and Tertiary.

(a) Primary Sector - This sector makes direct use of natural resources. It includes the production of raw materials and basic foods. Its activities include agriculture (both subsistence and commercial), mining and quarrying, forestry, farming, grazing, hunting and gathering, fishing, and packaging of the raw materials associated with this sector.

[21] World Bank 2020

(b) Secondary Sector - This sector is engaged in the manufacturing using the raw products from the “Primary Sector”. It mainly includes manufacturing and construction industries, processing, construction activities, metal working and smelting, automobile production, textile production, chemical and engineering industries, aerospace manufacturing, energy utilities, engineering, breweries and bottlers, and shipbuilding, all fall under this sector.

(c) Tertiary Sector - This sector provides services to the general population and businesses. Its activities include retail and wholesale trades, transportation and distribution, entertainment (movies, television, radio, music, theatre, etc.), restaurants, clerical services, media, tourism, insurance, banking, healthcare, law, education, and government services.

The “Primary Sector” employed a quarter (25.6 percent or 62,738 persons) of the workforce in 2012. The agriculture industry (agriculture itself, including both traditional and commercial rice and sugarcane productions, hunting, forestry, and fishing, etc.), accounted for 17.5 percent (42,732) of the entire workforce in 2012, down from 21.7 percent (50,103) in 2002. Another component of the “Primary Sector” is mining and quarry activities, which accounted for 8.2 percent (20,006) of the workforce in 2012. In summary, agriculture played the dominant role with 68.1 percent of the employment within the “Primary Sector”, while mining and quarry accounted for the remaining 31.9 percent of the sector.

The “Tertiary Sector,” also known as the service industry, played the dominant role in the employment of the workforce. In 2012, more than fifty percent (55.1 percent or 134,902 persons) of the workforce was engaged in this sector.

The “Secondary Sector,” which involves the manufacturing of raw materials produced by the “Primary Sector” to finished products, engaged a relatively smaller number of employees than both the “Primary” and “Tertiary” Sectors, respectively. This sector accounts for 19.0 percent or 46,418 workers in 2012. The distribution of workers within the “Secondary Sector” shows that the “construction industry” has a higher share of 54.8 percent (25,427 persons) compared to “manufacturing” with 45.2 percent (20,991 persons) in 2012.

With regards to the participation by gender in the workforce, the employment of women was predominantly in the “Tertiary Sector”. In 2012, there were 73,930 total employed women, of which 86.5 percent (63,938) were working in the “Tertiary Sector”, while the other two remaining sectors accounted for 13.1 percent.

Table 6: Employment distribution of the labour force in Guyana

Nos.	Industrial Sector	Year 2012		
		Males	Females	Total
1	Primary Sector (1 – 2)	58,516	4,222	62,738
2	Secondary Sector (3 – 4)	40,942	5,476	46,418
3	Tertiary Sector (5 – 21)	70,964	63,938	134,902
4	Not Stated (22)	483	294	777
5	All Industries (1 – 22)	170,905	73,930	244,835

1.6.9 Rural and Urban Population Distribution

Eight of the ten Administrative Regions have urban centres. The combined population of these towns and the capital city, Georgetown, totalled 207,380 or 27.7 percent of the population in 2012. The remaining 72.3 percent of the population lives in villages, mainly along the coastal belt, while a few others are scattered deep in the hinterland of the country.

1.6.9.1 Urbanisation

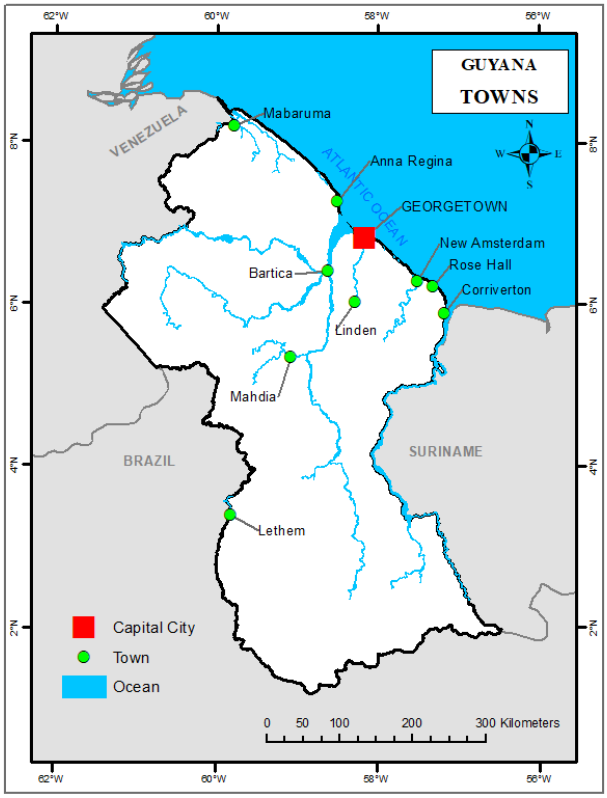

Figure 31: Map of Guyana showing the municipal towns

Guyana has only one city, but there are nine small towns of administrative and commercial importance at the Local Government level. In addition to the City of Georgetown, the nine towns are recognised municipal districts, each with its own Mayor and Council charged with local government responsibilities. These are Mabaruma, Anna Regina, New Amsterdam, Rose Hall, Corriverton, Bartica, Mahdia, Lethem, and Linden.

Georgetown, located in Region IV (Demerara – Mahaica), founded over 200 years ago and promoted to a city in 1842, is situated on the East Bank and at the mouth of the Demerara River. It is the capital city and seat of the Central Government; the main commercial centre and the principal harbour. It covers an area of 39 km^2 and has, with its environs, a population of approximately 118,363 persons[22].

[22] Figures derived from the 2012 National Census

Mabaruma, is situated in Region I (Barima–Waini), and serves as the administrative centre and regional capital of the Region. It is located close to the Aruka River, which forms the Venezuela–Guyana border. Mabaruma was declared a municipal township in 2017 and has an area of 111 km^2 and a population of 3,980 persons.

Anna Regina, situated in Region II (Pomeroon–Supenaam), is about 19 km from Adventure on the Essequibo Coast, and was declared a town in 1891. This town serves as the Administrative centre for the Pomeroon–Supenaam Region and has an area of 79 km2 with a population of 11,130 persons.

New Amsterdam, situated on the East Bank and at the mouth of the Berbice River, is the regional capital of Region VI (East Berbice-Corentyne). It was declared a town in 1891 and covers an area of 14 km^2 and has a population of about 15,370 persons. It has an important seaport for the export of bauxite.

Rose Hall, located in Region VI along the Corentyne coastland about 29 km from New Amsterdam, was formerly a village district. The town was established in 1970 with an area of 14 km^2 and a population of about 4,600 people.

Corriverton, located on the western bank and at the mouth of the Corentyne River in Region VI, formerly comprised three village districts. The town was established in 1970 and has an area of 48 km^2 and a population of about 10,240. There is a small seaport in this town.

Bartica, located in Region VII (Cuyuni–Mazaruni), is on the left bank of the Essequibo River at the confluence of the Cuyuni and Mazaruni Rivers. It is considered the most important hinterland mining town for small gold and diamond miners and serves as the administrative centre of the Cuyuni–Mazaruni Region. It was declared a municipal township in 2016 and is about 200 km^2 with a population of 9,170 persons.

Mahdia, is the capital of Region VIII (Potaro–Siparuni) and is located near the centre of Guyana. Mahdia was declared a township in 2018 and has an area of 1982 km^2 with a population of 2,560 persons.

Lethem, is located in Region IX (Upper Takatu – Upper Essequibo), forming part of the border with Brazil. Lethem was declared a town in 2017, covers an area of 261 km^2 with a population of 3,250 people.

Linden, located on the Demerara River about 107 km from Georgetown, was created a town in 1970 and incorporates the mining town of Mackenzie, and two former village districts, Wismar and Christianburg. The area of the town is approximately 144 km^2 with an estimated population of 28,710 people.

1.6.10 CLIMATE

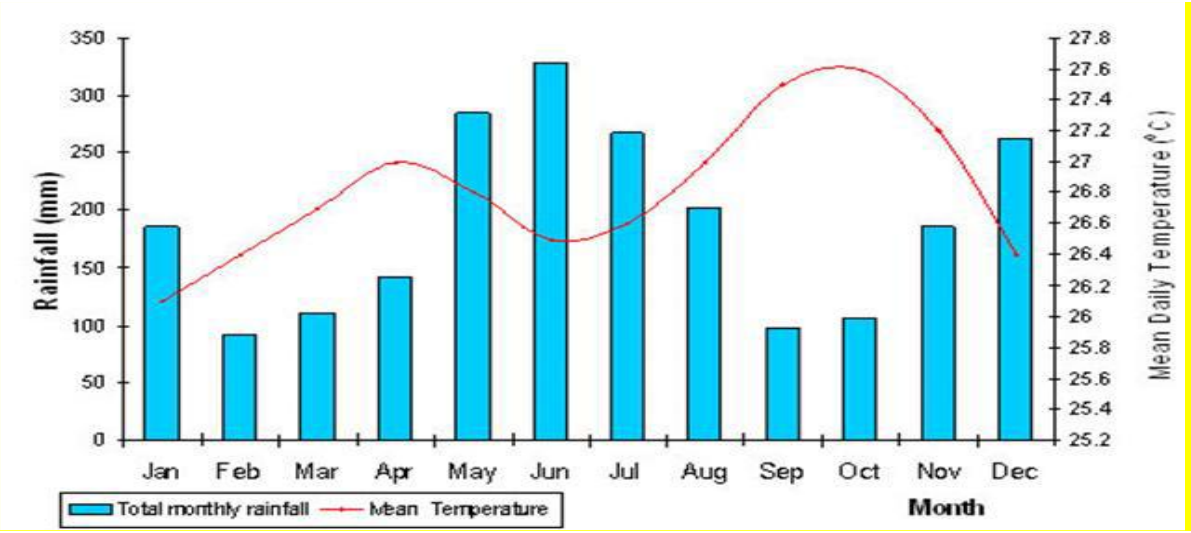

Figure 32: Mean monthly temperature and monthly rainfall in the coastal region of Guyana

Guyana is located near the equator and within the equatorial trough zone, which influences its weather and climate. The climate is tropical and characterized by uniform temperature and humidity, with high but variable rainfall. The annual rainfall ranges from about 2200 mm on the Coast of Guyana to 2800 mm inland, with the savannahs (Southern Guyana) experiencing one wet season from April to August, ranging from 1400 – 1800 mm.

The seasonal shifts of the equatorial trough and its associated zone of rain bands, called the Inter-Tropical Convergence Zone (ICTZ) are primarily responsible for the two wet and dry seasons experienced along the coast of Guyana. The ITCZ generally moves from the west of the country to the east and then retreats to the west, giving rise to a longer wet season in the west of the country. The first and long wet season commences from mid-April to mid-August, with 50% of the annual rainfall experienced during this period. The second and short wet season is experienced in December–January. Guyana's climate system is influenced by the El Niño Southern Oscillation (ENSO), which often results in floods and droughts.

1.6.10.1 Temperature, Wind, Sunshine, Humidity

Air temperatures range between 16 °C and 34 °C, with lower temperatures in the higher regions. Temperatures on the Coast range between 22 °C and 31 °C due to the stabilizing effect of the sea and the North Eastern Trade Winds. These Trade Winds flow over the coast with speeds averaging ten miles per hour and decrease as they move further inland, where light winds generally prevail.

The duration of sunshine averages seven (7) hours per day in the dry seasons and five (5) hours per day in the wet seasons.

The Relative Humidity is high, averaging 80 per cent or more on the coast. It is lower in the savannah regions at about 70 percent. In the rainforest regions, it can reach 100 percent, especially in the mornings.

1.6.10.2 Rainfall and Climate Types

Annual average rainfall totals range between 1,600 mm to 3,000 mm. Because of geographical influences, such as mountains and oceans, there is spatial variability of rainfall, resulting in three major climate types.

Tropical savannahs (very dry regions) – These are areas with annual rainfall of less than 1,788 mm. Such areas are located in the Rupununi Savannahs, the Intermediate Savannah, the Upper Cuyuni, and the Corentyne Coast. The Corentyne Coast is found to be much drier than places further inland.

Very wet tropical rainforest climate (very wet regions) - These are areas with the annual rainfall exceeding 2,728 mm. These regions are found in the Pakaraima Mountains, the upper Akarai Mountains, and the sub-coast.

Wet/dry tropical rainforest (wet/dry regions) - The remainder of the country experiences this type of climate. These are areas with annual rainfall between 1,778 mm and 2,800 mm. The average on the coast is about 2,300 mm. Most places in Guyana experience a bimodal annual cycle of rainfall with distinct wet seasons. The first rainy season, known as the primary wet season, extends from mid-April to the end of July, and the secondary wet season occurs from mid-November to January. The periods in between are often referred to as the primary dry (long) season and secondary (short) dry season, respectively. A unimodal annual wet cycle (mid-April to August) is witnessed over the southernmost part of Guyana – the Rupununi Savannahs.

1.6.11 GOVERNMENT

Guyana became an independent member of the Commonwealth in 1966, and 1970 became a Cooperative Republic. Guyana is a unitary republic with a unicameral parliament known as the National Assembly. Under the Constitution of October 6, 1980, executive power is vested in the President, who appoints and supervises the Prime Minister and other Ministers. The president is not directly elected; each party presenting a slate of candidates for the assembly must designate in advance a leader who will become president if that party receives the largest number of votes. The president has the authority to dissolve the parliament, but in contrast to a parliamentary regime, the Constitution of Guyana does not provide any mechanism for parliament to replace the president during his or her term of office, except in case of mental incapacity or gross constitutional violations.

The Prime Minister is required to be a member of the assembly. In practice, most other ministers are also members. Those who are not, serve as non-elected members, which permits them to debate but not to vote. The president is not a member of the National Assembly but may address it at any time or have his address read by any member he may designate at a convenient time for the Assembly. Under Guyana's constitution, the President is both the Head of State and Head of Government of the Co-operative Republic of Guyana.

The President appoints the Cabinet, which consists of the President, the Prime Minister, the Vice Presidents (if any are appointed), and the Ministers appointed by the President and may include no more than five individuals not sitting in the National Assembly. The Cabinet is tasked with aiding and advising the President as it relates to the general control and direction of the government. While the Cabinet is appointed by the President, it is also collectively responsible to the National Assembly.

The minority members of the Assembly elect an Opposition Leader. The Assembly comprises members who are elected in keeping with conditions associated with universal adult suffrage, for a term of five years. The national Assembly has 65 members: 40 elected by proportional representation and 25 indirectly elected by regional assemblies.

The right to vote belongs to all Guyanese citizens 18 years of age or older. Voting is carried out by secret ballot under a system of proportional representation. Votes are cast for lists of candidates compiled by the political parties, and seats are allocated proportionally among the lists.

Local government is administered principally through the Regional Democratic Councils (RDCs), each led by a Chairman. The RDCs are elected for terms of up to five years and four months in each of the country's ten Regions and form the second-tier government. Local government forms the third tier of government and comprises three types of councils: municipal, neighbourhood, and Amerindian village.

Whilst there are vestiges of a Dutch legal system remaining, particularly in the area of land tenure, the common law of Britain is the basis for the legal system in Guyana. In May 1966, Guyana gained independence from Britain, and in the 1970s, it enacted Constitutional, Judicial, and Legislative reforms, abolishing appeals to the Privy Council in the UK. The Guyana Court of Appeal then became the final tier in the then three-tier hierarchy, with the Magistrate's Court at the lowest ring and the High Court of the Supreme Court of Judicature following. The structure of the Judicature consists of magistrate courts for civil claims of small monetary value and minor offences; the High Court, with original and appellate jurisdiction in civil and criminal matters; and the Court of Appeal, with appellate authority in criminal cases. The Court of Appeal has the authority to conduct further hearings on matters dealt with by the High Court.

In early 2005, another Legislative amendment was made to allow Guyana's accession to the Caribbean Court of Justice as its final Court of Appeal.

The constitution secures the tenure of judicial officers by prescribing their age of retirement (sixty-two or sixty-five), guaranteeing their terms and conditions of service, and preventing their removal from office except for reasons of inability or misconduct established by means of an elaborate judicial procedure. These constitutional arrangements are supplemented by statutory provisions that establish a hierarchy of courts through which the individual under scrutiny may secure enforcement of his civil and political rights.

1.6.12 Religion

The Hindus constitute the single largest religious group with a membership of about 24.8 percent (185,439) of the national population reporting a religious affiliation in the 2012 Census. The next largest groups were the Pentecostal and Other Christians groups, accounting for 22.8 percent (170,289) and 20.8 percent (155,050) respectively of the national population reporting a religious affiliation. The smallest religious groups are the Baha'i (0.1 percent or 421 members), Rastafarian (0.5 percent or 3,496 members, Jehovah's Witness (1.3 percent or 9,602 members), and Methodist (1.4 percent or 10,106 members)(**Table 7**). The remaining groups, for instance, the Anglican, Roman Catholic, and Muslim, though influential in the Guyanese society, each comprise less than ten percent of the religious affiliations of the population. Overall, there appears to be an equal representation of the religious groups across the sexes, except for Non-Believers, where men exceeded women by a significant margin.

Table 7: Religious groups and their composition in Guyana

Religious Groups	Number			Percent (%)		
	Male	Female	Total	Male	Female	Total
Anglican	19,303	19,659	**38,962**	2.58	2.63	**5.22**
Methodist	4,807	5,299	**10,106**	0.64	0.71	**1.35**
Pentecostal	79,315	90,794	**170,289**	10.62	12.18	**22.80**
Roman Catholic	26,814	26,087	**52,901**	3.59	3.49	**7.08**
Jehovah Witness	4,335	5,267	**9,602**	0.58	0.71	**1.29**
Seventh Day Adventist	19,293	21,081	**40,374**	2.58	2.82	**5.41**
Bahai	219	202	**421**	0.03	0.03	**0.06**
Muslim	26,836	23,736	**50,572**	3.59	3.18	**6.77**
Hindu	93,897	91,542	**185,439**	12.57	12.26	**24.83**
Rastafarian	2,441	1,055	**3,496**	0.33	0.14	**0.47**
Other Christians	76,308	78,742	**155,050**	10.22	10.54	**20.76**
None	15,100	8,319	**23,419**	2.02	1.11	**3.14**
Others	3,137	3,187	**6,324**	0.42	0.43	**0.85**
TOTAL	**371,805**	**375,150**	**746,955**	**49.78**	**50.22**	**100.0**

1.6.13 Education

Formal education in Guyana is the responsibility of the state, which provides free education from pre-primary (nursery) to secondary levels. Within this sector, the administrative/day-to-day management of the sector is the responsibility of the Permanent Secretary, who is the accounting officer for the sector. The Permanent Secretary is assisted by a Deputy Permanent Secretary, Finance and a Deputy Permanent Secretary, Administration. The Chief Education Officer is responsible for the professional matters related to the delivery of education throughout the system.

Education in Guyana is regionalised. The country is divided into eleven education districts. Ten of these education districts correspond with the administrative and geographical regions of the country, while the capital, Georgetown, is treated as a separate education district. Regional Administrations have control of the budgets for their regions and are responsible for the implementation and monitoring of educational activities, including the provision and maintenance of educational facilities. Finances for the Georgetown education department are disbursed and monitored through the Central Ministry.

The role of the Central Ministry is retained through the responsibility for the conceptualisation and the formulation of educational policies, for coordinating, monitoring, and evaluating education programmes, and for establishing and maintaining parity among regions.

Nursery Education consists of a two-year programme that is designed to provide young children with a learning environment which will facilitate their physical, social, emotional, and intellectual development as well as the development of basic pre-concepts and desired attitudes to learning. Children are admitted to this level at the age of three years, six months.

Primary Education is the level at which compulsory education begins. This level of education provides the foundation for further schooling and training. Pupils start from five years, six months, and continue for six years, at the end of which they are eligible to write the National Grade Six Assessment (NGSA). Performance at this assessment determines allocation to secondary programmes offered.

Secondary Education is offered in general secondary schools and secondary departments of primary schools (commonly known as Primary tops -PTT). Some secondary departments of primary schools offer a three-year programme geared to academic and pre-vocational programmes, while others offer a five-year programme; as such, students write the Caribbean Secondary Examination Certificate (CSEC) subjects. The programme includes core subjects and varying pre-vocational subjects. In the General Secondary Programme, students pursue a five-year programme in a wide range of subjects in Science, Technology, Engineering, the Arts, and Mathematics. The programmes are a mix of academic and vocational programmes.

Some of the pre-vocational programmes are offered in Practical Instruction Centres (PICs), which provide specialist technical facilities for clusters of schools that do not have them. In 2008, the MOE introduced the Secondary Competency Certificate Programme (SCCP) to target students at the general secondary level who are at risk of dropping out. This programme is implemented in Grades 9 and 10 in 50 out of the 118 general secondary schools and Practical Instruction Centres. SCCP students are required to undertake the core subjects (English, Mathematics, Integrated Science, and Social Studies), along with a pre-vocational elective. On completion of the SCCP, they are provided with a certificate, which enables them to access traditional technical-vocational institutions to further their studies. Other students who complete this programme opt to write CSEC. At the end of the five years of general secondary education, students write subjects to obtain the Caribbean Secondary Examination Certificate (CSEC).

Post-secondary education is offered in 10 institutions across the country. These institutions provide full-time and part-time courses at Craft and Technical levels. Students are exposed to valuable practical experiences while serving attachments within various industries and agencies. There are other institutions, such as the Guyana School of Agriculture, which falls under the Ministry of Agriculture, that offer certificate and diploma courses in agriculture, forestry, fishery studies, agro-processing, livestock production, animal health, and veterinary public health.

Tertiary Education is offered by two public institutions. The Cyril Potter College of Education (CPCE) and the University of Guyana. CPCE offers initial teacher training at the nursery, primary, and secondary (academic and pre-vocational) levels. These programmes are of two or three years duration, at the end of which teachers gain an Associate Degree in Education or a Trained Teachers Certificate for those who have completed the course via distance mode. The National Centre for Educational Resource Development (NCERD) complements the training done at CPCE by providing continuous professional development for practising teachers, through planning and implementing teacher education upgrading programmes. The University of Guyana (UG) has two campuses that provide higher education, which offer courses leading to graduate and post-graduate degrees, certificates, and diplomas.

Admission to the university is based on the attainment of passes in five subjects (Grades 1 – 3), inclusive of Mathematics and English at the CSEC level for most programmes. An alternative is offered to mature applicants (a minimum of 26 years of age) who do not possess these qualifications but may be considered for admission, provided they have a good general education, credible work experience in the field, and a passing grade at the University of Guyana's Entrance Examination. The faculty will consider each application on its merit.

Non-formal education/continuing education in Guyana has two main functions: one is to provide opportunities mainly through civil society organisations and nongovernmental organisations (NGO), for persons who fail to complete their secondary education, and the other, to provide opportunities for continuing education

and professional training. The Institute of Distance and Continuing Education (IDCE) of the University of Guyana is also a major provider of continuing education programmes. Some of these programmes can give the participants credits either to enter the university or to reduce the number of courses they have to take for degree programmes. The non-formal kind of training is also provided by vocational institutions and various youth organisations, which are under the auspices of the Ministry of Culture, Youth and Sport.

The government's commitment to education in the last decade has remained relatively unchanged, with education expenditure as a % of GDP averaging at 5% per annum. In terms of absolute value, there has been a consistent increase in education allocation annually.

1.6.14 Economy

Immediately before independence in 1966, Guyana was in the early stages of developing its resources. This development continued under an economic plan drawn up by British, American, and Canadian experts. Manufacturing, which was on a small scale in the late 1960s, was expanded in the 1970s, but in the early 2000s, the economy of Guyana was dominated by agriculture, mining, and service industries. Over the last two decades, Guyana has fared well in terms of economic growth. Moving from a low-income country in the mid-1990s to a low-middle-income country from the mid-1990s to recent years (2014), to an upper-middle-income country from 2015 to present.

Growth occurred despite internal and external exigencies. Over the period 2006-2010 real growth rate averaged 4% while inflation was around 6%. During this period, Guyana was recovering from a major flood in 2005 and the residual negative effects of the world economy in 2008 - 2009. Nevertheless, Guyana has instituted and maintained prudent monetary and fiscal policies to maintain price and exchange rates and managed its debt through the formulation of a national debt financing strategy and, more recently, in 2015, the compilation of a comprehensive Public Debt Management Manual, which will provide clear policies and procedures for systems to operate more efficiently.

1.6.14.1 Profile of Economic Sector

The Guyana economy grew by four percent (4%) at the end of June 2018. This reflected economic activities, which have been bolstered by the emerging oil and gas sector. There were increases in the activities of financial and insurance, construction, wholesale and retail trade, transportation and storage, and other services. The inflation rate was 1.6 percent due to high food prices.

1.6.14.1.1 Agriculture Sector

The agriculture sector contracted by 0.3 percent compared with the 4.9 percent increase for the same period in 2017. This performance was mainly due to declines in the output of fishing, livestock, and sugar. However, output increases were recorded in the rice, forestry, and other crops sub-sectors.

Sugar

Sugar output fell by 2.7 percent to 33,531 tonnes. This outturn was due to restructured operations at GUYSUCO to three (3) productive sugar estates (Blairmont, Uitvlugt, and Albion/Port Mourant), operational constraints, and delays to cane harvesting.

Rice

Rice production expanded by 3.7 percent to 341,567 tonnes. This outturn was due to favourable average export market prices, newer varieties of paddy, a high average yield per hectare of 6 tonnes, and a 1.5 percent increase in hectares harvested.

Other Crops

The other crops sub-sector grew by 4.8 percent compared with a 4.6 percent expansion at the end of June 2018. This performance reflected higher production levels of root crops, vegetables, and citrus by 1.5 percent, 1.2 percent, and 0.2 percent, respectively, as market conditions remained favourable.

Fishing

The fishing industry contracted by 12.2 percent on account of lesser catches of small shrimp and prawns by 36.4 percent and 19.3 percent, respectively. Shrimp catches were curtailed by the intrusion of sargassum seaweed. However, fish catches increased by 3.2 percent on account of increases in fishing vessels.

Livestock

Output in the livestock sub-sector declined by 8.1 percent compared with the growth of 28.8 percent at end of June 2018. This outcome was largely due to a shortfall in the production of poultry meat by 13.6 percent. The poultry industry was adversely impacted by the buildup of smuggled chicken, higher mortality rates of poultry birds and 16.5 percent reduction in imported hatching eggs. In contrast, the output of pork and beef were estimated to increase by 40.9 percent and 37.6 percent respectively owing to greater productive capacities.

1.6.14.1.2 Forestry

Forestry activities expanded by 8.8 percent in contrast to the 17.9 percent growth at end-June 2018. There were increases in the output of sawn wood and total logs by 32.9 percent and 6.8 percent respectively, attributed to greater domestic demand from construction activities. However, there was lower production of roundwood by 2.6 percent due to adverse weather conditions.

1.6.14.1.3 Mining and Quarrying

The mining and quarrying sector's output grew by 2.6 percent compared with the 2.3 percent increase for the corresponding period in 2018. This performance largely reflected growth in gold declarations which offset the contractions in the output of bauxite and other mining.

Bauxite

Bauxite production declined by 1.1 percent on account of decreases in the output of Chemical Grade (CGB) and Refractory Grade (RASC) bauxite by 30.5 percent and 7.5 percent respectively. Production was affected by industrial unrest at the Bauxite Company of Guyana Incorporated in early 2019. In contrast, Metallurgical Grade Bauxite (MAZ) increased by 0.5 percent due to favourable export market conditions.

Gold and Diamonds

Total gold declaration increased by 4.4 percent to 300,674 troy ounces. This outturn was on account of higher declarations by small & medium scale miners by 15.8 percent, due to improved systems at the Guyana Gold Board. In contrast, there was lower total combined production from the two large foreign gold mining companies by 9.9 percent, which reflected lower output by Troy Resources by 39.5 percent while output by Guyana Goldfields increased by 10.1 percent. Total diamond declaration decreased by 37.1 percent to 22,781 carats on account of lower investments in production.

1.6.14.1.4 Manufacturing

The manufacturing sector's output grew by 3.6 percent compared with the 0.3 percent decline for the same period last year. This outturn was primarily due to improvements in milled rice and other manufacturing. Other manufacturing output expansion reflected higher production of ice cream, non-alcoholic beverages and detergents by 24.7 percent, 15.1 percent and 11.3 percent respectively.

1.6.14.1.5 Electricity and Water

The electricity and water sector expanded by 3.9 percent relative to 1.8 percent growth for the same period last year due to increased consumer demand. Electricity generation (measured by megawatts per hour) expanded by 6.0 percent.

1.6.14.1.6 Oil and Gas

The estimate of oil reserves and production varies at this point; however, the International Monetary Fund (IMF) indicates that the extractive industries and public investment will be key drivers of economic growth over the medium term. It is projected that Guyana is likely to be able to produce 700,000 barrels per day in the next decade.

1.6.14.1.7 Future Outlook

In light of all this, economists estimate that within the next two to five years, Guyana is expected to be the regional hub for oil and gas services, of which the contribution to the country's growth and development will be significant.

1.6.15 Environmental Overview and Concerns

1.6.15.1 Environmental Overview

Guyana, like many other developing countries, is extremely vulnerable to the negative impacts of climate change and natural disasters. Economic challenges, geographical characteristics, and limited capacity to predict and respond to environmental hazards compound the threats Guyana is confronted with as a result of these phenomena and the deleterious effects of anthropogenic activities. This is further compounded by the coastal plain housing seventy-five percent of Guyana's inhabitants, lying about 1.4 metres below the mean high-tide level of the Atlantic Ocean, and vulnerable to flooding, erosion, and salinization.

Guyana is subject to drought and floods (the most recent flood experienced in June 2021). Earthquakes and cyclones are not prominent, and according to the UNDP Disaster Risk Index, extremely rare. Guyana’s topography renders it vulnerable to natural risks since most of the country’s key investments are in low-lying areas, which are protected by sea defences. Further flood risk also exists from the different catchment areas used for irrigation purposes. There are frequent and uncontrolled breaches due to unanticipated high tides and breaches of an aged sea defence system. Moreover, unfavourable weather, such as prolonged periods of heavy rainfall or droughts (El Niño and La Niña phenomena), also jeopardizes national agricultural production.

However, the Government has recognized these vulnerabilities and has implemented several measures to mitigate their impact. The Government of Guyana has already made significant investments in enhancing the country‘s adaptive capacity and improving its disaster response strategy as part of its disaster mitigation efforts. Past

adaptation efforts have included both hard structural engineering and policies to prevent infrastructure deficits, and these will continue using the four pillars of Guyana's adaptation strategy: sea defence, river embankments, improved drainage systems, and a conservancy system.

1.6.15.2 Environmental Concerns

Guyana is susceptible to flooding and drought, as documented under the previous subheading, arising from climate change. This leads to the other two factors of the "triple planetary crisis," with the three main interlinked issues and concerns: biodiversity loss and pollution. Whilst pollution is examined from a greenhouse gas generating standpoint, there is more than this type of pollution impacting Guyana and the world.

Pollution arising from POPs, other hazardous chemicals such as mercury, and waste is also a major concern for Guyana. Pollution affects the air, ground and surface water, and soil. The contaminants arising from industrial, mining, and household activities, as well as poor waste management, inclusive of POPs, other hazardous chemicals, and products that may contain these chemicals. The inventories conducted on POPs chemicals reveal their possible presence in Guyana's dumpsites and landfills, with the potential to contaminate soil, air, and groundwater, posing a threat to human health and the environment.

1.7 INSTITUTIONAL, POLICY, AND REGULATORY FRAMEWORK

This subchapter presents a description of the institutional, policy, and regulatory framework within which the NIP will be implemented. It also covers more detailed baseline information about the management of POPs chemicals, such as key approaches and procedures for enforcement and monitoring requirements in Guyana.

1.7.1 Policy Framework

The 1980 Constitution of Guyana, Chapter II, outlines the principles for the country's political, economic, and social system. Specifically, Articles 2:25 and 2:36 of the Constitution provide the base for a national environmental policy and emphasize its role as a key principle in Guyana's social and economic systems. It recognizes the right of every person to an environment that is not harmful to his or her health or well-being. The preparation of a National Environmental Action Plan (NEAP) in 1994 was one of the first systematic efforts towards integrated environmental planning, and it outlines the focus of the Government of Guyana (GoG) as it relates to environmental management.

Guyana is a Party to most of the major international multilateral agreements on the environment, including: UN Framework Convention on Climate Change, Vienna Convention for the Protection of the Ozone Layer, Montreal Protocol on Substances that deplete the Ozone Layer, Kyoto Protocol, UN Convention to Combat Desertification, and UN Convention on Biological Diversity.

The Government of Guyana is committed to adopting and implementing a national policy for environmental management and sustainable development. The national

policy is guided by, and considers, the United Nations Environment Programme, which represents the multilateral framework within which international environmental issues will be pursued at the global level, in keeping with the 'Environmental Perspective to the Year 2000 and Beyond', as adopted by the United Nations General Assembly in December 1987.

Additionally, it takes into consideration the several regional declarations on sound environmental management and sustainable development. These include the Caribbean Environmental Health Strategy (1978), the Action Plan for the Caribbean Environment Programme (1981), the Declaration of Brasilia (1989), the Amazon Declaration (1989), and the Port of Spain Accord on the Management and Conservation of the Caribbean Environment (1989).

At the national level, the Management of Natural Resources and the Environment is guided by the Cabinet Sub-Committee on Natural Resources, which focuses on policy issues. Over the years, there have been major developments in sectors that help to support the achievement of environmental goals. These are:

- National Environmental Action Plan (1994);
- Environmental Protection Act (1996);
- Establishment of the Environmental Protection Agency (1996);
- Establishment of the Iwokrama International Rainforest Programme (1993);
- Guyana Climate Change Action Plan (2001);
- Guyana Climate Change Adaptation Policy and Implementation Strategy for Coastal and Low-lying Areas (2002);
- National Biodiversity Action Plan (2006 - 2011));
- National Biosafety Framework for Guyana (2007);
- Technical Report and Action Plan on a System of Indicators to monitor Forest Biological Diversity in Guyana;
- Guyana National Action Programme to Combat Land Degradation (2006);
- Guyana Readiness Preparation Proposal (2009);
- Guyana Low Carbon Development Strategy (2009); and
- Guyana Low Carbon Development Strategy 2030 (2022).

The National Development Strategy (NDS) [23] 1997 represents the highest level of national planning. This clearly sets out the vision to promote the sustainable management of natural resources and preserve a healthy environment in coastal, urban, and hinterland regions. This Strategy established the environmental policy for Guyana through the establishment of the overarching national environmental policy framework and priorities. It further emphasized that the conservation of Guyana's environment should be the prime consideration and is carefully delineated. This has since been revised and updated for the period 2001-2010 and remains the current basis for environmental and sustainable development policy[24].

The vehicle to promote the NDS Environmental Policy is the National Environmental Action Plan (NEAP) 2001–2005. Within this, the Government of Guyana unequivocally declared its commitment to sustainable development, including sustainable human

[23] http://www.guyana.org/NDS/NDS.htm

[24] http://www.ndsguyana.org

development, as major pillars of the country's socio-economic program. In this context, Guyana seeks to integrate economic, environmental, and social values during planning and to distribute benefits equitably across socio-economic strata and gender upon implementation. It also seeks to ensure that the opportunity for continued development remains undiminished for future generations. This approach also defines the need for environmental protection to be treated as a cross-sectoral matter that is applied to all aspects of the development process.

A second NEAP (2001-2005) was prepared and adopted in 2001 for the period 2001-2005 [25]. This elaborates a national environmental policy, strategy, gaps, priorities, and an action plan. While not an explicit policy on sustainable development, the NEAP does state the country's commitment to the principles of sustainable development consistent with the NDS.

This NEAP features a number of measures and policies that are pertinent to the Stockholm Convention POPs management and are presented as follows:

- National commitment to international multilateral agreements generally;
- Promotion of implementation tools for MEAs, such as:
  - (i) environmental education and public awareness,
  - (ii) human resources development,
  - (iii) institutional capacity building,
  - (iv) inter-agency collaboration,
  - (v) public participation,
  - (vi) information management and networking,
  - (vii) acquisition of appropriate technology, and
  - (viii) environmental legislation.
- Focus on cross-sectoral issues related to the following:
  - (i) land use,
  - (ii) environmental health, and
  - (iii) integrated water resource and waste management; and
- Development of cross-sectoral programs covering regulatory standards, controls, and monitoring in relation to:
  - (i) environmental health;
  - (ii) environmental pollution;
  - (iii) integrated waste management; and
  - (iv) pesticides and toxic chemicals.

1.7.2 Regulatory Framework

There are several pieces of legislation that are specifically concerned with the management of chemicals, wholly or partially, in Guyana. These legislations are as follows:

[25] Guyana – National Environmental Action Plan 2001-2005, Environmental Protection Agency, 2001 http://www.guyana.org/NDS/chap18.htm

(a) **Sulphuric Acid Act** (Act No 7 of 1928);
(b) **Pharmacy and Poison Act** (Act No. 36 of 1956);
(c) **Pharmacy Practitioners Act** (Act No. 9 of 2003)
(d) **Food and Drug Act** (Act No. 12 of 1971);
(e) **Environmental Protection Act** (Act No. 11 of 1996 & No. 17 of 2005);
(f) **Environmental Protection (Air Quality) Regulations** (Reg. No. 9 of 2000);
(g) **Environmental Protection (Hazardous Waste Management) Regulations** (Reg. No 7 of 2000) & No. 13 of 2005);
(h) **Environmental Protection (Water Quality) Regulations** (Reg. No. 6 of 2000);
(i) **Guyana Energy Agency Act** (Act No. 31 of 1997, No. 2 of 2002, No. 3 of 2004, No. 12 of 2005 & No. 19 of 2011);
(j) **Guyana Geology and Mines Act** (Act No. 7 of 1979, No. 3 of 1987, No. 20 of 1989 and No. 6 of 1997);
(k) **Trade Act** (Act No. 34 of 1958, No. 5 of 1971, No. 4 of 1972, No. 16 of 1973, No. 5 of 1974, No. 14 of 1975 & No. 4 of 1983);
(l) **Narcotic Drug and Psychotropic Substances (Control) Act** (Act No. 2 of 1988);
(m) **Occupational Safety and Health Act** (Act No. 32 of 1997);
(n) **Pesticides and Toxic Chemicals Control Act** (Act No. 13 of 2000 & No. 13 of 2007);
(o) **Pesticides and Toxic Chemicals Regulation** (Reg. No. 8 of 2004 & No. 13 of 2007); and
(p) **Petroleum and Petroleum Products Regulations** (Reg. No. 7 of 2004).

However, four (4) main pieces of legislation governs the management of POPs in its entirety or partially:- (i) the Environmental Protection Act (1996), its amendments and regulations, (ii) the Pesticides and Toxic Chemicals Control Act (2000) and its amendment and regulations, (iii) the Food and Drugs Act, and (iv) the Occupational Safety and Health Act.

1.7.2.1 Environmental Protection Act 1996 (No 11 of 1996)

The focal point of legislation protecting the environment in Guyana is the Environmental Protection Act, which was promulgated in 1996. This Act established the Environmental Protection Agency (EPA) on June 5, 1996, giving it overall responsibility for the management of the environment. The purpose of the Act is to provide for the management, conservation, protection, and improvement of the environment, the prevention and control of pollution, the assessment of the environmental impact of economic development, and the sustainable use of natural resources.

The Environmental Protection Act established the EPA and provides the legal mandate to administer and implement the national environmental policies established by the NDS and NEAP. The Act provides for the management, prevention, and control of environmental pollution. One of the functions of the Agency as delineated in the Act is “to prevent and control environmental pollution” and “formulate standards and codes of practice to be observed for the improvement and maintenance of the quality of the environment and place limits on the release of contaminants into the environment”.

The Act was amended in 2005, and a series of regulations: water quality, hazardous waste management, noise management, air quality, environmental authorisations, and litter enforcement have been adopted to give greater effect to the legislative framework provided by the Act.

Land-use planning plays an important role in the conservation and wise use of natural resources by creating a suitable framework within which these uses can occur. A National Land Use Policy is in existence and provides the policy context for all land uses, including conservation land uses.

Part V of the Act deals with the Prevention and Control of Pollution, which examines the discharge or permits the entry of any contaminant into the environment, whether it is solid, liquid, or gas, and covers the amount and concentration of the contaminant.

Implementation of the Environmental Protection Act and its associated regulations is the responsibility of the Environmental Management Division of the Environmental Protection Agency. However, for the mining sector, the Guyana Geology and Mines Commission (GGMC), in compliance with a Memorandum of Understanding (MOU) with the Environmental Protection Agency, is responsible for the implementation of some Sections of the Environmental Protection Act 1996 and the associated Regulations.

Information on the activities of the Environmental Protection Agency is publicly available on the Agency's website http://www.epaguyana.org. The Agency also has a public awareness unit that is responsible for disseminating information on its activities via the publication of public notices and environmental messages through the print and broadcasting media. The unit also focuses on the development of suitable information brochures and posters for students and the general public.

The relevancy of this Act to the administration and management of POPs under the Stockholm Convention involves the provision of the legal basis for the government to direct the management of environmental pollution inclusive of explicit functions "to prevent and control environmental pollution" and "to formulate standards and codes of practice to be observed for the improvement and maintenance of the quality of the environment and place limits on the release of contaminants into the environment". This is elaborated in Part V of the Act, which deals with the prevention and control of pollution through any means that discharge or permit the entry of any contaminant into the environment, whether it is solid, liquid, or gas, and covers the amount and concentration of the contaminant. In practical terms, this covers the management of POPs chemicals in the form of stockpiles and wastes and, where they are released into the environment, the setting of maximum allowable levels of contamination. This legal authority is given practical implementation through three Environmental Protection Regulations made effective in 2000 covering hazardous waste, air protection, water quality, and noise.

1.7.2.1.1 Environmental Protection (Hazardous Waste Management) Regulations 2000

These Regulations cover the management of waste, including chemical waste, and cover industrial, commercial, and any other activity that produces waste deemed to be hazardous under a definition aligned with and adopted under the Basel Convention, including waste classification. It encompasses hazardous waste generated from industrial, commercial, and any other activity that produces waste, as well as management activities associated with handling, storage, transportation, and disposal of waste at a general level. The following note specifies relevant aspects of the regulations.

The Regulations are read and construed as being in addition to, and not in contravention of, the Pesticides and Toxic Chemicals Control Act 2000 (No. 13 of 2000). Based on the definition, all chemical wastes, persistent organic pollutants (POPs) are covered under these Regulations for the purposes of management.

The following are some specific aspects relevant to the management of POPs as established by the Regulations that need to be noted:

- Disposal is defined as "*the discharge, deposit, injection, dumping or placing of any hazardous waste into or on any land so that it may enter the environment, be emitted into the air or discharged into any waters, including groundwater*". It is noted that this definition does not encompass disposal by means that may be considered environmentally sound, and in the case of POPs wastes, their destruction or irreversible transformation per the Stockholm Convention.

- Hazardous waste is defined as any "*waste or combination of wastes which, because of its quantity, concentration or physical, chemical or infectious characteristics, may pose a substantial hazard to human health, and belong to any category contained in Schedules I, unless they do not contain any of the characteristics contained in Schedule II and includes waste that is hazardous industrial waste, acute hazardous waste chemical, hazardous waste chemical, severely toxic waste, flammable waste, corrosive waste, reactive waste, radioactive waste, clinical waste, leachate toxic waste or polychlorinated biphenyl waste*". This definition can be used to cover all chemicals listed under the Stockholm Convention.

- Permits are required for the generation of hazardous waste, and a requirement exists that such wastes be monitored throughout the production, storage, transport, and release phases. It is noted that no explicit permitting requirements apply to facilities intended for storage, treatment, and disposal, or competence certification of those involved in handling and transport.

- The waste streams on which focus is centred for control are as set out in Schedule I, namely:

(i) clinical wastes from medical care in hospitals, medical centres and clinics;
(ii) wastes from the production and preparation of pharmaceutical products;
(iii) wastes from the production, formulation and use of biocides and phytopharmaceuticals;
(iv) waste pharmaceuticals, drugs and medicines; and
(v) wastes from the manufacture, formulation and use of wood preserving chemicals.

- Additionally, Schedule I specifies wastes containing the following constituents for control;
  (i) metal carbonyls;
  (ii) beryllium, beryllium compounds;
  (iii) hexavalent chromium compounds;
  (iv) copper compounds;
  (v) zinc compounds;
  (vi) arsenic, arsenic compounds;
  (vii) selenium, selenium compounds;
  (viii) cadmium, cadmium compounds;
  (ix) antimony, antimony compounds;
  (x) tellurium, tellurium compounds;
  (xi) mercury, mercury compounds;
  (xii) thallium, thallium compounds;
  (xiii) lead, lead compounds;
  (xiv) inorganic fluoride compounds excluding calcium fluoride;
  (xv) inorganic cyanides;
  (xvi) acidic solutions or acids in solid form;
  (xvii) basic solutions or bases in solid form;
  (xviii) asbestos (dust and fibres) \organic phosphorous compounds;
  (xix) organic cyanides;
  (xx) phenols, phenol compounds including chlorophenols;
  (xxi) ethers;
  (xxii) halogenated organic solvents;
  (xxiii) any congener of polychlorinated bibenzo-furan;
  (xxiv) any congenor of polychlorinated dibenzo-p-dioxin; and;
  (xxv) other organohalogen compounds.

It is noted that the regulations have not directly or by reference adopted any quantitative limits with respect to the above that would more specifically differentiate waste containing the above as hazardous in practice. Relative to POPs waste as controlled under the Convention, they do explicitly cover dioxins and furans and could be deemed to cover other POPs waste under coverage of halogenated substances, although it would likely be appropriate to expressly cover polychlorinated biphenyls (PCBs).

1.7.2.1.2 Environmental Protection (Air Quality) Regulations 2000

These Regulations were formulated to protect the air quality and provide the necessary infrastructure for controlling the quantity of contaminants by stipulating specific allowable levels of emissions that are released into the atmosphere at any given time. Parameters are specified for the following contaminants:

(a) Smoke;
(b) Solid Particles;
(c) Sulphuric acid mist or sulphuric trioxide;
(d) Fluoride compounds;
(e) Hydrogen chloride;
(f) Chlorine;
(g) Hydrogen sulphide;
(h) Nitric acid or oxides of nitrogen; and
(i) Carbon monoxide.

While providing the basic framework for air quality regulation, this regulation does not extend to setting actual air quality standards for those parameters listed. It is noted that the scope of controlled emissions does not extend to any emissions relevant to the Stockholm Convention and specifically, unintentional release covered in Convention Annex C, such as dioxins and furans, which should appropriately be listed for Guyana.

1.7.2.1.3 Environmental Protection (Water Quality) Regulations 2000

These Regulations were developed to manage the discharge of waste matter into inland and coastal water bodies. They provide for minimizing the contamination of potential and existing water supply sources. Limits are specified for the following substances:

(a) Ammonical Nitrogen;
(b) Sulphate;
(c) Chloride;
(d) Cobalt;
(e) Colour;
(f) Detergents, Anionic;
(g) Fluoride (as F);
(h) Molybdenum;
(i) Phosphate (as P);
(j) Polychlorinated Biphenyls (PCBs);
(k) Selenium;
(l) Silver;
(m) Beryllium;

(n) Vanadium;
(o) Radioactive Material;
(p) Nitrate nitrogen;
(q) Temperature;
(r) Pesticides, fungicides, herbicides, insecticides, rodenticides, fumigants or any other biocides or any other chlorinated hydrocarbons; and
(s) A substance that either by itself or in combination with other waste or refuse may give rise to any gas, fume or odour or substance which causes or is likely to cause pollution

While relatively comprehensive, no actual discharge limits for any substances have been established under these regulations. One POPs chemical, PCBs, is named, and the wording allows for any other chemical to be addressed as required, but none has been included to date.

1.7.2.2 Pesticides and Toxic Chemicals Control Act 2000 (No 13 of 2000)

The Pesticides and Toxic Chemicals Control Act established the Pesticides and Toxic Chemicals Control Board and provides for the management of pesticides and toxic chemicals as well as the development of all supporting Regulations required for managing the life cycle of these chemicals, covering production, import, use, export, and disposal. The Act provides the legal basis for the following:

(a) register pesticides and toxic chemicals;
(b) license persons to import or manufacture registered pesticides and toxic chemicals;
(c) authorize persons to sell restricted pesticides;
(d) register premises in which a restricted pesticide may be sold;
(e) license pest control operators;
(f) consider and determine applications made pursuant to the Act and to deal with all aspects of the importation, manufacture, transportation, storage, packaging, preparation for sale, sale, use, and disposal of pesticides and toxic chemicals; and
(g) advise the Minister on matters relevant to the making of regulations under this Act, and to monitor the implementation of such regulations.

Part IV of the Act (Registration and Licenses) provides the specific powers required for registration, storage, sale, import, licensing, prohibition, and restriction of pesticides and chemicals.

Section 9 empowers the Board to act on the improvement of management practices related to pesticides and chemicals, while Section 34 provides for dealing with offences and penalties.

The 2007 Amendment to the Act provides for the regulation of exports and for accession to international agreements governing pesticides and chemicals by providing for the adoption of obligations assumed under them. This effectively provides legal authority to enforce provisions and obligations under the Stockholm and Rotterdam Conventions, as well as facilitate implementation of the Basel Convention,

noting that it would also link more directly to the management of hazardous waste under the Environmental Protection Act.

1.7.2.2.1 Pesticides and Toxic Chemicals Regulations 2004 and Amendment

The 2004 regulations established under the Act provide the instruments and requirements for the implementation of the Act in the following areas:

(a) pesticide and chemical registration and classification procedure;
(b) pesticide labelling;
(c) certification of pesticide applicators;
(d) pesticide manufacturing (formulation) and distribution certificates;
(e) experimental pesticides and chemicals studies;
(f) transportation, storage, disposal, and recall procedures for pesticides and chemicals;
(g) ministerial emergency registration and exemptions;
(h) management of pesticide residues and obsolete pesticides; and
(i) pesticide worker protection.

The 2007 amendment served to elaborate and clarify detailed requirements for the import and export of chemicals, generally including schedules and documentation required

Under these regulations, the basis for control of chemicals used in the country is the registration provisions that initially focused just on pesticides, which constitute the main category of controlled chemicals in use, but now extends more broadly to any chemical potentially constituting a risk to the environment and human health. All such chemical pesticides used in Guyana must be registered by the Board and only the registrant of a chemical is allowed to import that chemical. Registration of a chemical or pesticide requires the submission of the complete formula and a full description of the tests made and the results upon which the potency claims of the pesticide are made. Data submitted includes the following:

(a) physical characteristics;
(b) chemical characteristics;
(c) chemical composition;
(d) toxicological properties;
(e) certified limits of the ingredients;
(f) environmental fate;
(g) toxicity data;
(h) foliar dissipation; and
(i) soil dissipation data.

Under the Regulations, all information submitted is treated as confidential and can only be shared with the public with the written authority of the registrant, noting that

material safety data sheets and associated information are public and must be available.

Controlled chemicals and pesticides are classified under the following categories:

(i) Registered – approved as registered for import;
(ii) Restricted – chemicals registered but subject to a certificate of import, sale, and use as well as life cycle record keeping;
(iii) Prohibited – chemicals banned from import, sale and use; and
(iv) Pending – chemicals whose registration is in process and under assessment.

In general, prohibited chemicals are those judged to be unacceptable based on toxicity, use pattern under local conditions, experience in other countries (particularly OECD countries) and the bans/recommendations adopted by international organizations such as the World Health Organization (WHO) and United Nations Food and Agricultural Organization (FAO), and multi-lateral Conventions including the Stockholm and Rotterdam Conventions. As elaborated in more detail below, bans and restrictions contained in the Stockholm Convention are generally but not entirely covered under this regulation. The PTCCB website maintains current lists of chemicals in each of the above categories[26].

In the case of restricted pesticides, permitting for use is limited to certain crops, application conditions, and locations, taking into consideration the following factors:

(a) the pesticide, as formulated, has an acute oral LD_{50} of 50 mg/kg or less;
(b) the pesticide, as formulated, has an acute dermal LD_{50} of 200 mg/kg or less;
(c) the pesticide, as formulated, has an acute inhalation LC_{50} of 0.05 mg/l or less, based upon a 4-hour exposure;
(d) the pesticide, as formulated, is corrosive to the eyes or causes corneal irritation persisting more than 21 days;
(e) the pesticide, as formulated, is corrosive to the skin, causing scarring or tissue destruction;
(f) the pesticide, as diluted for use, has an acute dermal LD_{50} of 15 g/kg or less;
(g) when used in accordance with label directions or widespread and commonly used practice, the pesticide may cause significant sub-chronic toxicity, chronic toxicity, or delayed toxic effects on man, as a result of single or multiple exposures to the product ingredients or residues.
(h) under normal conditions of label use or widespread and commonly recognized practice, the pesticide causes discernible adverse effects on non-target organisms such as significant mortality or effects on the physiology, growth, population levels, or reproductive rates of such

[26] http://www.ptccb.org.gy/index-4.html

organisms, resulting from direct or indirect exposure to the pesticide, its metabolites or degradation products; or

(i) any other factor that poses a serious risk of causing human injury or environmental harm despite the normal labelling restrictions, packaging requirements, and other cautions as determined by the Board.

Under the Regulations, chemicals can only be sold from certified premises, while the sale of restricted chemicals must be carried out only at premises approved for the sale of such types of chemicals. Similarly, applicators must be registered on an annual basis. In both cases, PTCCB maintains lists of certified premises, including those approved for the sale of restricted chemicals, and approved applicators.

Enforcement of the Act and its associated Regulations is done through the inspectorate of the Board. The enforcement mechanisms available under the Regulations are notice of warning, civil penalties, stop sale, use, or removal order, seizure, injunction, and criminal proceedings.

1.7.2.3 Food and Drugs Act 1971

The Food and Drug Act relates to the control and management of the composition, use, and effects of substances used in foods, drugs, cosmetics, and therapeutic devices. This Act is administered and enforced by the Food and Drug Department of the Ministry of Health through analysts and inspectors. The Act also provides for the control of chemicals used in the disinfection of premises or control of vermin in food premises; and in the control of pests of plants and animals, although the latter is largely superseded and transferred over to the Pesticides and Toxic Chemicals Control Board via an MOU. This Act also covers importation, standards, and misleading representation of food, drugs, and cosmetics. The main relevance of this legislation to the POPs issue is its role in advising the Minister of Health in policy decisions on chemicals that are allowed or disallowed for importation and use in Guyana. This specifically relates to the situation regarding the option of using DDT for vector control and consequential requirements under the Stockholm Convention for a specific exemption.

1.7.2.4 Occupational Safety and Health Act 1997

The Occupational Safety and Health Act is the responsibility of the Occupational Safety and Health Department of the Ministry of Labour. The Act makes provision for the registration and regulation of industrial establishments and for the occupational safety and health of persons at work. The Act covers hazardous chemicals in workplaces that can endanger the health of workers, and allows for the limited or restricted use of such chemicals. It also covers the introduction of new chemicals in the workplace. A specific relevant provision that operates alongside the provisions of the Pesticide and Toxic Chemicals Control Act is the requirement that employers maintain a hazardous material inventory and appropriate documentation and procedures covering the following:

(a) toxic properties, both acute and chronic health effects;
(b) chemical and physical characteristics of the chemical;
(c) corrosive and irritant properties;
(d) allergenic and sensitizing effects;
(e) carcinogenic effects;
(f) teratogenic and mutagenic effects;
(g) effects on the reproductive systems;
(h) labelling of the chemical;
(i) provision of material safety data sheets; and
(j) instruction and training in the chemicals used.

1.7.2.5 Solid Waste Management Bill 2014

One piece of pending legislation that should be noted as potentially being of significant importance within the national legislative framework related to POPs is the proposed Solid Waste Management Act, which proposes to establish a national Solid Waste Management Authority under the Ministry of Local Government and Regional Development. Under the proposed Bill of 2014, it contains a definition for 'hazardous wastes' as follows: "*a waste or combination of wastes which, because of its quantity, concentration or physical, chemical or infectious characteristics, may pose a substantial hazard to human health and belong to any category contained in Schedule I of the Environmental Protection (Hazardous Wastes) Regulations 2000, unless they do not contain any of the characteristics contained in Schedules II of the environmental Protection (Hazardous Wastes) Regulations 2000 and includes the following waste:*

(a) hazardous industrial waste;
(b) acute hazardous waste chemical;
(c) hazardous waste chemical;
(d) severely toxic waste;
(e) flammable waste;
(f) corrosive waste;
(g) reactive waste;
(h) radioactive waste;
(i) clinical waste; and
(j) leachate waste, or polychlorinated biphenyl (PCBs) waste, and
(k) includes a mixture of acute hazardous waste chemicals, hazardous waste chemicals, pathological waste, radioactive waste, or severely toxic wastes, and any other waste or hazardous material."

This Bill's significance in relation to the POPs issue is that it proposes to establish national standards for solid waste disposal, including placing limitations on accessibility to disposal facilities that may currently dispose of POPs.

While the above legislations provide the fundamental legislative framework available to address the POPs issue, a number of other legislations exist that relate to the control of other chemicals of various types and categories, such as drugs and narcotics, petroleum products, sulphuric acid, and ozone-depleting substances.

The Ministry of Finance and the executive branch of the government are also stakeholders, recognizing the fiscal and public good implications of the country's involvement in addressing POPs issues and meeting national obligations under the Stockholm Convention and other MEAs.

1.7.3 Relevant International Commitments and Obligations

Guyana is a Party to a wide range of multilateral environmental agreements and conventions related to the environment, as well as an active participant in activities under the International Conference on Chemicals Management (ICCM). The major ones that have a relationship with the management of the POPs chemicals are shown in **Table 8**.

Table 8: Guyana International Environmental Commitment and Obligations

Environmental Agreement & Responsible Agency	Signed	Ratified	Acceded
Convention on International Trade in Endangered Species of Wild Fauna and Flora CITES **Environmental Protection Agency**		25th August 77	
UN Framework Convention on Climate Change **Office of Climate Change**	13th June 92		
Convention on Biological Diversity. Rio de Janeiro, 5 Jun 1992 **Environmental Protection Agency**	13th June 92	29th August 94	
Vienna Convention for the Protection of the Ozone Layer. Vienna March 1995 **Hydrometeorological Department MOA**			12th August 93
Montreal Protocol on Substances that Deplete the Ozone Layer. Montreal September 1987 **Hydrometeorological Department MOA**			12th August 93
UN Convention to Combat Desertification in those Countries Experiencing Drought and/ or Desertification Particularly in Africa. Paris, 14 Oct 1994 **Guyana Lands and Surveys Commission**		26th June 97	
Basel Convention on the Control of Trans-boundary Movement of Hazardous Waste and their Disposals. Geneva, 22 March 1989 **Environmental Protection Agency**			4th April 01
Kyoto Protocol to UN Convention on Climate Change **Hydrometeorological Department MOA**			5th August 03
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. Rotterdam, 10 Sept 1998 **Pesticides and Toxic Chemicals Control Board**			30th April 07
Stockholm Convention on Persistent Organic Pollutants. Stockholm, 22 May 2001 **Pesticides and Toxic Chemicals Control Board**			12th September 07
Cartagena Protocol on Biosafety to the Convention on Biological Diversity. Montreal, 29 Jan 2000 **Environmental Protection Agency**			16th July 08

Amendment to the article XXI of CITES adopted in Gaborone on April 30, 1983 deposited on July 5, 2007 **Environmental Protection Agency**	Not yet in force		
Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region **Environmental Protection Agency**			

In addition to the Stockholm Convention, there are two (2) relevant conventions signed by Guyana. These are the Basel and Rotterdam Conventions.

1.7.3.1 The Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal seeks to "*protect, by strict control, human health and the environment against the adverse effects which may result from the generation and management of hazardous wastes and other wastes*".

A central goal of the Basel Convention is the environmentally sound management of hazardous waste. To this end, the Convention establishes a system to control the transboundary movement of hazardous waste and requires all Parties to report on their generation, export, and import of wastes covered by the Convention. Parties can also access, via the Secretariat or one of the Regional Centres for Training and Technology Transfer, technical assistance and training in the management and minimisation of hazardous wastes.

All of the chemicals included in the SC, on becoming wastes, are subject to the controls of the Basel Convention. Specifically, the Basel Convention governs the management, movement, and disposal of the following types of POPs wastes:

(a) **PCBs, PCTs, PCN, and PBBs**

Waste electrical and electronic assemblies or scrap containing components such as accumulators and other batteries, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors; Wastes, substances and articles containing, consisting of or contaminated with PCB, PCT, PCN or PBB, or any other polybrominated analogues of these compounds, at a concentration level of 50 mg/kg or more.

(b) **Pesticide POPs, including aldrin, chlordane, DDT, dieldrin, endrin, HCB, heptachlor, mirex, lindane, PCP, endosulfan, and toxaphene.**

Wastes from the production, formulation, and use of biocides and phytopharmaceuticals, including waste pesticides and herbicides, which are off-specification, outdated, or unfit for their originally intended use.

(c) **Unintentionally produced PCDD, PCDF, HCB, PCB, PeCB, or PCN**

The Basel Convention Secretariat has issued a wide range of guidelines, guidance, and training manuals to instruct and assist countries in the environmentally sound

management of hazardous wastes, including the General technical guidelines for the environmentally sound management of wastes consisting of, containing, *or contaminated with persistent organic pollutants (POPs).*

1.7.3.2 The Rotterdam Convention

The Rotterdam Convention was created in response to the call in Chapter 19 of Agenda 21 for a legally binding instrument on the Prior Informed Consent (PIC) procedure. The PIC procedure is “a means for formally obtaining and disseminating the decisions of importing countries as to whether they wish to receive future shipments of specified chemicals and for ensuring compliance with these decisions by exporting countries."

The Rotterdam Convention’s aim is “*to protect human health, including consumers and workers, and the environment against potentially harmful impacts from certain hazardous chemicals and pesticides in international trade*”. To achieve this aim, two main objectives have been identified:

- To promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm; and
- To contribute to their environmentally sound use, by facilitating exchange about their characteristics, by providing for a national decision-making process on their import and export, and by disseminating these decisions to Parties.

The Rotterdam Convention establishes a first line of defence by giving importing countries the tools and information they need to identify potential hazards and exclude chemicals they cannot manage safely. The Convention promotes the safe use of imported chemicals through labelling standards, technical assistance, and other forms of support.

1.7.4 POPs Regulatory Authorities

The principal government agencies with legislative and regulatory authorities for the management of chemicals, pesticides, and hazardous materials and their associated multi-lateral agreements are the PTCCB and the EPA. The Agency that takes the lead for the implementation of the Stockholm Convention is the PTCCB, which serves as the focal point. The PTCCB is also the focal point for the Rotterdam Convention and the Global Framework on Chemicals (GFC), formerly known as the Strategic Approach for International Chemical Management (SAICM), as of September 2023. The EPA is the focal point for the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. The Hydrometeorological Department of the Ministry of Agriculture is the focal point for the Montreal Protocol. The following provides a profile of the two (2) principal Agencies relative to the Stockholm Convention.

1.7.4.1 Pesticides and Toxic Chemicals Control Board (PTCCB)

The PTCCB operates as an autonomous agency under the Ministry of Agriculture and the legal authority of the Pesticides and Toxic Chemicals Control Act. It has regulatory authority over the management - import, export, production, transportation, use, disposal, and storage - of pesticides as well as chemicals having environmental and health impacts. By definition, this encompasses all chemicals such as pesticides, industrial chemicals, disinfectants, detergents, paints, and paint products.

The PTCCB is supervised by a Board of Directors representing a range of major national institutional and external stakeholders having an interest in chemicals management issues, including the Ministry of Agriculture, EPA, the Ministry of Health, research and academic institutions, medical practitioners, and agricultural producers. Operationally, the PTCCB conducts its work with staff under the direction of the Registrar. It is organized into two sections, Registration and Enforcement.

- The Registration section is responsible for registration and licensing associated with the management of pesticides and toxic chemicals.
- The Enforcement Section is responsible for enforcing the Act and Regulations associated with the licensing and registration process, as well as the provision of training under the said Act and Regulations.

A Pesticides and Toxic Chemicals Laboratory (PTCL) is operated under the auspices of the Board to enhance the life cycle management of pesticides and toxic chemicals. The PTCL is generally considered to be the main pesticide and toxic chemical management analytical support in the country.

In addition to the registration, assessment, and permitting functions defined in the description of the Pesticide and Toxic Chemicals Control Act and its subsidiary regulations, the PTCCB acts as the focal point for the Stockholm and Rotterdam Conventions as well as the national activities associated with the International Conference on Chemicals Management and associated initiatives relating to the GFC. In addition, it undertakes public awareness, training, and other education programs for farmers, extension agents, vendors, students, pest control operators, and Customs and Trade Administration Officers throughout Guyana. The Board maintains a public awareness program through the development and distribution of training manuals and the publication of a quarterly newsletter. Further, the Board participates frequently at national exhibitions and television programmes featuring agriculture issues, in addition to hosting a website with a comprehensive range of topics pertinent to its mandate.

The management of chemicals is covered under the Pesticides and Toxic Chemicals Control Act 2000 (No. 13 of 2000), its amendment, the Pesticides and Toxic Chemicals Control (Amendment) Act 2007 (No. 13 of 2007), their Regulations, the Pesticides and Toxic Chemicals Control Regulations 2004 (No. 8 of 2004), its amendment, the Pesticides and Toxic Chemicals (Amendment) Regulations 2007 (No. 8 of 2007).

Under the principal act, pesticide is defined as "*any substance or mixture of substances intended for preventing, destroying or controlling any pest, including vectors of human or animal disease, unwanted species of plants or animal causing harm during or otherwise interfering with the production, processing, storage, transport, or marketing of food, agricultural and industrial commodities, wood and wood products, or animal feedstuffs or which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies but the term does not include any anti-septic, disinfectant or drug*" and toxic chemical is defined as "*any disinfectant or any other substance known to be poisonous, corrosive, irritating, sensitizing or harmful to man or animal that is used in agriculture, the arts, commerce or industry, or for any domestic or other purpose, other than any antiseptic, drug or pesticide*". Based on these two definitions, all chemicals are managed under this Act with the exception of pharmaceuticals, antiseptics, and drugs.

A number of overlaps exist with respect to the chemicals classified as precursor chemicals, which are governed under the Narcotic Drug and Psychotropic Substances (Control) Act, which is managed by the Ministry of Home Affairs in collaboration with the Food and Drug Department.

Whilst sulphuric acid is governed by the Sulphuric Acid Act 1928 (No 7 of 1928) and is managed by the Commissioner of Police, this chemical would be classified as a toxic chemical under the Pesticides and Toxic Chemicals Control Act 2000. This Act does not make a determination or reference to this chemical (sulphuric acid), so the overlap will continue until a legal reference is made.

This overlap is further exemplified under the Food and Drugs Act 1971 (No. 12 of 1971) where a drug is defined as "*any substance or mixture of substances manufactured, sold or represented for use in (a) the diagnosis, treatment, mitigation or prevention of a disease, disorder, abnormal state of health, or the symptoms thereof, in man or animal; (b) restoring, correcting or modifying organic functions in man or animal; (c) disinfection in premises in which food is manufactured, prepared, preserved, packaged or stored for sale or sold, or for the control of vermin in such premises; or (d) the control of plants or animal pests*."

Notwithstanding the above, by virtue of an MOU with the Food and Drug Department, the management of pesticides and toxic chemicals is the sole responsibility of the PTCCB, with the exception of the precursor chemicals and sulphuric acid. The management of these two named chemicals is the responsibility of the Ministry of Home Affairs and the Food and Drug Department of the Ministry of Health. The PTCCB also has MOUs to address similar "grey" areas associated with the management of chemicals within the mining sector with the GGMC, such as mercury, and the Guyana Revenue Authority (GRA) for the importation and exportation of all pesticides and toxic chemicals.

1.7.4.2 Environmental Protection Agency (EPA)

The EPA operates under the Ministry of Natural Resources and Environment with a specific mandate from the Environmental Protection Act described above. Implementation of this part of the Environmental Protection Act is assigned to the Environmental Protection Division within the EPA. The staff of the Environmental Management Division administers the relevant parts of the legislation, namely those associated with hazardous waste, air pollution, and water quality. Some staff are directly involved with hazardous waste regulatory issues. There are two responsibilities relevant to the POPs that this Division handles: (i) maintenance of a national hazardous waste generation inventory and (ii) functioning as the national focal point for the Basel Convention. It should be noted that for the mining sector, the GGMC, in compliance with an MOU with the EPA, is responsible for the implementation of some sections of the Environmental Protection Act and the associated regulations, namely those associated with mine tailings and management and use of mercury.

1.7.5 Key Approaches and Procedures for POPs chemical and pesticide management, including enforcement and monitoring requirements

These aspects are generally covered in the above sections. The basic approach to chemicals and pesticide management is to control imports through the registration system. The use and handling of the registered chemicals are managed through a licensing and certification system, which is supported by enforcement and analytical infrastructures. There is further support, featuring analytical enforcement to complete the life cycle management of all chemicals.

Where the management of the POPs chemicals is concerned, Guyana has the legislative and regulatory tools to prevent entry into the country by listing the chemical as prohibited. Further, if the chemical is not permitted for use within the exporting country, it is automatically prohibited from being exported to Guyana. Only registered chemicals are allowed to be imported, and a license to import must be issued before said chemical is allowed into the country. The importation of any chemical is enforced by the Customs Administration Unit of the GRA and the Enforcement Section of the PTCCB.

Where a chemical is restricted in Guyana, only prior authorized personnel are allowed to use, import, store, transport, and dispose, which are strictly monitored and enforced by the Enforcement Section of the PTCCB.

As stated earlier, the tools for the management of POPs are present within the country; however, timely execution using said tools is not always forthcoming. Whilst a number of chemicals are not present in the country, the legislative completion of the prohibition must be executed, which is an example of a deficiency under the current system. Similarly, the coverage of products containing POPs, specifically in respect to recently introduced annexed POPs chemicals, requires clarification.

Similarly, with respect to the POPs chemicals in waste form or as unintentional releases, the basic legislative and regulatory framework for management exists, except in relation to waste exports, which in this form is under the auspices of the EPA

and is covered by the Basel Convention. However, as noted above, the deficiencies identified, in terms of their practical application and the actual coverage they provide for POPs wastes, will be addressed under this NIP.

These include, but are not limited to, the following:

(a) more explicit specification of POPs as waste, discharge or release contaminant;
(b) adoption directly or by reference to a recognized international standard of quantitative limits, at least for priority POPs chemicals (i.e., PCBs, PCDD/F);
(c) standard and permitting provision for hazardous waste management facilities and operations; and
(d) explicit waste tracking and stockpile reporting requirements generally and potentially specific to priority POPs (i.e. PCBs).

Likewise, there is no specific coverage of contaminated sites under the current regulations, although this could be incorporated under the hazardous waste regulation. In relation to the POPs issue, this is important so that action and cleanup standards can be set when POPs-contaminated site legacies are addressed. In terms of enforcement and monitoring, EPA's capacity is limited and, in practical terms, is allocated to other agencies in specific areas of competence, the management of obsolete pesticides by PTCCB being an example.

The one additional gap in the regulatory framework related to hazardous waste that exists relates to regulations governing the import, transit, and export of hazardous waste in compliance with Basel Convention requirements and procedures. A specific regulation addressing this was developed in 2001 and offers relatively comprehensive coverage[27]. However, it has not been formally enacted as a legal regulatory instrument. Completing this process will be important in the context of implementing the Basel Convention's obligations and this NIP, given that export of POPs wastes may be required and there is additionally a need to control scrap metal exports that may have possible POPs contaminants.

1.8 ASSESSMENT OF POPs ISSUE IN GUYANA

This subchapter contains specific information on POPs listed under the three annexes of the Stockholm Convention, including: historical, current, and projected future production, use, import, export, waste management, and existing policy and regulatory framework. Further to this, the inventory information, current technical, management, and monitoring capacity, potential impacts, and the level of public awareness and concern are also covered.

Guyana has never had any direct production of basic or complex chemicals. The production of consumer products, including paint, detergents, soaps, and certain pharmaceuticals, necessitated the importation of basic chemical products. Historical records of chemical imports are very limited prior to the enactment of the Pesticides and Toxic Chemicals Control Act in 2000. This commenced the regulatory processes and the recordings of information associated with the production, use, disposal, and import of pesticides and toxic chemicals in Guyana.

[27] Draft Environmental Protection (Export and In-transit Import) Regulation (2001)

The assessment of the POPs management in Guyana is based on the six (6) POPs inventory conducted and their associated reports, which are categorized by POPs groups: (i) Pesticides, (ii) uPOPs, (iii) PCBs, (iv) PBDEs and HBCD, (v) SCCPs and (vi) PFOS/PFOA. The following are the findings of the inventories and the assessment of each group as per the Stockholm Convention Annexes.

2.3.1 Assessment with respect to Annex A, Part I (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.

Article 3 of the Convention obligates Parties to prohibit and/or take the legal and administrative measures necessary to eliminate the production, use, export, and import of POPs that are *intentionally* produced. Restrictions on production and use are applicable for DDT, which is an important control for malaria outbreaks.

1.8.1.1 General

There are sixteen (16) POPs pesticides listed under the Stockholm Convention: nine (9) POPs pesticides initially listed and seven (7) new POPs pesticides that were added to the list over the lifetime of the Convention. **Table 9** provides the names of the pesticides in the two groups.

Table 9: POPs Pesticides listed under the Stockholm Convention.

No.	Initial POP Pesticides	New POP Pesticides
1	Aldrin	Alpha-hexachlorocyclohexane (α-HCH)
2	Chlordane	Beta- hexachlorocyclohexane (β-HCH)
3	Dichlorodiphenyltrichloroethane (DDT)	Chlordecone
4	Dieldrin	Lindane
5	Endrin	Pentachlorobenzene (PeCB)
6	Heptachlor	Technical Endosulfan and its related Isomers
7	Hexachlorobenzene (HCB)	Pentachlorophenol (PCP)
8	Mirex	Dicofol
9	Toxaphene	Methoxychlor

1.8.1.2 Production of POPs pesticides

Guyana does not have any production or formulation facilities for any pesticide. There has never been any recorded evidence of any production of POPs pesticides in Guyana.

1.8.1.3 Import and Use of POPs pesticides

Whilst there is no evidence of imports of the initially listed POPs. The institutional memory and recorded stockpile of the following pesticides insinuates that they were imported and may have been previously used in Guyana:

(a) Endrin – This was used as a rodenticide and insecticide for the sugar cane borer in the sugar industry;
(b) Mirex – This was used as the active ingredient in the formulation for acoushi ant bait.

(c) Lindane – This was used as the medication for scabies and lice.

There is evidence of the importation of endosulfan in Guyana, where the last importation occurred in 2006. This was used in the rice and the small coffee industry against the borer.

1.8.1.4 Regulatory and Policy Framework

Guyana has a strong legislative and regulatory framework for the management of pesticides and toxic chemicals. The Pesticides and Toxic Chemicals Control Act (No. 13 of 2000) provides for the control of the manufacture, importation, sale, storage, and use of pesticides, and related matters. The Act also established a regulatory agency, the Pesticides and Toxic Chemicals Control Board, which has oversight of all pesticides and toxic chemicals entering and used in Guyana.

The Pesticides and Toxic Chemicals Control Act of 2000 established a regulatory agency that has oversight for pesticides and all toxic chemicals entering the country. The PTCCB regulates all aspects of pesticide and toxic chemicals entering and used in Guyana.

1.8.1.5 Legal status of initial POPs Annex A pesticides

The initial listed POPs Annex A pesticides – Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene (HCB), Mirex, and Toxaphene – have all been specifically banned from import and use under the Pesticides and Toxic Chemicals Control Act (No. 13 of 2000) and its associated Regulations, the Pesticides and Toxic Chemicals Regulations (No. 8 of 2004) and its amendments and particularly the Pesticides and Toxic Chemicals Control (Prohibited Pesticides) Order 2006 (No 22 of 2006). **Table 10** provides a summary of the management actions for the intentionally produced chemicals – POPs pesticides - in Guyana.

Table 10: Management Actions for the Initial POPs in Guyana.

No.	Initial POP Pesticides	Management Actions
1	Aldrin	Banned from import and use (Order No. 22 of 2006)
2	Chlordane	Banned from import and use (Order No. 22 of 2006)
3	Dieldrin	Banned from import and use (Order No. 22 of 2006)
4	Endrin	Banned from import and use (Order No. 22 of 2006)
5	Heptachlor	Banned from import and use (Order No. 22 of 2006)
6	Hexachlorobenzene (HCB)	Banned from import and use (Order No. 22 of 2006)
7	Mirex	Banned from import and use (Order No. 22 of 2006)
8	Toxaphene	Banned from import and use (Order No. 22 of 2006)

1.8.1.6 Legal status of new listed POPs - Annex A pesticides

The following are the legal status of the newly listed POPs pesticides:

(a) Four of the newly listed POPs in Annex A pesticides – Alpha-hexachlorocyclohexane (α-HCH), Beta-hexachlorocyclohexane (β-HCH), Lindane, Pentachlorophenol (PCP) and its salts and esters – have all been specifically banned from import and use under the Pesticides and Toxic Chemicals Control Act (No. 13 of 2000) and its associated Regulations, the Pesticides and Toxic Chemicals Regulations (No. 8 of 2004) and its

amendments and particularly the Pesticides and Toxic Chemicals Control (Prohibited Pesticides) Order 2006 (No 22 of 2006).

(b) Endosulfan is prohibited by an amendment under the Pesticides and Toxic Chemicals Control Act and Regulation via Order No 4 of 2015.

(c) Chlordecone and Pentachlorobenzene (PeCB) which were listed at the fourth meeting of the SC COP, are regulated but not supported by the required legal instrumentation. As such, an action plan item under this NIP would be to add these chemicals to the list of banned chemicals under PTCCB regulations.

Table 11 provides a summary of the administrative actions for the newly listed intentionally produced chemicals – POPs pesticides – in Guyana.

Table 11: Management Actions for the New POPs in Guyana.

No.	New POP Pesticides	Management Actions
1	Alpha-hexachlorocyclohexane (α-HCH)	Banned from import and use (Order No. 22 of 2006)
2	Beta- hexachlorocyclohexane (β-HCH)	Banned from import and use (Order No. 22 of 2006)
3	Lindane	Banned from import and use (Order No. 22 of 2006)
4	Pentachlorophenol (PCP)	Banned from import and use (Order No. 22 of 2006)
5	Technical Endosulfan and related Isomers	Banned from import and use (Order No. 4 of 2015)
6	Pentachlorobenzene (PeCB)	Not registered (No legal measures to support any action)
7	Chlordecone	Not registered (No legal measures to support any action)

1.8.1.7 Legal status of pesticides under Other Conventions and International Policies.

The Pesticides and Toxic Chemicals Control (Prohibited Pesticides) Order 2006 (No 22 of 2006) prohibited a number of other pesticides and toxic chemicals associated with other conventions or multilateral environmental agreements (MEAs). These are listed as follows:

(a) 2, 4, 5–T and its salts and esters,
(b) captafol,
(c) chlordimeform,
(d) chlorobenzilate,
(e) dinoseb,
(f) 1, 2 – dibromoethane,
(g) fluoroacetamide,
(h) mercuric chloride,
(i) methyl parathion,
(j) parathion and
(k) phosphamidon.

Under an amendment to the Act, Order No. 4 of 2015, the following pesticides were added to the prohibition list:

(a) alachlor,
(b) aldicarb,

(c) azinophos-methyl,
(d) methamidophos,
(e) combination formulation of benomyl,
(f) carbofuran and
(g) thiram.

Further to this, restrictive usage was placed on the following:

(a) DDT,
(b) aluminium phosphide,
(c) oxamyl;
(d) methomyl and
(e) paraquat dichloride.

In 2019, Order No 6 further prohibited the following chemicals:

(a) trichlorfon; and
(b) carbofuran.

In 2019, Order No. 7 amended the list of restricted pesticides with the addition of monocrotophos.

1.8.1.8 Monitoring Data on POPs Pesticides

There are no known studies carried out assessing the impact of any of the POPs pesticides on the environment and human health in Guyana. The country lacks the capacity to carry out the analyses required for evaluating and monitoring, and conducting research activities on POPs pesticides.

1.8.1.9 Potential Health Impacts of POPs Pesticides

There is documented evidence that shows that exposure to pesticides associated with occupational, agricultural, and household use, and indirectly from diets, can be a source of contamination. This prolonged contamination can lead to a number of diseases such as cancer, as well as neurological, mental, and reproductive disorders.

1.8.2 Assessment of polychlorinated biphenyls (PCBs) (Annex A Part II Chemicals)

1.8.2.1 General

Polychlorinated biphenyls (PCBs) are a class of aromatic organochlorinated compounds containing 2 – 10 chlorine atoms substituted to a biphenyl molecule. The chemical formula for PCBs is $C_{12}H_{10-x}Cl_x$. PCBs are man-made chemicals that are not flammable and have high electrical resistance with good insulating properties, which make them useful for electrical utilities and in other industrial applications.

The World Health Organisation (WHO) categorized the uses of PCBs into three applications: completely closed, nominally closed, and open-ended. The closed usage includes dielectric fluids in transformers, capacitors, and coolants, in nominal closed applications such as hydraulic fluids, and in open applications such as sealants and caulking materials, paints and other coatings, plastic additives in PVC and artificial rubber, waxes, carbonless copy paper, and many other products.

PCBs have been identified as category 1 carcinogens and are endocrine, reproductive, and immune system disrupters with a negative impact on the environment, threatening wildlife and biodiversity. PCB was listed among the first twelve POPs, the dirty dozen, under the Convention in Annex A, Part II, as an industrial chemical and Annex C as an unintentionally produced POP, uPOP. According to the Conventions, Parties must eliminate the use of PCBs in equipment by 2025 and ensure the environmentally sound waste management of liquids containing PCBs and equipment contaminated with PCBs by 2028.

An initial inventory for PCBs was conducted in 2013 to support the development of the initial NIP and to examine PCBs in electrical transformers. An inventory was further conducted to support this NIP, and was focused on the identification of transformers that are potentially contaminated with PCBs.

1.8.2.2 Production and Use

Guyana is not a producer or an importer of PCBs as a chemical compound. The use of PCBs in electrical or industrial equipment was discontinued in the 1980s.

1.8.2.3 Importation

PCBs have been imported into the country as dielectric fluids in electrical equipment such as transformers manufactured prior to the mid-1980s. Guyana is not historically an industrialised country, so the use of the transformers has mainly been by the power utility company involved in the power generation, transmission, and distribution system. The main utility company is the state-owned Guyana Power and Light Inc. (GPL), responsible for supplying electric power, servicing 90% of the country's demand via generation, transmission, and distribution facilities. There are a few other privately owned power operators, such as the Linden Power Company (LPC), now operated by BOSAI Minerals Inc.; the Linden Electric Company Incorporated (LEC) that supplies electricity to the Linden, McKenzie and the Demerara areas; and the Linden Utility Services Cooperative Society Limited (LUSCSL) that supplies the Wismar Christiansburg area and its settlements.

1.8.2.4 Assessment of PCB Stockpile and Wastes

Based on the above, stakeholder consultations and field assessments were conducted, focused on both the stored out-of-service equipment and oils and in-service equipment (where possible) that may contain PCBs, used by the main agencies supplying power in Guyana. The GPL, the largest provider, presented a master list of the operating power stations and the transformer equipment.

1.8.2.4.1 Power Generation and Supply

The assessment of the power generation and distribution was confined to the GPL facilities. Similarly to the consultations in the initial 2013 NIP for Guyana, consultations with GPL revealed that their distribution system is or was such that there are three (3) general types of transformers within their system and elsewhere in the country - namely (i) larger power transformers, typically in the 69 KV range, (ii) grounding transformers both located at generation facilities and main sub stations, and (iii) smaller pole mounted and customer based distribution transformers located

throughout the distribution network. A significant number of the power and grounding transformers were installed in the 1960s and 1970s. It was recognised that both the 2013 and updated PCBs inventory for the 2021-2023 period include a number of transformers manufactured before the 1980s that remain in service.

For the initial 2013 NIP, the analysis for the presence of PCBs in the operable equipment, manufactured prior to 1985, was conducted using the Clor-N-Oil test kits (supplied by Drexsil) that give an indication of PCB content exceeding 50 ppm.

The assessment was carried out for this NIP by the BCRC-Caribbean and the PTCCB, who conducted a survey at seven of the ten locations operated by GPL within their power generation and distribution networks. Out of the one hundred and one (101) pieces of potentially PCB-contaminated equipment identified, a total of twenty-seven (27) oil samples were obtained. This included twenty-three (23) live and stored transformers and four (4) oil circuit breakers.

To facilitate a more robust analysis and inventory, the oil samples were shipped to the laboratory Aevitas Inc., in Ontario, Canada, for analysis of PCBs using the Standard Test GC-MS Method according to the Test Method ASTM D4509 modified (LAB-M02).

The analyses confirmed positive test results for eleven (11) samples, with transformers exceeding the threshold of 50 mg/kg[4] (ppm). The range of the analysis was 290 – 1200 mg/kg[4]. Eleven (11) of the samples were determined to be free from PCBs, and five (5) were determined to have residual PCB concentration[28].

In addition to the results of the sample analyses, the assessment also concluded that seventeen (17) pieces of equipment are suspected to be PCB contaminated based on the similarity of age, manufacturing batch, date, and serial numbers to the confirmed lab tests. **Table 12** provides a list of the equipment confirmed by the current analysis, previous screening, and labeling, and those suspected due to circumstantial reasons to have PCB contamination in excess of 50 ppm.

Table 12: List of in-service and out of service large transformers - confirmed positive and potentially PCB contaminated.

Location	Equipment Type	Equipment Identification# / Manufacturer	PCB Content (ppm)	Remarks
Sophia Substation (Specialized Equipment)	Three-phase grounding transformer	T.60002.10; Federal Pioneer (Toronto, Canada), 1974	480	In-service; already labelled as PCB positive; no visible leaks.
	Three-phase grounding transformer	T.60002.9; Federal Pioneer (Toronto, Canada), 1974	700	In-service; already labelled as PCB positive; no visible leaks.
	Three-phase grounding transformer	T.60002.7; Federal Pioneer (Toronto, Canada), 1974	350	In-service; already labelled as PCB positive; no visible leaks.

[28] According to UNEP DTIE (2015), for equipment having PCB concentrations greater than 2 mg/kg, but less than 50 mg/kg based on the laboratory analyses, these are sometimes loosely termed as having 'residual-PCBs'.

Location	Equipment Type	Equipment Identification# / Manufacturer	PCB Content (ppm)	Remarks
	Three-phase grounding transformer	SN 62.07.60002-1; Federal Pioneer (Toronto, Canada), 1974	720	In-service; already labelled as PCB positive; no visible leaks.
	Transformer	SN: 10749/2 Bryce Electric Construction Co. Ltd (Hackbridge, England), 1957	-	Out of service in storage yard; Potentially contaminated
	Transformer	SN: 56263/1 Bush Transformers Ltd Hawker Siddley (England) 1976	-	In service, not sampled. Potentially contaminated
	Transformer	SN: 56263/2 Bush Transformers Ltd Hawker Siddley (England) 1976	-	In service, not sampled. Potentially contaminated
	Transformer	SN: 56264/1 Bush Transformers Ltd Hawker Siddley (England) 1976	-	In service; not sampled. Potentially contaminated
	Three-phase Transformer	SN: 63918-2 Federal Pioneer (Canada), 1974	-	Potentially contaminated
	Three-phase Transformer	B-3 S 7307 Westinghouse Canada Ltd 1974	-	In service; not sampled. Potentially contaminated
	Three-phase Transformer	A-3 S 7307 Westinghouse Canada Ltd 1974	-	Offline/decommissioned; Potentially contaminated
Kingston 2 Generating Power Plant (PPDA Inc)	Transformer	SN: T-60002.4	900	In-service, PCB Positive; no visible leaks.
Kingston Power Station – Water St	Interbus Substation Transformer	SN: T439877 Associate Electrical Industries Ltd UK 1962	-	Out-of-service; potentially contaminated; no access for sample. Previous inventory indicated visible leaks where it was last in service and soil positive for PCBs.
	Interbus Substation Transformer	SN: T439880 Associate Electrical Industries Ltd UK 1962	-	Out-of-service; potentially contaminated; no access for sample.
		SN: W101872 Associate Electrical Industries Ltd UK 1962	-	Out-of-service; potentially contaminated; no access for sample.

Location	Equipment Type	Equipment Identification# / Manufacturer	PCB Content (ppm)	Remarks
		SN: W101874 Associate Electrical Industries Ltd UK 1962	-	Out-of-service; potentially contaminated; no access for sample.
		SN: W101873 Associate Electrical Industries Ltd UK 1962	-	Out-of-service; potentially contaminated; no access for sample.
		SN: W103122 Associate Electrical Industries Ltd UK 1963	-	Out-of-service; potentially contaminated; no access for sample.
		SN: W103988 Associate Electrical Industries Ltd UK 1963	-	Out-of-service; potentially contaminated; no access for sample.
#53 Substation	Three-phase grounding transformer	T-60002.3 Federal Pioneer (Canada), 1974	1200	In-service; PCB positive; some visible leaks on the ground
	Three-phase grounding transformer	T-60003.1 Federal Pioneer (Canada), 1974	-	In-service; Potentially contaminated; no sample taken
Garden of Eden Power Station	Three-phase grounding transformer	SN: 62.07.60002-2 Federal Pioneer (Canada), 1974	290	In-service; PCB positive; no visible leaks
	Three-phase grounding transformer	T-60002.5 Federal Pioneer (Canada), 1974	350	In-service; PCB positive; no visible leaks
	Three Phase Grounding Transformer	SN: 55170/1 Brush Transformers Limited, Hawker Siddley (England), 1975	-	Potentially contaminated
	Three Phase Grounding Transformer	SN: 55170/2 Brush Transformers Limited, Hawker Siddley (England), 1975	-	Potentially contaminated
	Three Phase Grounding Transformer	SN: SGT1069-0401 Westinghouse Electric Corporation (USA), 1981	-	Potentially contaminated
Canefield	Three Phase Grounding Transformer	T-60002-6 Federal Pioneer (Toronto, Canada), 1974	310	In-service; PCB positive; no visible leaks

Location	Equipment Type	Equipment Identification# / Manufacturer	PCB Content (ppm)	Remarks
	Three Phase Grounding Transformer	T-60002-11 Federal Pioneer (Toronto, Canada), 1974	460	In-service; PCB positive; no visible leaks
	Three Phase Grounding Transformer	SN: 55170/3 Brush Transformers Ltd; Hawker Siddley (England) 1975	-	In-service, PCB Positive (*marked from previous inventory*); not sampled in current inventory due to access
	Three Phase Grounding Transformer	SN: 55170/4 Brush Transformers Ltd; Hawker Siddley (England) 1975	-	In-service, PCB Positive (*marked from previous inventory*); not sampled in current inventory due to access
Versailles			880	In-service; PCB positive; labelled from previous inventory

1.8.2.4.2 Sealants / Caulks in Construction

PCBs and, in lower volume, PCNs have been used in sealants/caulks in housing and construction mostly between 1950 and 1975. Sealants are sealing materials that are filled in building joints or other openings between construction materials. PCBs/PCNs in the sealants have been substituted with chlorinated paraffins, which have been used until now. Sampling for PCBs/PCNs would require a thorough survey of buildings that were built in the 1950s to 1970s, while chlorinated paraffins are produced and used until now (see Section 1.2.2.2). Such an extensive sampling and analysis was not carried out during the inventory to determine the presence of PCBs in the sealants and caulks used in construction.

1.8.2.4.3 Paint and Coatings

The possible uses of PCB/PCN-containing paints in Guyana are swimming pool paints, road marking paints, and metal coating. However, the determination of the extent of use of these paints in Guyana would require extensive sampling and testing, which was beyond the scope of the inventory's assessment. Furthermore, given the phasing out of PCBs and PCNs, it is unlikely that recently manufactured paints contain these substances. However, SCCPs might be used in current paints (see Section 1.2.2.2).

1.8.2.5 Policy and Regulatory Framework

The management of PCBs in Guyana is covered under the current Pesticides and Toxic Chemicals Control Act and its associated Regulations (2004), along with the Environmental Protection (Hazardous Waste Management) Regulations 2000, which are currently used to manage the importation and disposal of PCBs. The Pesticides Regulations, Order No. 4 of 2015, regulates PCBs.

1.8.2.6 Potential Health Impacts

There are a number of studies that chronicle the impact of exposure to PCBs in humans, wildlife, and the environment. There has never been any monitoring study conducted in Guyana on the impact of PCBs. A comprehensive survey of PCB-contaminated sites has not been conducted, so the national impact is still to be determined. The current analysis, based on the current sampling, indicates that precautionary measures should be taken to reduce the impact on both humans and the environment. These measures should eliminate the impact for the determined locations and equipment within the timeframe identified by the Convention.

1.8.3 Assessment of polybrominated diphenyl ethers (PBDEs) (Annex A, Part IV, Part V, and Part IX), hexabromobiphenyl (HBB) (Annex A, Part I)

The first inventory of PBDEs, HBB, and HBCD was conducted to update the current NIP. The inventory examined their import, usage, initial flow, recycling and waste management, export, storage, and disposal based on their respective guidance documents.

Hexabromobiphenyl (HBB) is listed in Annex A of the Convention. There is no specific exemption for its production or use. Due to the small production (total ca. 6000 t) and limited use (1970 to 1976), it is likely that most HBB-containing materials were disposed of decades ago. Further, HBB and HBB-containing articles were identical to those of POP-PBDEs, and the inventory approach is similar, leading to the agreement that the materials addressed by managing POP-PBDEs will at the same time address the minor amount (if any) of articles possibly containing HBB (UNEP 2021). Thus, it is recognised that an HBB assessment is not relevant in Guyana.

The assessment of POP-PBDEs focused mainly on waste electrical and electronic equipment (WEEE) and the transportation sector. The evaluation of available and relevant national data was carried out using the tiered approach provided by the PBDEs inventory guidance document (UNEP, 2017d).

1.8.3.1 PBDEs in current production and use

1.8.3.1.1 Production of PBDEs

Guyana has never been a producer of PBDEs.

1.8.3.1.2 Import of PBDEs as chemical

There is and likely was no import of PBDEs as chemicals since Guyana does not have industries that use PBDEs (Section 2.3.3.1.3 to 2.3.3.1.8). However, PBDEs have been imported in products like EEE (Section 2.3.3.3) and vehicles (Section 2.3.3.7) in the past

1.8.3.1.3 Use of PBDEs in the manufacturing of products with exemption

Guyana has never been a manufacturer of products containing PBDE; therefore, there is no need for any exemption.

1.8.3.1.4 Production of parts for vehicles, including spare parts.

There are no manufacturers or producers of vehicle parts of any kind in Guyana

1.8.3.1.5 Additives in plastic housings and parts used for heating home appliances

There are no electronic production or production processes associated with electronics in Guyana

1.8.3.1.6 Polyurethane foam for building insulation

Guyana is located in the tropics, and there is no need to insulate the buildings, which are constructed from wood and concrete.

1.8.3.1.7 Textile products that require anti-flammable characteristics

Guyana does not produce any textile products.

1.8.3.1.8 Use of PBDEs containing recycled plastic in the manufacturing of products

There are no products produced from recycled plastic in Guyana.

1.8.3.2 PBDEs in Electrical and Electronic Equipment and related Waste (EEE/WEEE)

This was the first inventory for Guyana, and it determined the WEEE fractions containing PBDEs. The amount of PBDEs, mainly c-OctaBDE and decaBDE, in this sector was calculated and reported following the "Guidance for the inventory of polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on Persistent Organic Pollutants"[29] .

1.8.3.3 Importation of Electronic and Electrical Equipment

This NIP reflects the information gathered for the first inventory developed for Electrical and Electronic Equipment (EEE) and related Waste (WEEE) for Guyana.

The primary source of import and export information for Guyana is the Customs and Trade Administration Unit through its ASYCUDA database. However, this system became operational in 2018, and only data associated with the period 2019 – 2021 was available. The EEE examined by this inventory has a life span of four to five years for Categories 3 (Information Technology and Telecommunication Equipment) and 4 (Consumer Equipment), respectively. Therefore, historical data from this system is not available to complete the inventory. Supporting information and data were therefore accessed from the UN Comtrade data system for the period 2010 – 2018.

Information Technology and Telecommunications Equipment (ITE) and Consumer Equipment (CE) generally account for the major composition of PBDEs and deca-BDE for the EEE. The major equipment includes laptops, desktop computers, mobile phones, telephones, televisions, video equipment, and audio equipment. The cathode

[29] UNEP (2021). Draft guidance on preparing inventories of polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on Persistent Organic Pollutants. Secretariat of the Basel, Rotterdam and Stockholm conventions, United Nations Environment Programme, Geneva.

ray tube (CRT) type computers and televisions are the two types of equipment of most interest, since they contain the highest amount of POP-PBDE and deca-BDE.

1.8.3.4 Estimated WEEE entering the Waste Stream

The inventory for 2019 revealed that there were 699 tonnes and 992 tonnes under Category 3 and Category 4 generated and entering the waste stream as WEEE. Under Category 4, the CRT TV was 198 tonnes and the LCD was 794 tonnes. The breakdown of the WEEE was 376 kg of c-octaBDE, with the two homologues of hexaBDE and heptaBDE as 41 kg and 162 kg. The decaBDE content for the period under review was 3,337 kg.

1.8.3.5 EEE in Current Use and Stock

The quantity of equipment in stock and in current use will include all the materials that were imported after the cut-off year for the 2019 evaluation. The two categories showed that the EEE containing WEEE were 3,393 tonnes and 6,492 tonnes for Categories 3 and 4, respectively, with the CRT TV estimated at 83 tonnes and the LCD at 6,409 tonnes. This EEE was estimated to contain 1,726 kg of c-octaBDE with 190 kg of hexaBDE and 742 kg of heptaBDE. The decaBDE content within the WEEE is estimated at 12,296 kg. Other EEE categories also contain PBDEs, however, at lower levels.

1.8.3.6 End of Life Waste Stream (WEEE)

There is no e-waste management established in Guyana. The assumption is that WEEE generated prior to the inventoried year has been disposed of largely in landfills and dumpsites. The waste generated for the period prior to the inventory is estimated at 6,824 tonnes, generating 1,723 kg of c-octaBDE, comprising 189 kg and 741 kg hexaBDE and heptaBDE, respectively, and 6,910 kg of decaBDE.

1.8.3.7 Inventory of PBDEs in the Transport Sector (Import and Current Use)

Cars and other vehicles (trucks and buses) constitute the majority of the transport sector, containing the main quantity of PBDEs in the sector. The focus and methodology for the inventory focused on these vehicles.

The total registration for the period 2000 – 2018 shows 195,438 registrations with 72,674 cars, 11,389 buses, 14,834 lorries, and 12,718 vans.

The number of vehicles that reflect the year of manufacture range for 1975 – 2004 is 82,348. The import for the range 2005 – 2017 is 91,368.

The PBDEs in imported vehicles are calculated based on the guidance manual (2021). The total decaBDE presence in imported products is 8,414 kg, as shown in **Table 13**.

Table 13: Amount of PBDE present in imported vehicles.

Range (years)	Vehicles Import (adjusted)	decaBDE Content	Total decaBDE (kg)
1975 - 2004	82,348	80 g / vehicle	6,587
2005 – 2017	91,368	20 g / vehicle	1,827
2018	4,921	0 g / vehicle	0
Total			**8,414**

1.8.3.7.1 Inventory of PBDE-containing vehicles in end-of-life

The total number of registered vehicles for the inventory period is one hundred and twenty thousand four hundred and twenty-eight (120,428). The vehicles are mostly reconditioned vehicles with a service life of approximately 8 years. This would provide a replacement of 12.5% which would be similar for the end-of-life vehicles (ELVs). This would mean that the estimated number of ELVs for Guyana for 2019 is 15,053 vehicles. PBDEs in these 15,053 ELVs, largely produced before 2005 (therefore 80 g DecaBDE/vehicle), are estimated to be 1,204 kg DecaBDE. The amount of polymer/plastics associated with these vehicles is 200kg per vehicle, containing 3,010,600 kg plastics, as shown in **Table 14**.

Table 14: Amount of POP-PBDE in vehicles having entered end of life in Guyana

End of life Vehicles	Average Polymer Content	Total Polymer content (kg)
15,053	200 kg / vehicle	3,010,600

1.8.3.7.2 Inventory of Exported Vehicles

According to the scrap dealers, only the bodies of the vehicles are exported. However, the scrap metal exported is bulked with other metal originating from other activities, as such, there is a lack of data on the export of scrap vehicles.

1.8.3.7.3 Inventory of PBDEs in recycling

In Guyana, there is no recycling of PBDE-containing plastic from end-of-life vehicles.

1.8.3.8 Policy and regulatory framework

Currently, there is no legislation or policy specifically targeted at the management of PBDEs in Guyana.

1.8.3.9 Potential health impacts

A substantial number of studies have established the abundant presence of PBDEs in the environment. PBDE exposure mainly occurs from the diet - fish, meats, and dairy products have the highest concentration - and the indoor environment, though some occupational exposure has also been documented.

The toxicological endpoints of concern for environmental levels of PBDEs are likely to be thyroid hormone disruption, neurodevelopmental deficits, and cancer (Shaw et al., 2010)[30].

1.8.4 Assessment of hexabromocyclododecane (HBCD) (Annex A, Part I and Part VII)

1.8.4.1 Production and Use

Guyana has no industry for the production and use of hexabromocyclododecane (HBCD) in its chemical form. Further there is no record of any importation or use of

[30] Shaw SD, Blum A, Weber R, Kannan K, Rich D, Lucas D, Koshland CP, Dobraca D, Hanson S, Birnbaum LS. (2010) Halogenated Flame Retardants: Do the Fire Safety Benefits Justify the Risks? Rev. Environ. Health 25(4), 261-305.

expanded and/or extruded polystyrene (EPS/XPS) insulation in any construction. Guyana is a tropical country, and the application of insulation is not part of or a requirement for the construction of buildings.

1.8.4.2 Inventory of HBCD and DecaBDE in textiles

1.8.4.2.1 HBCD in Clothing

There is no specific information available for HBCD (or DecaBDE) in textiles for Guyana. There is a possibility of its presence in the clothing of firefighters and workers in similar professions. Information will need a Tier 3 inventory with screening and measurement.

1.8.4.3 Inventory of HBCD or decaBDE in furniture or mattresses

Guyana has no regulations for specific flammability standards for furniture/mattresses. However, there is some importation of furniture and mattresses from North America, which may contain flame retardants like HBCD or PBDEs as part of the requirement for that market. Further screening and measurement are required to determine the quantities in these products.

1.8.4.4 Inventory of HBCD in minor uses

There is no specific information available for HBCD in minor uses such as paints.

1.8.4.5 Policy and Regulatory Framework

The Pesticides and Toxic Chemicals Regulations via Order No. 10 of 2021 prohibits the importation and use of HBCD in Guyana.

1.8.4.6 Potential Health Impacts

The health impact of HBCD lies in its toxicity to aquatic and soil organisms. New scientific findings have contributed significantly to our understanding of chronic, long-term effects of the toxicity and hazards of HBCD exposure both to wildlife and humans, with the endpoints being thyroid hormone disruption, neurodevelopmental deficits, and cancer.

1.8.5 Assessment of Short-Chain Chlorinated Paraffins (SCCPs) (Annex A, Part I)

The first inventory of SCCPs was conducted to update the current NIP. The inventory examined import, export, production, usage, emission, and disposal based on the UNEP SCCP inventory guidance documents[31].

Chlorinated paraffins (CPs), or polychlorinated n-alkanes (CA), are complex mixtures of substances with the general molecular formula $C_xH_{(2x-y+2)}Cl_y$. CPs are characterised by the carbon-chain length range of their n-alkanes and by the chlorine content of the product. According to their chain length, CPs are categorized into short-chain CPs

[31] UNEP (2019). Guidance on preparing inventories of short-chain chlorinated paraffins (SCCPs) (Detailed guidance). Secretariat of the Basel, Rotterdam and Stockholm conventions, United Nations Environment Programme, Geneva.

(SCCPs, C_{10}–C_{13}), medium-chain CPs (MCCPs, C_{14}–C_{17}), and long-chain CPs (LCCPs, C_{18}–C_{30}) (Glüge et al., 2016[32]; UNEP 2019)[31].

MCCPs and LCCPs are not listed in the Convention and are not restricted. However, SCCPs (chain length C_{10} to C_{13}) can be present as impurities in MCCPs, LCCPs, or other CP mixtures. If the SCCP (>48% chlorine) content in CP mixtures is above 1%, this mixture is also considered a POP. Furthermore, MCCPs have been assessed in the POP Review Committee and are suggested to be listed as POPs[33]. Therefore, for an inventory of SCCPs, MCCPs, and other CP mixtures also need to be assessed and analysed.

SCCPs are primarily used as plasticizers or flame retardants in polyvinyl chloride (PVC), rubber and PUR foam, as recently documented for China, the largest CP producer and user (Chen et al. 2021[34]). SCCPs are also used in a variety of applications, including in metal working fluids and other lubricants, paints, adhesives and sealants, leather fat liquors, textiles, and other polymeric materials. Most of these uses are exempted in the Stockholm Convention listing.

1.8.5.1 Production of SCCPs and other CPs containing SCCPs

Guyana has never been a producer of SCCPs and other CPs containing SCCPs.

1.8.5.2 Export of SCCPs and Other CPs containing SCCPs

Guyana is not a producer of SCCPs and other CPs containing SCCPs; as such, there is no export of these materials.

1.8.5.3 Import of SCCPs and Other CPs containing SCCPs

SCCPs and CPs containing SCCPs can be imported or exported for the use in specific exemptions by Parties that are registered for those specific exemptions. Such imports and exports should be recorded in the inventory, including the quantities. Guyana has not registered for exemptions for the use of SCCPs.

SCCPs are listed in Annex III to the Rotterdam Convention and are subject to the Prior Informed Consent (PIC) procedure. Guyana, as a Party to this Convention, should be notified through the Pesticides and Toxic Chemicals Control Board (PTCCB) of any shipment of SCCPs in accordance with the procedure of the Convention.

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[32] Glüge, J., Wang, Z., Bogdal, C., Scheringer, M. and Hungerbühler, K., 2016. Global production, use, and emission volumes of short-chain chlorinated paraffins–A minimum scenario. Science of the Total Environment, 573, 1132-1146.

[33] BRS Secretraiat (2023) UN Body recommends international measures to eliminate hazardous chemicals
http://www.pops.int/Implementation/PublicAwareness/PressReleases/POPRC19PressRelease/tabid/9682/Default.aspx

[34] Chen C, Chen A, Li L, Peng W, Weber R, Liu J. (2021) Distribution and Emission Estimation of Short- and Medium-Chain Chlorinated Paraffins in Chinese Products through Detection-Based Mass Balancing. Environ. Sci. Technol. 55, 7335–7343.

However, SCCPs are frequently imported unrecognized either in CP mixtures or in products, and the Rotterdam Convention process does not currently function satisfactorily for such industrial POP (Babayemi et al. 2022[35])

1.8.5.4 Assessment of PVC import and presence of SCCPs and MCCPs

The import of plasticized polyvinyl chloride (PVC) can contain SCCPs r CP mixtures containing SCCPS as secondary plasticizer or even primary plasticizer (Chen et al. 2021)[34]. These items include plates, sheets, film, foil, and strips plasticized with greater than six percent (>6%) plasticizer. These also include PVC in rolls or in form of tiles.

PVC products containing or possibly containing plasticizer are imported into Guyana under six identified HS codes – 390422, 391530, 391810, 392043, 392049, and 392112. The import of plasticized PVC can contain SCCPs as secondary plasticizer or even primary plasticizer (Chen et al. 202130). These items include plates, sheets, film, foil, and strips plasticized with greater than six percent (>6%) plasticizer. These also include PVC in rolls or in the form of tiles. The total imports for the period covering 1991 – 2020 show that the total imported under the identified HS code was 22,448 tonnes. The amount under the selected HS code is shown in **Table 15**.

Considering the related SCCP and MCCP impact factors of PVC products from Chen et al (2021)[35] and Babayemi et al. (2022)[36], the total estimated amount of SCCP imported in plasticized PVC to Guyana for 2018 and 2019 was 56.2 t and 33.8 t, respectively (**Table 16**). The total estimated amount of MCCP imported in plasticized PVC to Guyana for 2018 and 2019 was 56.2 t and 33.8 t, respectively.

Table 15: HS Codes of PVC imported to Guyana and Quantity containing Plasticizer and possibly SCCPs.

HS Codes	Description	Total Imports (1991 – 2020) (t)
390422	Vinyl chloride, other halogenated olefin polymers; plasticised poly(vinyl chloride), in primary forms, mixed with other substances	2,856
391530	Vinyl chloride polymers; waste, parings and scrap	0
391810	Floor, wall or ceiling coverings; of polymers of vinyl chloride, whether or not self-adhesive, in rolls or in the form of tiles	15,828
392043	Plastics; polymers of vinyl chloride, containing by weight not less than 6% of plasticisers; plates, sheets, film, foil and strip (not self-adhesive), non-cellular and not reinforced, laminated, supported or similarly combined with other materials	47
392049	Plastics; polymers of vinyl chloride, containing by weight, less than 6% of plasticisers; plates, sheets, film, foil and strip (not self-adhesive),	2,876

[35] Babayemi JO, Nnorom IC, Weber R (2022) Initial assessment of imports of chlorinated paraffins into Nigeria and the need of improvement of the Stockholm and Rotterdam Convention. Emerg. Contam. 8, 360-370 https://doi.org/10.1016/j.emcon.2022.07.004

	non-cellular and not reinforced, laminated, supported or similarly combined with other materials	
392112	Plastics; plates, sheets, film, foil and strip, of polymers of vinyl chloride, cellular	841

Source https://www.foreign-trade.com/reference/hscode.htm?code=3904

Table 16: Summary of the total estimated amount of SCCP and MCCP imported in plasticized PVC to Guyana for 2018 and 2019.

Category	Amount of SCCP (tonnes)		Amount of MCCP (tonnes)	
	2018	2019	2018	2019
TOTAL (tonnes) (PVC)	**56.2**	**33.6**	**37.4**	**21.6**

1.8.5.5 Assessment of Rubber containing additives imported and presence of SCCPs and MCCPs

There is a range of rubber types and products that potentially may contain plasticizers, including SCCPs, imported into Guyana. An examination of the imports revealed that rubber imports have increased over the years and is estimated at 10,000 tonnes per annum.

There is a range of rubber types and products that potentially may contain plasticizers, including SCCPs, imported into Guyana. An examination of the imports revealed that rubber imports have increased over the years and are estimated at 10,000 tonnes per annum. This evaluation identified seven (7) HS codes that have the potential to include plasticizers. The total import for the period 1991- 2020 is shown in **Table 17** along with the identified HS code.

Considering the related SCCP and MCCP impact factors of rubber products from Chen et al (2021)**Error! Bookmark not defined.** and Babayemi et al. (2022), the total estimated amount of SCCP imported in rubber to Guyana for 2018 and 2019 was 3.1 t and 4.5 t, respectively. The total estimated amount of MCCP imported in plasticized rubber to Guyana for 2018 and 2019 was 72.4 t and 117 t, respectively.

Table 17: HS code categories for selected rubber and quantity imported, which could possibly contain SCCPs

HS Code	Description	Total Imports (1991-2020) (t)
4004	Rubber; waste, parings and scrap of rubber (other than hard rubber) and powders and granules obtained therefrom	3
4007	Vulcanised rubber thread and cord	215
4008	Plates, sheets, strip, rods and profile shapes, of vulcanised rubber other than hard rubber	595
4009	Tubes, pipes and hoses, of vulcanised rubber (other than hard rubber), with or without their fittings (e.g. joints, elbows, flanges)	18.731
4010	Conveyor or transmission belts or belting, of vulcanised rubber	7,614

HS Code	Description	Total Imports (1991-2020) (t)
4015	Articles of apparel and clothing accessories (including gloves, mittens and mitts), for all purposes, of vulcanised rubber other than hard rubber	2,683
4016	Articles of vulcanised rubber other than hard rubber	8,113

Source: https://www.foreign-trade.com/reference/hscode.htm?code=3904

Table 18: Summary of the estimated total amount of SCCP and MCCP in rubber products imported to Guyana for 2018 and 2019.

Category	Amount of SCCP (tonnes)		Amount of MCCP (tonnes)	
	2018	2019	2018	2019
TOTAL (tonnes) Rubber	**3.1**	**4.5**	**72.4**	**117**

1.8.5.6 Assessment of Emissions of PVC and Plastic and Rubber

The determination of the composition draws data from the study conducted in China titled “Distribution and Emission Estimation of Short and Medium Chain Chlorinated Paraffins in Chinese Products through Detection-Based Mass Balancing” by Chen et al., 2021[30].

The SCCP and MCCP concentration range related to the products imported under the HS Code identified is drawn from Table S2, “The details of product samples, concentration ranges of SCCPs and MCCPs in products, and the percentage of detectable samples to total samples (*fD*) for products. (“n.d.” refers to “not detectable”; the brackets behind the regions mean the sample number collected in these regions)” conducted in China.

The emissions for the year 2018 are estimated to be 1 t for SCCP and 8.8 t for MCCPs, and for 2019, 1.6 t and 13.4 t, respectively. The main area of contamination for the two years is soil with 24.9 t of the two emissions – SCCPs and MCCPs. This was followed by air with 5.4 t and water with 3.49 t. Overall, there is an increase in emissions by approximately 50% for SCCPs and MCCPs from 2018 to 2019.

1.8.5.7 Policy and Regulatory Framework

SCCPs are listed under the Rotterdam Convention for prior informed consent (PIC) procedure, and as such, consent must be given before shipping to Guyana, and this is through the PTCCB, as the national focal point. However, the Rotterdam Convention does not function properly for SCCPs since SCCPs are traded in CP mixtures and in products which are not labelled and currently not recognised in exports and imports (Babayemi et al. 2022).

There is a regulatory framework specifically for the control and management of SCCPs, Order No. 6 of 2019, which lists SCCPs as prohibited, and is used to manage these chemicals in Guyana.

However, the disposal and waste management of these POPs can be further regulated via the Environmental Protection (Hazardous Waste Management) Regulations via an

amendment which would add these products under the current chemical management. The management will consider the presence of consumer products and availability of alternatives, as well as the associated risks. Furthermore, Environmental Protection (Water Quality) Regulations and Environmental Protection (Air Quality) Regulations can follow a similar pattern to prevent contamination of water bodies, air bodies, and runoff. The amendment of these Regulations can also identify limits for emissions containing products and waste.

1.8.5.8 Potential Health Impacts

SCCPs are highly toxic to aquatic organisms and are considered a possible carcinogen for humans. SCCPs do not break down naturally and have been measured in a variety of biota, including freshwater aquatic species, marine mammals, and avian and terrestrial wildlife, and clearly show contamination of the environment. SCCPs, therefore, have the potential to cause adverse effects to human health and the environment.

1.8.6 Assessment of dichlorodiphenyltrichloroethane (DDT) (Annex B, Part II[36])

DDT is identified in the Convention for restricted production and use. Production and use are allowed for disease vector control[37]Production was allowed when DDT was used as an intermediate in the production of dicofol (which has been listed as a POP in 2019) or as a closed-system site-limited intermediate that is chemically transformed in the manufacture of other chemicals that do not exhibit the characteristics of POPs.

1.8.6.1.1 Production of DDT

DDT was never produced in Guyana.

1.8.6.1.2 Use of DDT in Guyana

DDT has been solely used by the Ministry of Public Health's Vector Control Unit, but there are no records on the quantity of DDT imported and the amount used in Guyana. The data that was present was destroyed by fire in 2009 at the Ministry, which housed the offices of the Unit. The use of DDT was primarily to control mosquitoes, which were the vectors of malaria and dengue, particularly in the hinterland regions of Guyana. This use changed over time to treating the living quarters of the communities (indoor residual spraying). The use of DDT has been discontinued since 1994 and replaced with malathion in combination with diesel.

There is no known use of DDT for agricultural purposes.

1.8.6.1.3 Legal Status

DDT is formally restricted under the Pesticides and Toxic Chemical Control Regulations, Order No. 4 of 2015. The restriction only allows use by the Ministry of Health. Guyana retained the use of DDT for aid in the control of malaria by the Ministry

[36] Where chemicals are listed under Annex B, Parties must take measures to "restrict" the production and use of the chemicals in light of any acceptable purposes and / or specific exemptions listed under Article 4.

[37] https://chm.pops.int/implementation/exemptions/acceptablepurposesddt/tabid/456/default.aspx

of Health's Malaria Control Unit. However, there has been no importation or use of DDT since the early 90s; its use has been replaced by malathion.

The process of registering a specific exemption, as required under Article 4 and Annex B Part 2, was initiated when Guyana became a Party to the convention and continues to be the same presently. However, Guyana has never sought to renew this exemption.

The Pesticides and Toxic Chemicals Control Act and its associated regulations cover all the legal requirements for the management of DDT in Guyana. As such, an action plan item under this NIP would be to upgrade this chemical to the list of banned or prohibited chemicals under PTCCB regulations.

1.8.6.1.4 Monitoring Data for DDT

There is no study in Guyana on DDT and its impact on the environment and human health.

1.8.7 Assessment of PFOS, Its Salts and PFOSF (Annex B[32], Part III Chemicals)

The first inventory of PFOS, its salt, and PFOSF was conducted to update the current NIP. The inventory examined import, export, production, usage, emission, and disposal based on the guidance documents.

PFOS is both intentionally produced and formed from PFOS-related compounds, which are precursors of PFOS. The use of PFOS is acceptable with specific exemptions in accordance with Part III of Annex B. The acceptable purposes are for insect baits with sulfluramid (CAS No. 4151-50-2) as an active ingredient for control of leaf-cutting ants from *Atta* spp. and *Acromyrmex* spp. for agricultural use only. The specific exemptions are for metal plating (hard-metal plating) only in closed-loop systems; fire-fighting foam for liquid fuel vapour suppression and liquid fuel fires (Class B fires) in installed systems, including both mobile and fixed systems.

PFOA has been listed in Annex A in 2019 and has not been assessed in this NIP update. However, some initial considerations have been done on PFOA during the PFOS inventory, which are mentioned where appropriate.

1.8.7.1 Production of PFOS, its salts, and related substances

PFOS, its salts, and related substances, including sulfluramid, were never produced in Guyana.

1.8.7.2 Import and Use of PFOS, its salts, and related substances

There is no known import of PFOS, its salts, and related substances. However, there were and possibly are consumer products imported that may contain PFOS, its salt, and related substances, where the exemptions are provided for under the Annex. Some of these items included but are not limited to:- fire-fighting foam, sulfuramid, synthetic carpets, textiles, leather, and paper.

1.8.7.3 Fire-fighting Foam (current/historic use and stock)

Aqueous Film Forming Foam (AFFF) is a fire suppressant used to extinguish flammable liquid fires, such as fuel fires, and was a major foam in which PFOS, PFOA, and other PFAS have been used together with some other PFAS-containing foams.

The Guyana Fire Service (GFS) is the major user of firefighting foam in Guyana, with foam stocks that are stored at the two international airports - the Cheddi Jagan International Airport located in Timehri, and the Eugene Correia International Airport in Ogle. The GFS conducts fire-fighting training at the Airport at Timehri twice per annum, with each training using two (2) cannisters of the firefighting foams. The foam used in the training exercises is usually washed into the drainage system and then into the Demerara River. Based on the frequency of firefighting training exercises, it can be assumed that approximately twenty (20) gallons of foams may be expelled into the environment annually.

There has been only one (1) record by the GFS where the AFFF foam was used to extinguish an electrical fire in August 2020 during an incident at DeSinco Trading, a store located in Georgetown.

Other companies using fire-fighting foams are the two companies producing alcohol in Guyana, Banks DIH Limited and the Demerara Distillers Limited (DDL), the fossil fuel suppliers, the Guyana Oil Company Limited (GUYOIL) and RUBIS, and two mining companies that store large quantities of fossil fuel, Aurora Gold Mines and Troy Resources.

The results of the inventory sampling at the identified sites are presented in the table below:

Table 19: Inventory of Fire-fighting Foams Identified at the Selected Sites

LOCATION	PRODUCT ACCORDING TO LABEL	TYPE OF FOAM CONCENTRATE	CONTAINER	VOLUME (LITRES)
Cheddi Jagan International Airport	Angus Fire Tridol S6	AFFF 6%	Rosenbauer Panther Crash Tender GSS 9268	1,500
Cheddi Jagan International Airport	Angus Fire Tridol S6	AFFF 6%	Rosenbauer Panther Crash Tender GMM 3930	1,500
Cheddi Jagan International Airport	Angus Fire Tridol S6	AFFF 6%	Rosenbauer Panther Crash Tender PYY 2337	1,500
Cheddi Jagan International Airport	Angus Fire Tridol S6	AFFF 6%	Fire Engine GRR 6720	500
Cheddi Jagan International Airport	Angus Fire Tridol S6	AFFF 6%	Storage Room 25x 200 l PE drums	500
Cheddi Jagan International Airport	**Angus Fire Tridol S6**	**AFFF 6%**	**Total Cheddi Jagan International Airport**	**5,500**
Guyana Fire Service Headquarters	Angus Fire FP70	FP	Fire Engines	~ 100

Guyana Fire Service Headquarters	Unknown (potentially: Aberdeen 3% AFFF C6)	Unknown (potentially: AFFF)	5x 1,000 l Composite IBCs	4,500
Guyana Fire Service Headquarters	**Unknown**	**Unknown**	**Total at Guyana Fire Service Headquarters**	**4,600**
Eugene F. Correia International Airport	Angus Fire Tridol S6	AFFF 6%	Crash tender	1,500
Eugene F. Correia International Airport	Angus Fire Tridol S6	AFFF 6%	Crash tender	1,500
Eugene F. Correia International Airport	Angus Fire Tridol S6	AFFF 6%	Crash tender	1,500
Eugene F. Correia International Airport	Angus Fire Tridol S6	AFFF 6%	Fire Engine	250
Eugene F. Correia International Airport	Angus Fire Tridol S6	AFFF 6%	Storage Room (9 x 200 l PE drums)	1,800
Eugene F. Correia International Airport	**Angus Fire Tridol S6**	**AFFF 6%**	**Total at Eugene F. Correia International Airport (OGL)**	**6,550**
GuyOil Providence terminal	Delta Fire Ltd DFC 203 (Manufacturing date November 2016)	FP	15x 200 L PE drums	3,000
GuyOil Providence terminal	Angus Fire Petroseal (Manufacturing date 15-08-1996)	FFFP	2x 25 L container	50
Rubis Oil terminal	Ansulite AFC3B (C6)	AFFF	10x 200 L PE drums	2,000
Rubis Oil terminal	Unknown	Unknown (potentially: AFFF)	600 gal steel tank (potentially bladder tank)	2,270

1.8.7.4 Sulfluramid (Mirex S) insecticide for ants and termites

Sulfluramid, N-Ethyl perfluorooctane sulfonamide (CAS No. 4151-50-2), is used as a surfactant and an active substance in insecticide products for the control of termites, cockroaches, and other insects, such as the leaf-cutting ants.

There is no record indicating that sulfluramid was imported or used in Guyana. However, there are possibilities through cross-border illegal trade that some form of this chemical may have entered Guyana from Suriname, which shows importation of this chemical until 2014 (Pinas et al. 2020[38]). However, there is no documentation to show that this chemical was imported into Guyana.

1.8.7.5 Chromium Plating and Other Plating

In this sector, the PFOS-related substances most commonly used are tetrathylammonium perfluorooctane sulfonate (CAS No. 56773-42-3) and potassium perfluorooctane sulfonate (CAS No. 795-39-3). These are mainly used as surfactants, wetting agents, and mist suppressants in hard and decorative chromium plating.

There is no chromium plating industry in Guyana or any similar plating industry or agency. Further, no plating industry previously existed in Guyana.

1.8.7.6 Inventory Synthetic Carpets, Textiles, Leather, Paper, and Related Stockpiles

According to the PFOS inventory guidance, the end of the supply chain is articles containing PFOS and its related substances arising from the manufacturing process. Some of the products referred to are synthetic carpets, paper, textile, furniture, clothes, and leather apparels.

1.8.7.6.1 Synthetic Carpets

Fluorinated compounds are widely used during the manufacture of synthetic carpets to provide stain protection, especially for synthetic carpets based on synthetic fibres being impregnated. A small market share of synthetic carpets based on wool fibres is also impregnated.

Guyana is not a manufacturer of synthetic carpets, nor does it recycle carpets. However, carpets have been imported from a wide range of manufacturers, but this would have been mostly post-2010. However, due to the timeline of use, there is a possibility that some PFOS / PFOA-containing carpets could have been imported and used in the hotel and other industries or private households. Upon disposal, carpets are sent to the dump site in Georgetown and other similar sites around the country.

1.8.7.6.2 Textiles

PFOS and PFOS-related substances, as well as PFOA-related compounds, have been used in large quantities to provide soil, oil, and water resistance for textiles, apparel, home furnishing, and upholstery, in particular until production stopped in 2002. Although PFOS has likely been discontinued in textiles for several years and

[38] Pinas, V., Van Dijk, C. and Weber, R., 2020. Inventory and action plan for PFOS and related substances in Suriname as basis for Stockholm Convention implementation. Emerging Contaminants, 6, 421-431.

exemptions have ceased, it is highly possible that PFOA or related compounds, or other PFAS, are still used in production worldwide today.

Guyana is not a manufacturer of textiles. However, textiles treated with PFOS or PFOA have likely been imported, but there are no records to make a determination. One use of PFOA-related substances is coats for surgeries, which are discarded through the dumpsites through the garbage system existing in the country. Therefore, the end-of-life products containing PFOS / PFOA are partly incinerated or dumped at dumpsites around the country, with a risk of releases.

1.8.7.6.3 Leather

Leather used in shoes, bags, and apparel can be impregnated with water and dirt repellents. Using impregnation with PFOS and PFOA water repellants, the products initiate the ability to repel water and transport the moisture to the outside.

Guyana has a small leather manufacturing industry, but the inventory showed that there is no impregnation with PFOS / PFOA or related substances. However, in the past, some of the leather has likely been imported as belts, textiles, furniture, wallets, purses, which would have been discarded at the dumpsite in Georgetown or any other similar sites around the country, or even incinerated.

1.8.7.6.4 Paper

PFOS-related substances have been used in the packaging and paper industries in both food packaging and commercial applications to impart grease, oil, and water repellency of paper, paperboard, and packaging substrates, or a glossy finish. The specific exemption has been stopped.

Guyana is not a manufacturer of paper. However, the Caribbean Container Incorporated (CCI) is a manufacturer of cardboard boxes, but none of the product falls into the category under investigation. Furthermore, amounts of PFAS-treated food packaging could have been imported through the recently established fast food chains

The early food packaging industry in Guyana involved paper bags and greaseproof paper. Furthermore, fast food chains imported their food packages. Most of these fast-food packaging and other grease-proof paper have ended up in dumpsites.

1.8.7.7 Need for specific exemptions and/or acceptable purposes for exempted PFOS and related chemical uses

There is no requirement for any exemptions for the use of PFOS in Guyana at this time. The need for exemption for PFOA has not been assessed yet and can be assessed following the development and availability of the respective guidance materials.

1.8.7.8 Summary of available monitoring data (environment, food, humans) and health impacts

There is no study in Guyana on PFOS and related chemicals.

1.8.7.8.1 Legal status of PFOS, its salts, and related substances

Guyana is not a producer of PFOS and its related industrial chemicals. Sulfuramid has never been registered for use in Guyana and is administratively prohibited.

The Pesticides and Toxic Chemicals Control Act and its associated regulations cover all the legal requirements for the management of PFOS in Guyana via Order No. 4 of 2015.

1.8.8 Assessment of Releases from Unintentionally Produced Chemicals (Annex C Chemicals)

Under the Stockholm Convention, Parties agree to develop and venture to implement an action plan taking into account the obligations set out under Article 5 of the Convention. Under Article 5, the Convention has defined certain POPs for reduction and ultimate elimination from anthropogenic sources in which these substances are unintentionally formed and released.

This sub-section provides an assessment of unintentional releases of Annex C POPs covered under Article 5 of the Convention. The currently listed Annex C chemicals of potential interest are Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDFs), Hexachlorobenzene (HCB), Pentachlorobenzene (PeCB), polychlorinated biphenyls (PCB), and hexachlorobutadiene (HCBD).

Since PCDD/Fs and the other listed unintentional POPs (PCBs, PCNs, HCB, and PeCB) are formed together during incineration and other thermal processes, the UNEP Toolkit recommends, for practical reasons, that inventory activities be focused on PCDD/PCDFs, as these substances are indicative of the presence of other unintentional POPs (UNEP 2013)[39]. For these sources PCDD/PCDFs are considered to constitute a sufficient basis for identifying and prioritizing sources and control measures for all Annex C POPs and for evaluating their efficacy. Since the major uPOPs emission sources in Guyana are incineration and other thermal sources without organochlorine production, which can result in specific formation of certain uPOPs (see below for HCBD), the inventory can focus on PCDD/PCDFs as representatives. Therefore, the inventory and actions on uPOPs have focused mostly on PCDD/PCDFs, as most information regarding formation, releases, and related emission factors (UNEP 2013)[39], prevention, and control is available for these substances, and other uPOPs are reduced and elongated by these measures (UNEP 2013)[35].

1.8.8.1 Update of the PCDD/PCDF inventory of Guyana

The update of this PCDD/PCDF inventory was guided by a focus group drawn from a number of agencies and the methodology involved the use of the decision guidance

[39] UNEP (2013) Toolkit for Identification and Quantification of Releases of Dioxins, Furans and Other Unintentional POPs under Article 5 of the Stockholm Convention on Persistent Organic Pollutants. https://toolkit.pops.int/

document for uPOPs and the 2013 UNEP Toolkit[35]. There were ten groups and 28 sub-groups identified as sources of emission for uPOPs in Guyana.

The initial emission for 2010 was revised using the 2013 UNEP Toolkit[35,] and this established the baseline data for Guyana and was used to measure progress with respect to uPOPs reduction and minimization. A summary of the PCDD/PCDF emissions for 2019 in toxic equivalency (TEQ) for Guyana is shown in Table 20. The total emission for the year was 27.5 g TEQ, comprising 23.1 g TEQ for air, 3.2 g TEQ for land, 0.3 g TEQ for product, and 0.8 g TEQ for residues. The emissions for the first inventory completed in 2010 are shown in Table 21 and a variance analysis is shown in Table 22.

Table 20: Summary of the Emissions for PCDD/PCDF for 2019.

Group	Source Groups	Annual Releases (g TEQ/a)				
		Air	Water	Land	Product	Residue
1	Waste Incineration	2.33	0.00	0.00	0.00	0.02
2	Ferrous and Non-Ferrous Metal Production	0.06	0.00	0.00	0.00	0.06
3	Heat and Power Generation	3.06	0.00	0.00	0.00	0.14
4	Production of Mineral Products	0.00	0.00	0.00	0.00	0.00
5	Transportation	0.14	0.00	0.00	0.00	0.00
6	Open Burning Processes	17.42	0.00	3.24	0.00	0.00
7	Production of Chemicals and Consumer Goods	0.00	0.00	0.00	0.27	0.00
8	Miscellaneous	0.10	0.00	0.00	0.00	0.00
9	Disposal	0.00	0.01	0.00	0.00	0.60
10	Identification of Potential Hot-Spots				0.00	0.00
1-10	**Total**	**23.1**	**0.0**	**3.2**	**0.3**	**0.8**
	Grand Total			**27.5**		

Table 21: Summary of the Revised Emission for PCDD/PCDF for 2010.

Group	Source Groups	Annual Releases (g TEQ/a)				
		Air	Water	Land	Product	Residue
1	Waste Incineration	0.08	0.00	0.00	0.00	0.00
2	Ferrous and Non-Ferrous Metal Production	0.21	0.00	0.00	0.00	0.03
3	Heat and Power Generation	3.21	0.00	0.00	0.00	0.13
4	Production of Mineral Products	0.00	0.00	0.00	0.00	0.00
5	Transportation	0.09	0.00	0.00	0.00	0.00
6	Open Burning Processes	16.45	0.00	2.01	0.00	0.00

Group	Source Groups	Annual Releases (g TEQ/a)				
		Air	Water	Land	Product	Residue
7	Production of Chemicals and Consumer Goods	0.00	0.01	0.00	0.03	0.01
8	Miscellaneous	0.08	0.00	0.00	0.00	0.00
9	Disposal	0.00	0.01	0.00	0.00	0.88
10	Identification of Potential Hot-Spots	0.00	0.00	0.00	0.00	0.00
1-10	**Total**	**20.1**	**0.0**	**2.0**	**0.0**	**1.0**
	Grand Total	**23**				

Table 22: Variance of the Emissions for PCDD/PCDF for 2010 and 2019.

Group	Source Groups	Annual Releases (g TEQ/a)				
		Air	Water	Land	Product	Residue
1	Waste Incineration	**2.3**	0.0	0.0	0.0	0.0
2	Ferrous and Non-Ferrous Metal Production	-0.1	0.0	0.0	0.0	0.0
3	Heat and Power Generation	-0.2	0.0	0.0	0.0	0.0
4	Production of Mineral Products	0.0	0.0	0.0	0.0	0.0
5	Transportation	0.0	0.0	0.0	0.0	0.0
6	Open Burning Processes	1.0	0.0	1.2	0.0	0.0
7	Production of Chemicals and Consumer Goods	0.0	0.0	0.0	0.2	0.0
8	Miscellaneous	0.0	0.0	0.0	0.0	0.0
9	Disposal	0.0	0.0	0.0	0.0	-0.3
10	Identification of Potential Hot-Spots	0.0	0.0	0.0	0.0	0.0
1-10	**Total**	**3.0**	**0.0**	**1.2**	**0.2**	**-0.2**
	Grand Total	**4**				

(Source: uPOPs Inventory Report for Guyana 2019)

1.8.8.2 Variance Analysis Summary

A comparison of the emissions revealed that there's an increase of 4.0 g TEQ, comprising 3.0 g TEQ more emissions to air, 1.2 g TEQ more releases to land, and 0.2 g TEQ more releases to products. However, there was a reduction in the amount of releases to the residue of 0.2 g TEQ for the year.

The main groups contributing to the increase in variation for air emissions are Waste incineration, with an increase of 2.3 g TEQ, and Open Burning, with 1.0 g TEQ. There was a reduction in the annual emissions for the source groups of Ferrous and Non-Ferrous Metal Production and Heat and Power Generation.

The probable increase in emissions from the waste incineration source group is due to the increase in waste generated and incinerated at the hospitals. The incinerators need to be improved to reduce emissions.

The increase in open burning emissions is due to the increase in rice production, giving rise to an increase in straws and padi husk burnt, producing a total release of approximately 11.7 g TEQ for the year, inclusive of land emissions, compared to 6.2 g TEQ in 2010 (recalculated). This alone is responsible for an increase of 5.5 g TEQ. There was a decrease in emissions from sugar production due to the closure of four (4) sugar estates during this period. Further to this, forest fires were included and accounted for 0.315 g TEQ in emissions for the year. Also, the fire at the dump site arising from waste incineration is responsible for 7.7 g TEQ.

There was an increase of 0.2 g TEQ per annum for the product based on the use of 2,4-D as a pesticide. This was not calculated for the 2010 inventory.

1.8.8.3 Assessment of specific formation and release of other unintentional POPs

There are certain processes in the organochlorine industry where specifically other uPOPs are formed or present as described in the inventory guidance for PCNs[40] or HCBD[41].

PCNs are unintentionally produced at high levels during the production of certain chlorinated solvents and are also present in industrial PCB mixtures[36]. There is no production of organochlorine solvents, chlorine, or chlorinated paraffins in Guyana.

There is also no major source of unintentional formation/release of HCBD present in Guyana. This is because they are formed at high levels in specific organochlorine production processes, including the manufacture of organochlorine solvents (such as tetrachloroethane, tetrachloromethane, and trichloroethane), primary PVC production, and other organochlorine processes, as well as in certain aluminium and magnesium production. 37 None of these processes was or is currently present in Guyana.

1.8.8.4 Policy and Regulatory Framework for uPOPs

The Environmental Protection (Air Quality) Regulations 2000 were established to guard the air quality and provide the necessary infrastructure for controlling the quantity of contaminants by stipulating specific allowable levels of emissions that are released into the atmosphere at any given time. However, the regulations do not extend to setting actual air quality standards. It is noted that the scope of controlled emissions does not extend to any emissions relevant to the Stockholm Convention and specifically, unintentional release covered under Convention Annex C, such as dioxins and furans, which should appropriately be listed for Guyana.

1.8.8.5 Monitoring Data

There is no study or monitoring report generated on the impact and effects of PCDD/PCDFs or other uPOPs on humans and the environment in Guyana.

[40] UNEP (2021). Guidance on preparing inventories of polychlorinated naphthalenes (PCNs). Secretariat of the Basel, Rotterdam and Stockholm Conventions, United Nations Environment Programme.

[41] UNEP (2022). Guidance on preparing inventories of hexachlorobutadiene (HCBD). Secretariat of the Basel, Rotterdam and Stockholm conventions, United Nations Environment Programme, Geneva.

1.8.8.6 Potential Health Impacts

There are a number of studies which have shown that PCDD/PCDFs, due to their characteristics of persistence, toxic and biochemical response induced, can be carcinogenic and affect the endocrine, reproductive, and neurological systems negatively.

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

This section compiles information on contaminated sites for individual POPs in accordance with the inventories. Article 6 of the Convention relates to chemicals in Annexes A and B (POPs that are intentionally produced) and wastes (including products and articles upon becoming wastes) that consist of, contain, or are contaminated by chemicals listed in Annexes A and B and Annex C (uPOPs). It obligates Parties to the Convention to develop and implement strategies to identify stockpiles and to manage those stockpiles in a safe, efficient, and environmentally sound manner until they are deemed waste.

1.8.9.1 Assessment of POPs Stockpiles and Wastes

This sub-section covers the assessment of the current inventories of POPs stockpiles, wastes, and contaminated sites. It is developed specifically to evaluate compliance actions required in relation to Article 6 of the Convention. This assessment was undertaken in association with the Annex-specific chemicals assessments above, which served to identify current POPs import and use. Here, the identified POPs stockpiles and waste, as well as POPs contaminated sites, are covered. In the case of POPs pesticides, this assessment was extended to an inventory of obsolete pesticides generally, and this is reported below. Overall, no POPs stockpiles, wastes, or contaminated sites were identified except as related to PCBs, although the possibility that residual contamination associated with other POPs contained in discarded consumer products, or from unintentional releases, could exist, albeit on a widely distributed and low volume concentration basis that is likely below the low POPs content as defined by the Basel Convention[42].

1.8.9.2 Assessment of POPs Pesticide Stockpile and Waste

The Pesticides and Toxic Chemicals Control Board under the Project (GCP/SLC/204/GFF) *"The Disposal of Obsolete Pesticides including persistent organic pollutants (POPs), promotion of Alternatives and Strengthening Pesticides Management in the Caribbean"* funded by the Global Environment Facility (GEF) and executed by the Food and Agricultural Organisation of the United Nations (FAO), identified 33 tonnes of obsolete chemicals in Guyana including some POPs pesticides. Under the project, 21 tonnes were exported for destruction by high-temperature incineration, and 12 tonnes were safeguarded locally in August 2016. All of the POPs

[42] UNEP (2023). General technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants. UNEP/CHW.16/6/Add.1

chemicals identified were shipped for destruction with the contracting firm Veolia Subsidiary in the United Kingdom.

The 12 tonnes safeguarded locally are under the supervision of the PTCCB and located in their bond along with an additional 15.5 tonnes, giving rise to a total of 27.5 tonnes of obsolete pesticides currently stored in Guyana under supervision.

The waste generated is chemicals that were seized and deemed illegal in Guyana along with some expired products.

1.8.9.2.1 Amount, type, and condition of POPs pesticide stockpiles and waste

There are no known POPs pesticide stockpiles in Guyana. However, there are 27.5 tonnes of obsolete chemicals in storage with the PTCCB.

1.8.9.2.2 Management of empty pesticide containers

The PTCCB has conducted baseline studies on the East Bank Essequibo at Ruby and Parika Backdam to address the disposal of empty pesticide containers in an effort to reduce the risk to human health and the environment. The development of a project to address the life cycle management of pesticide containers is in the conceptual stage. However, there are no guidelines for the management of empty containers. Therefore, this is a gap that needs to be addressed.

1.8.9.2.3 POPs Pesticide Contaminated Sites

The project (GCP/SLC/204/GFF) executed by the FAO and the status inspection of the sites where the obsolete chemicals, including some POPs pesticides, stated that the sites do not seem to be highly contaminated based on vegetative growth of plants. However, no residual laboratory tests were executed to support this assumption. The POPs pesticide present in the bond was an insecticide and would therefore not affect plant growth, and contamination can therefore not be related to vegetation. It would be important to execute a residual analysis to determine the presence of endrin at this site.

The PTCCB has a bond that is used to store and monitor all obsolete chemicals in Guyana.

All chemicals received or seized follow a standard operating procedure and are then stored in accordance with the chemical's requirements based on its formulation.

1.8.9.2.4 Situation at (former) production and formulation sites

There are no known production or formulation sites for pesticides in Guyana.

1.8.9.2.5 Situation at (former) warehouses and other pesticide storage sites

There is only one (1) known former POPs pesticide storage site where the stockpiles of obsolete pesticides were warehoused; this was controlled by GUYSUCO. This site has since been emptied, but is still under lockdown and observation, even though it

has been deemed cleared. It is proposed that a residual analysis be performed for the presence of endrin and other POPs pesticides at this site.

1.8.9.2.6 Disposal sites of POPs pesticides

There is no formal disposal site for POPs pesticides in Guyana. Historically, it is very likely that pesticides, and in particular pesticide containers, may have been disposed of at landfills and open dump sites. It is known that empty containers are currently partly disposed of at landfills and dump sites.

1.8.9.2.7 Application sites of POPs pesticides

1.8.9.2.7.1 POPs contamination at the POPs agricultural application sites

The only recorded usage of POPs pesticide for agriculture in Guyana is for endosulfan; however, it was not used for any extended time, and there are no data or residual studies conducted to determine contamination levels for this chemical at previous application sites. In the 1960s and 1970s, unrecorded uses of other POPs pesticides took place. These pesticides were largely used on sugar cane, and the soils might be contaminated.

1.8.9.2.7.2 DDT contamination at the sites treated with DDT

There are no known contaminated sites based on past DDT application and no related investigations. DDT was used mainly in the hinterland regions of Guyana – Regions 1, 7, 8, and 9 – as an indoor residual spray on dwellings in malaria-prone communities.

1.8.9.2.7.3 POPs pesticides used for the construction of houses

There is no known use of any POPs pesticide in the construction of wooden houses.

1.8.9.2.7.4 Cattle dips

No POPs pesticides are used or have been used for cattle dips.

1.8.9.2.8 PCP application sites and PCDD/PCDF contamination

There is no recorded importation or use of PCP in Guyana. Although PCP has been used heavily in Suriname, with the associated release of PCDD/PCDF[43], one of Guyana's neighbours, it is estimated that a similar use did not likely take place in Guyana due to a different use framework of pesticides in Guyana.

1.8.9.3 Assessment of PCB stockpiles, wastes, and contaminated sites

Stockpiles and Wastes

A range of potentially PCB-contaminated sites has been identified and is associated with the PCB storage sites, where PCB transformers and other equipment operated. The initial PCB inventory estimated that approximately 6 t of potentially heavily

[43] Government of Suriname (2018) National Implementation Plan (NIP) Update for the Stockholm Convention on Persistent Organic Pollutants (POPs) for Suriname.

contaminated soil would require treatment and/or disposal from these sites. A larger quantity of soil would be contaminated at levels below 50 ppm and likely to also be in need of remediation. Although the second inventory did not conduct soil sampling, further assessment is necessary to determine the level of contamination and its locations.

There are other sites that need to be evaluated based on the following, as highlighted in the initial inventory for scrap metal dealers, who have traditionally handled discarded transformers for their ferrous and non-ferrous metal scrap, including handling of residual oil as a separate export commodity.

1.8.9.4 Assessment of POP-PBDEs stockpiles and Wastes

1.8.9.4.1 Potentially Contaminated Sites

A large share of PBDEs imported in the past in EEE, vehicles, and possibly furniture have been disposed of in landfills and dump sites. Any location or site where POP-PBDEs-containing products or residues have been disposed of has the potential to release these contaminants into the environment via air, water, and soil, in particular through open burning. At these disposal/dump sites in Guyana, it is common practice for waste to be burned as a waste management strategy.

Guyana is divided into 10 administrative regions, and each of them has its own designated dumping sites. The official waste disposal sites are shown in **Table 23**.

Table 23: Official waste disposal sites in Guyana

Region	Location Disposal sites
1	Khan's Hill
2	Lima Dump
	Charity Dump
3	Windsor Forest (earmarked)
4	Le Repentir (closed)
	Haags Bosch Sanitary Landfill
	Lusignan Landfill
	Diamond Grove
5	Zorgenhoop
	Naarstegheid
	West of Burma Road
6	New Amsterdam – Belle Bieu
	Kilcoy/Chesney
	Number 0 Village
7	Byderabo dump
8	Nil
9	Bonn Success
10	Caracara Dump
	Dokara dump

Any location or site where POP-PBDEs-containing products or residues have been disposed of has the potential to release contaminants into the environment via air, water, and soil. Further, at these disposal/dump sites, it is common practice for waste to be burned as a waste management strategy.

1.8.9.5 Assessment of HBCD Stockpiles and Waste

The stockpiles and waste associated with HBCD imported to Guyana in the past are similar to PBDE. However, since the major HBCD use of EPS/XPS insulation has not been imported to Guyana in relevant amounts and the uses in EEE and transport were relatively small, the total amount of HBCD in waste is likely small. The official waste disposal sites would be the ones with residues based on disposal and have the potential to contain a minor amount associated with this group of chemicals.

1.8.9.6 Assessment of SCCPs Stockpiles and Waste

As seen, SCCPs stockpile and waste can be derived from the likely high import of SCCPs in products (Section 2.3.5). Consequently, SCCPs stockpile and waste will be present within all the regions at the designated dumpsites.

1.8.9.7 Assessment of PFOS Stockpiles and Waste

PFOS contaminated sites are generated from firefighting use and industrial uses, as well as releases from landfills and dumps. The related groundwater contamination can lead to relevant contamination of drinking water, as has been documented, e.g., for the United States (Hu et al., 2016)[44] and China (Liu et al., 2021)[45]. But soil can also be contaminated and lead to further contamination of food (Brambilla et al., 2015).

There are strong possibilities that the Georgetown Dump site, where most of the disposal was carried out in the past, can be a potential source of PFOS, PFOA, and related contaminants. The dumpsite is closed at this time, but gets high precipitation with associated releases of leachate as found at other dumpsites (Lang et al. 2017)[46].

Furthermore, the training area of the fire service is likely contaminated by PFOS and PFOA. The training area for the Guyana Fire Service is at Timehri, located within the facilities of the Cheddi Jagan International Airport (GPS 6º29’54” N 58º14'56” W). To a minor extent, potentially contaminated sites from the use of PFOS-containing aviation hydraulic fluid must be considered.

1.8.9.8 Assessment of uPOPs

The potentially PCDD/PCDF and other uPOPs contaminated sites are the dump sites identified in **Table 23**. Historical activities associated with these sites could result in

[44] Hu, X.C., Andrews, D.Q., Lindstrom, A.B., et al (2016). Detection of poly-and perfluoroalkyl substances (PFASs) in US drinking water linked to industrial sites, military fire training areas, and wastewater treatment plants. Environmental science & technology letters, 3(10), 344-350.

[45] Liu L, Qu Y, Huang J, Weber R (2021) Per- and polyfluoroalkyl substances (PFASs) in Chinese drinking water: risk assessment and geographical distribution. Environ Sci Eur. 33, 6

[46] Lang, J.R., Allred, B.M., Field, J.A., Levis, J.W. and Barlaz, M.A., (2017). National estimate of PFAS release to US municipal landfill leachate. Environmental science & technology, 51(4), pp.2197-2205.

contamination. In Guyana, there are other sites with the potential of being contaminated, these are:

- PCB equipment storage and usage sites, including where PCB containing oil has been stored or managed, since technical PCBs contain unintentional PCDFs[35];
- Chlorinated phenols usage location – storage, mixing, and application;
- Fires have occurred (dumpsites, burnt house, vehicles, cane and rice fields);
- ELV storage and disposal sites; and
- Accidental and Intentional burnt areas of waste and contaminated wastes.

Accidental fires, including landfill fires, bush /rubbish fires, dwelling houses and commercial fires, vehicular fires, are common during the dry season (February to April and August to November) and may be considered sources of PCDD/PCDF contaminated soot and residues polluting soils.

1.8.10 Summary of Future Production, Use, and Releases of POPs – Requirement for Exemptions

1.8.10.1 Specific exemption for POP Pesticides

No exemption is needed for POPs pesticides in Guyana, as none are being imported or used. Guyana initially retained the use of DDT for managing malaria vector control. However, this was not renewed and has been replaced with malathion and diesel.

1.8.10.2 Specific exemption for POP-PBDE

There is no need for exemptions for the recycling of plastic containing POP-PBDE since this activity is not practiced in Guyana. Also, there is no need for exemptions for the use of decaBDE in production.

1.8.10.3 Specific exemption for HBCD

HBCD is not used in Guyana; as such, there is no need for exemptions. The exemption has also ended.

1.8.10.4 Specific exemption for SCCP

There is likely no need for any exemption for SCCPs in Guyana since no production is done and there are no users of the listed SCCPs in the country. Further assessment will be conducted in the action plan, including the assessment of MCCPs, which is currently assessed by the POPRC and might be listed in 2025.

1.8.10.5 Specific exemption for PFOS / PFOS-related chemicals

The inventory was unable to determine the presence of PFOS / PFOS-related chemicals in the fire-fighting foam used in Guyana. Therefore, further assessment should be conducted to determine the presence and amount of these chemicals. Also, PFOA, listed in 2019, might be present in these foams. There are a number of alternatives available in the fluorinated line; as such, no exemption is required for PFOS/PFOS-related chemicals for Guyana.

For PFOA, the current use and need for exemption have not been assessed, but will need to be done for the next NIP update (action plan)

1.8.11 Existing Programmes for Monitoring Releases and Environmental and Human Health Impacts, including findings.

Currently, there is no formal program for identifying and monitoring POPs chemicals in Guyana, primarily because none of these chemicals have been detected in the country. This would also lead to a lack of analytical equipment or laboratory facilities for detecting POPs chemicals, resulting in no studies on their impact on the environment and human health.

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

1.8.12.1 General

In Guyana, where agriculture occupies one of the major production sectors, awareness raising and information dissemination have been concentrated on the impact and importance of climate change and health issues associated with epidemiology. Further areas of awareness raising have been concentrated on some aspect of biodiversity conservation and environmental protection. This has not been the case with the dangers and risks associated with chemicals and pesticides, inclusive of POPs. This would need to be addressed through the development of an awareness and education programme for the targeted audience and the general public (action plan).

There is a general lack of information, awareness, and education among target groups. This implies a need to expand and intensify public education in safe chemicals handling, and to develop mechanisms for the active engagement of the citizenry, policy makers, workers, NGOs, and industrial associations in monitoring and alerting on incidents and practices that could undermine safety.

1.8.12.2 Information and awareness

The availability of information on chemicals in general, including the POPs and their impacts on human beings and the environment, is limited to those who deal with them daily, mainly persons in the specialized agencies, and the private sectors. General public or nationwide information dissemination and awareness are not conducted structurally or on a regular basis.

In general, awareness of the use of pesticides is gradually increasing through training programmes for farmers associated with the health impact of these chemicals and the use of PPE. However, POPs pesticides are not targeted since they are not present in the country. However, due to limited availability of funds, not all farmers are reached, and attendance is not compulsory. Further, the PTCCB is introducing pesticide awareness of health impact in schools in collaboration with the Ministry of Education. There is a week dedicated to pesticide awareness during the month of October,

designated as “agriculture month” in Guyana. Financing is considered the main challenge for upscaling awareness initiatives.

The information on industrial POPs, such as SCCPs or PFAS, is lacking in the private sector and most agencies, and only initial awareness has been raised by the inventory activities and workshops related to the NIP update.

1.8.13 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

Similar to the development of the NIP, reporting under Article 15 on measures taken to implement the provisions of the Convention and for information exchange with other Parties to the Convention is an obligation for Parties.

The timeframe for the national reporting to the Stockholm Convention is every four years and in accordance with a format as established by the COP at its first meeting (Decision SC-1/22). Based on the information compiled for this NIP, Guyana intends to submit the report for Article 15 reporting.

Information exchange on POPs-related issues with other Parties to the Convention was weak in the past. However, contacts have been established, particularly within the regional POPs project. Guyana has developed close links with other countries in the Caribbean within the regional POPs project, and information exchange is facilitated by regional workshops.

1.8.14 Relevant activities of non-governmental stakeholders (including industry, civil society, research community)

The non-governmental organisations (NGOs) in Guyana are very actively involved in the sustainable development agenda and the conservation/environmental movement. The NGO community is involved at all levels of the conservation/environmental agenda, through established public consultation processes, community participation in government decision-making on issues of importance to the protection of the environment, and in the planning and management of Guyana’s national system of protected areas. However, the NGO community has not prioritized the issue of chemicals and waste management, including POPs chemicals, as one of its areas of importance.

Through the implementation of the national awareness program being developed, the NGO community and other social partners will be targeted for increased awareness of POPs chemicals, their impacts, and the need to mitigate their impacts. The result of this awareness program is expected to include greater awareness of POPs and their impact on the environment, and behavioural changes that benefit society at large.

The POPs awareness materials developed by the BCRC Caribbean, such as the “Stop the POPs” materials[47] will be considered and utilised.

[47] https://www.stopthepops.com/

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

There is no technical infrastructure for the measurement of POPs. There is also no comprehensive guide for standard operating procedures for chemical management in Guyana. Chemical management is covered through Acts and Regulations, which seek to provide for the life cycle management of chemicals with a strong emphasis on pesticides.

1.8.16 Overview of technical infrastructure for POPs management and destruction

There is no technical infrastructure for POPs management and destruction in Guyana. All of the stockpile of POPs identified has been exported and destroyed under the FAO Project at a high cost. It is expected that similar projects will address the accumulation of obsolete and expired chemicals currently stored by the PTCCB. However, there are other areas of POPs management and destruction that are now envisaged based on amendments to the Convention.

1.8.16.1 Waste management, including POPs management

Waste management has become one of the biggest challenges confronting developing countries, including Guyana. Currently, most of the waste in Guyana is not recycled or recovered, but just disposed of at the dumpsite. Only a few valuables are recovered from the waste, including metals from, e.g., vehicles or from some electronics (WEEE). However, plastic/polymers containing POP-BFRs or synthetic carpets partly containing PFOS-related substances are dumped, with a build-up of stocks in dumpsites and associated releases. Furthermore, numerous management challenges arise from addressing the empty pesticide containers.

1.8.16.2 POPs destruction capacity and export

Since there are no POPs destruction capacities in Guyana, POPs and POPs-containing waste are either sent to dumpsites or confronted with the prospect of being exported. Activities on the export of pesticide stockpiles and PCBs, which cannot be properly destroyed in Guyana. Guyana will also build some capacities for the export of POPs waste, including the application of the Basel Convention's procedures. The large POPs stocks in WEEE plastic, vehicles, SCCPs in PVC and rubber, and construction are likely difficult to export and currently end up in dump sites. For the disposal of these waste fractions, better alternatives are needed (action plan)

1.8.16.3 Capacity and Infrastructure for contaminated sites assessment, securing, and remediation

In Guyana, the infrastructure and capacity for the assessment, securing, and remediation of contaminated sites are not well developed. Initial experiences have been gained within the project on pesticide stockpile management.

Also, an initial assessment has been made for the transformer storage site of N.V.EBS. Most of the activities, especially the analysis and assessment, cannot be conducted

locally and must be sent to other countries or regional laboratories for analysis. Further, there is no specific registration of contaminated sites and no database on contaminated sites under development or in existence.

1.8.17 Identification of Impacted Populations or Environments, Estimated the Scale and Magnitude of Threats to Public Health and Environmental Quality, and Social Implications for Workers and Local Communities

Generally, every citizen is exposed to POPs via food and indoor exposure and therefore impacted by POPs. Assessing levels in human milk or blood can reveal the POP contamination level of humans. Guyana lacks the full capacity for monitoring and research to detect POPs in the environment and to assess their impacts on the environment and on human health. The lack of detection of such chemicals under the inventories used to develop this NIP does not augur well for the investment in such analytical capacity. However, a Tier III assessment should be conducted to confirm the presence and quantity, enabling an informed decision on the way forward.

Regional activities on POPs monitoring and Global Monitoring Plan activities should be evaluated and considered for generating POPs data for Guyana.

1.8.18 Details of any Relevant System for the Assessment and Listing of New Chemicals

There are legal means to ban and prohibit POPs from entering Guyana, and most of the POPs have already been banned in the country. However, no system has been established to assess and determine new chemicals on the market as POPs. However, pesticides and industrial chemicals are not produced in Guyana. All pesticides entering the country must be registered, and their evaluation would have been completed to assess effects on human health and the environment.

There is no specific system for the assessment of chemicals used in industrial processes or chemicals in products.

1.8.19 Details of Any Relevant System for the Assessment and Regulation of Chemicals already in the Market

There is no system for the assessment of chemicals already in the market in Guyana. However, all pesticides on the market are registered by the PTCCB, and part of the assessment of these chemicals includes evaluations on their impact on the environment and human health. There is no system of assessment for industrial chemicals. The PTCCB has the analytical capability to undertake this assessment for most of the pesticides imported in Guyana; however, assessing for POPs capabilities would need to be evaluated for implementation.

1.9 NIP Implementation Status

This subsection examines the gaps and the status of implementation of the Stockholm Convention in Guyana. The first part examines the identified gaps

and their national significance. The second part presents the status of the implementation of the Convention in Guyana.

1.9.1 Implementation Gaps

A range of actions and activities have been conducted or completed to address the implementation of the Convention in Guyana since its entry into force. However, several provisions or obligations remain unaddressed or only partially addressed. This section presents the provisions under the Convention and the implementation gaps associated with the achievement of these obligations. The status of the implementation gaps is provided in **Table 24**.

Table 24: Outline of the implementation gaps for the Stockholm Convention.

Convention Reference	Implementation Gap	National Significance
Article 3 Measures to reduce or eliminate releases from intentional production and use **Article 3.1**	**Annex A – Eliminate from Production and Use** Statutory provisions for elimination from production and use**,** subject to permitted use with specific exemptions applicable to POPs chemicals listed under Annex A are not in place.	Parties are obligated to provide the enabling infrastructure and legal framework for all POPs chemicals to be in compliance with the Convention's Articles. The following chemicals, listed under Annex A of the Convention are not explicitly covered: **PeCB, chlordecone, tetra-BDE, HBB, hexaBDE, heptaBDE, PCN, and deca-BDE.**
Annex A Part II (PCBs)	Absence of specific policies and regulations directed to the mandatory identification (registration), labelling, and status reporting of PCB containing electrical equipment in use in accordance with Annex A Part II. Absence of defining the PCB phase out requirement consistent with the guidance and elimination dates applied to Annex A Part II	Need for a nationally adopted PCB Phase Out Plan and its implementation. Need for specified allowable limits of PCB content and contamination that define PCB containing equipment in use. Implementation of procedures for comprehensive screening transformers in the utility system.
Annex B Part II (DDT)	DDT is restricted but the statutory provision for prohibition is not in place.	The use of DDT has been substituted in Guyana with malathion and diesel. DDT will need to be added, through an amendment, to the list of prohibited chemicals under the Pesticides and Toxic Chemicals Control Act and Its Regulations.
Article 5 – Measures to reduce or eliminate releases from unintentional production	Action plan for addressing uPOPs has not been prepared. No uPOPs release limit values or source performance standards have been established. Absence of BAT/BEP requirement in relation to source permitting	There is need for the development of an action plan to address unintentional releases of POPs as listed in Annex C of the Convention. The action plan should provide for release reduction and include: (i) Enabling legal infrastructure for uPOPs releases; (ii) Establishing release limits for uPOPs; (iii) Establishing regulations and standards for the promotion of solid waste management and biomass burning; (iv) Introduce better practices and standards for the management of PCBs; (v) Utilisation of BAT/BET provisions along with permitting and monitoring system for major releases; and (vi) Any other practices and measures that will reduce the release of uPOPs.

Convention Reference	Implementation Gap	National Significance
Article 6 – Measures to reduce or eliminate releases from stockpiles and wastes	Comprehensive identification, quantification and locations of POPs stockpiles (chemicals and consumer products containing POPs) and wastes.	The environmentally sound management of stockpiles and waste containing POPs will require the following interventions: (i) Need for expanded assessment of discarded electrical equipment stockpiles for PCB contamination. (ii) Consolidation and secure storage of present stockpiles of PCB containing/contaminated equipment. (iii) Development of ongoing mechanisms, capability and/or infrastructure to identify, capture, handle, store and ultimately dispose of POPs stockpiles and waste. (iv) Review of hazardous waste regulations to ensure coverage of POPs waste inclusive of specified limits on POPs release points. (v) Need for action/cleanup standards and action plans applicable to identification, containment and ultimately remediation of POPs contaminated sites, particularly PCB sites. (vi) Immediate action to prevent the sale and potential export of PCB contaminated waste electrical and electronic equipment (WEEE).
	Environmentally sound management of stockpiles and wastes particularly in respect to ensuring release prevention during handling and storage.	
	Provision for environmentally sound disposal of POPs stockpiles and wastes	
	Elimination of uncontrolled recovery and export of scrap metal from waste potentially contaminated with POPs.	
	Unidentified and unsecured POPs contaminated sites.	
Article 7 – Implementation plans	Timely updating and submission of the NIP, with review and update of the implementation plans as per obligation under the Convention.	Obligations as a Party requires timely submission, and with the PTCCB as a focal point, a unit within the PTCCB needs to be created to address the Conventions obligations. Development and submission of Guyana's NIP update in accordance with decisions of the COP in keeping with amendments of the Convention. Provisions need to be established for the execution of the NIP and implementation plans, along with monitoring and evaluation of the progress and updating of the plans.
	Designating an executing unit to make provisions for implementation, monitoring and evaluation of the NIP implementation plans and for updating it in keeping with Decision SC 2/7	
Article 9 – Information Exchange	Ensure information exchange related to reduction and elimination of production, use, releases and alternatives to POPs including risks and costs.	Providing for the sharing of experiences associated with the implementation of the Convention leading to a possible reduction in cost in some instances. Expanded information activities as part of NIP implementation. Review public disclosure practices with respect to chemicals confidentiality during registration to ensure disclosure of health and safety information.
	Designate a focal point for information exchange with the execution unit	

Convention Reference	Implementation Gap	National Significance
		Designating a person with responsibility for information exchange and serve as the focal point within the executing unit for the Convention.
Article 10 – Public information, awareness and education	Limited public information, awareness materials and education efforts related to POPs. Limited POPs related training, awareness and educational programs.	Providing for the expansion of information sharing, awareness and education related to POPs and other hazardous material: (i) Investigate the development and implementation of a national pollutant release and transfer register (PRTR) system; (ii) Expand current PTCCB and EPA public information programs related to chemicals and waste management to encompass POPs; (iii) Inclusion of POPs related materials in higher education programs; and (iv) Targeted training programs on the identification, risk reduction, environmental and health impact and management of POPs chemicals, stockpiles and wastes.
Article 11 – Research, development and monitoring	Lack of active R&D related to POPs and its impacts. Lack of POPs related monitoring of environmental or health impacts. Lack of capacity and capability related to analysis and monitoring of POPs Non-participation in the Global POPs Monitoring Programme	The lack of identification of the presence and quantification of POPs presence has impacted on the building of these capabilities and capacities. Tier III studied will need to be undertaken to address this gap. Consideration will have to be provided: (i) To target R&D capability in national institutions; (ii) To initiate the development of national environmental and health impact monitoring programs, inclusive of POPs chemicals. (iii) To optimize and upgrade of national laboratory capacity and capability for POPs analysis, particularly PCBs and POP chemicals. (iv) To participate in regional and international initiatives to develop specialized POPs analytical capability and capacity, particularly PCDD/F. (v) To participate proactively in the Global POPs Monitoring Programme.
Article 12 – Technical assistance	Technical and financial assistance is limited to support for the preparation of the NIP.	Recognition is accepted of the limited financial capacity of the country to provide for the implementation of the NIP. In this regard, there is need to pursue additional international technical assistance targeting the Stockholm Convention's implementation.

Convention Reference	Implementation Gap	National Significance
Article 13 – Financial resources and mechanisms	Lack of state and private sector resources directed to the management of POPs. No operational economic instruments or extended producer responsibility mechanisms in place to support targeted POPs related initiatives. No current initiatives to attract international assistance.	Similar to technical assistance. This however, provide the opportunities: (i) To investigate implementation of an extended producer responsibility mechanism to support the long-term management of obsolete pesticides. (ii) To initiate development of a proposal for GEF funding of NIP implementation. (iii) To pursue bilateral support for elements of NIP implementation.
Article 15 – Reporting	No official reporting as required under the Convention undertaken and country is nominally in non-compliance with reporting dates	The lack of implementation has established a similar lack of reporting. The establishment of the unit with the PTCCB will facilitate reporting on the implementation of the provisions of the Conventions. Further, one of the responsibilities of this unit will be to develop baseline statistical data on imports, export, use, stockpile, disposal and other requirement under the Convention as required within the provisions.
Article 16 Effectiveness Evaluation	Monitoring and evaluation related to global transport of POPs has not been undertaken or sought.	The establishment of the Unit within the PTCCB will provide for the development of a formal M&E process needed as part of the NIP implementation strategy and action plan and able to measure and monitor POPs increased or decreased presence in Guyana.

1.9.2 Implementation Status

The initial NIP for Guyana was submitted to the Stockholm Convention on 7th June 2013. The NIP was projected over a time frame divided into two blocks, 2013 – 2018 and 2018 – 2028.

The lead implementing agencies identified were the PTCCB and the EPA. These were proposed to be supported by a number of other agencies considered key institutional stakeholders, such as: Ministry of Agriculture, Ministry of Natural Resources and Environment, Ministry of Health, Ministry of Local Government and Regional Development, Guyana Energy Authority, Guyana Revenue Authority Customs and Trade Administration, representatives of the chemical's importers, Guyana Power and Light and the University of Guyana.

The status of implementation is presented in **Table 25.**

Table 25: Outline of the level of compliance for the Stockholm Convention for Guyana

Convention Reference	Level of Compliance	Comments
Article 3 Measures to reduce or eliminate releases from intentional production and use	For POPs pesticides see **Section 2.3.1**	Pesticides on the list are prohibited from import and use.
	For PCBs see **Section 2.3.2**	PCB is still present in some transformers
	For PBDEs see **Section 2.3.3**	
	For HBCD see **Section 2.3.4**	
	For SCCP see **Section 2.3.5**	
	For DDT see **Section 2.3.6.1**	DDT is not used anymore and is restricted
	For PFOS see **Section 2.3.6.2**	
Article 4 Register of exemptions	There are no POPs intentionally used in Guyana, and no exemption has been registered. However, SCCP, PFOS and PFOA are likely present in imported products and present in products like firefighting foam.	The need for exemptions for PFOA and SCCPs/MCCPs will be conducted (action plan)
Article 5 Measures to reduce or eliminate releases from unintentional production	For uPOPs see **Section 2.3.7**	A minor increase of PCDD/F releases of circa 10% compared to the baseline inventory in 2010.
Article 6 Measures to reduce or eliminate releases from stockpiles and waste	For POPs pesticides see **Section 2.3.8.2**	The POPs pesticide stockpile has been exported for destruction under a Regional Project.
	For PCBs see **Section 2.3.8.3**	A range of transformers have been measured during this NIP update revealing PCB stockpiles.
	For PBDEs see **Section 2.3.8.4**	Tier III assessment is required to confirm presence, locations and quantity for the application of reduction and remediation measures.
	For HBCD see **Section 2.3.8.5**	
	For SCCP see Section **2.3.8.6**	
	For PFOS see **Section 2.3.8.7**	
	For uPOPs see Section **2.3.8.8**	
Article 7 Implementation plans	Guyana submitted its first NIP on the 7th June 2013.	The submission of this updated NIP will address further amendments and update the initial NIP
Article 8 Listing of Chemicals in Annexes A, B and C	As at present, Guyana has not submitted a proposal on the listing of new chemicals in Annexes A, B or C to the COP.	
Article 9 Information Exchange	See Section 2.3.11	There are a number of regional projects coordinated by the BCRC and GEF along with the CGPC which serves as a mechanism of information sharing.
Article 10 Public Information, Awareness and Education	See Section 2.3.11.2	
Article 11 Research, Development and Monitoring	See Section 2.3.14	

Convention Reference	Level of Compliance	Comments
Article 12 Technical Assistance	Guyana is a recipient developing country Party. Guyana was supported by GEF for the development of the initial NIP and the updated NIP is developed by the BCRC-Caribbean and is funded by the GEF and implemented by UNEP.	
Article 13 Financial Resources and Mechanisms	Financial resources are needed for the implementation of the Convention. As at 2022, according to the Status of Contribution compiled by the SC Secretariat, Guyana has paid pledges for all prior and current years.	GEF supported the development of the Initial NIP for Guyana. FAO regional Project is responsible for the POPs pesticide stockpile.
Article 15 Reporting	Guyana has not sent any report pursuant to Article 15 of the Convention for the 3rd, 4th , and 5th Reporting Cycle.	Guyana will submit to the 6th reporting cycle including the outcome of the NIP.
Article 16 Effectiveness Evaluation	Guyana has not participated in any GMP study for any POPs.	
Article 17 Non-Compliance	The procedures and institutional mechanisms for determining non-compliance are not yet approved and developed, thus the country's compliance cannot be verified.	
Article 19 Conference of Parties	Guyana has attended COP Meetings.	
Article 21 Amendment to the Convention	Guyana has accepted all the Stockholm Convention's amendments	
Article 22 Adoption and Amendment of Annexes	Guyana has accepted and adopted all the amendments of the Annexes of the Stockholm Convention	
Article 24 Signature	Guyana was not an initial signatory to the Convention.	
Article 25 Ratification, Acceptance, Approval or Accession	Guyana acceded to the Stockholm Convention on 12th September 2007	
Article 26 Entry into Force	The Stockholm Convention entered into force for Guyana on 11th December 2007	

STRATEGIES AND ACTION ELEMENTS OF THE NATIONAL IMPLEMENTATION PLAN

This chapter addresses the following two elements: the formal policy statement and the implementation strategy for the NIP. The implementation strategy sets out specific action plans or strategies to achieve Convention obligations and other additional objectives set by Guyana.

1.10 Policy statement

The Government of Guyana is a Party to several multilateral environmental agreements, including the Rotterdam, Stockholm, and Basel Conventions, which cover chemical management. As a Party to these Conventions among others, Guyana has signaled to the international community that she is contributing to the management, reduction, phase-out, and elimination of regulated chemicals under these Conventions. Furthermore, the Government of Guyana recognizes that the management and phasing out of Persistent Organic Pollutants, within the framework of the Stockholm Convention and other agreements, requires international and regional cooperation, in which Guyana is an active participant at the Regional and International levels.

The use of pesticides and PCBs is largely based on the importation of these chemicals from developed and industrialized countries. Guyana is not a producer of these chemicals and considers, therefore, that the adverse effects of these substances should be mitigated with the support of those countries, which, directly and indirectly, have profited from the introduction of these chemicals. Guyana has never produced or formulated POPs chemicals and has discontinued the importation and use of these regulated chemicals.

The endorsement of the Initial NIP for Guyana by the Minister of Agriculture outlined the Government of Guyana's policy with respect to the implementation of the Stockholm Convention on Persistent Organic Pollutants. The policy statement highlighted the following aspects that reflected both the Country's commitment to addressing POPs issues, and more generally, to sound chemical management on an ongoing basis:

(a) Reaffirmation of the county's commitment to meeting the objectives of the Stockholm Convention, namely "to protect human health and the environment from persistent organic pollutants" as is implicit in its status as a Party to the Convention.
(b) Linkage of the NIP to the current National Development Strategy (NDS).
(c) Adoption of a "precautionary approach" with respect to efforts made toward meeting this objective.
(d) Integration of the country's efforts to address POPs within its broader efforts, ensuring sound chemical management under the framework of the International Conference on Chemicals Management (ICCM) and the Global Framework on Chemicals (GFC).

(e) Recognition of the interconnections and need for coordination between the Stockholm Convention and its implementation, with obligations and implementation activities associated with the Rotterdam and Basel Conventions, as well as the anticipated convention of mercury.
(f) Pursuit of a NIP implementation strategy based on ensuring cooperative inter-agency efforts under the coordination of PTCCB, a high level of stakeholder involvement, and an open and transparent public consultation and disclosure.
(g) Prioritization of critical areas identified in the NIP, including:
    (i) ensuring legislation and regulation covering all POPs and products containing them;
    (ii) addressing registration and reporting of exemptions as required;
    (iv) addressing the continued presence of PCBs in the national electrical system;
    (v) environmentally sound disposal of current POPs and obsolete pesticide stockpiles and wastes, and ensuring capacity to do so in the future;
    (vi) identification, containment, and elimination of POPs contaminated sites;
    (vii) addressing priority sources of unintentional POPs releases, specifically those associated with the combustion of waste and biomass, and
    (viii) development of human resource capacity and technical capabilities in the country through educational programs, training, and targeted research and development.

1.11 IMPLEMENTATION STRATEGY

This implementation strategy serves as a road map for fulfilling the objectives established by the Stockholm Convention. Guyana has never been a producer of any of the POPs listed nor an importer of technical POPs materials for production purposes. There is evidence that some POPs were used in Guyana as pesticides and others imported as a content of consumer products.

Guyana has, over the years, inadvertently achieved a number of the objectives of the Stockholm Convention, and it is the intention to build on what has already been attained. There are only two pesticides that require legal measures to prohibit, whilst administratively, they are prohibited from importation and use.

POPs chemicals contained within consumer products as waste, hazardous waste, and uPOPs, are currently the main potential source of POPs released and of major concern in Guyana. The estimate of the problem has some significant data gaps, which include confirmation and quantification as well as health and environmental impact.

This implementation strategy for the updated NIP aims to address the highlighted concerns and identified gaps within each inventoried group. The existing legal framework will need to be strengthened and improved to address POPs concerns and, more importantly, administratively enforced and financed. This will have to be supported with the associated public awareness campaign to reduce the impact of POPs chemicals in the country. Further, the implementation strategy must be supported at all levels of government – Ministries and Agencies – along with the

various stakeholder agencies, including the private sector. This coordinated approach will go a long way to addressing the environmental and health impact of POPs chemicals and other similar pollutants in the country.

1.11.1 Activities, Strategies, and Action Plans

The six (6) POPs groups will be examined in this section in more detail, along with the specific action plans for each group. However, there are some overarching actions that are required at the commencement of the process, such as the implementation of the Inter-Agency Coordinating Committee with the responsibilities for addressing the gaps of the Stockholm Convention within the country and the execution of the NIP.

There will be a need for institutional and regulatory strengthening, capacity development, establishment of inventories, identification and quantification of contaminated sites, remediation of identified contaminated sites, analysis and monitoring, and public education and awareness.

It is structured into principal activities as summarized in the following sub-sections, each with one or more tasks defined along with anticipated outcomes and outputs. These generally follow the Convention text and correlate with specific Articles. In each case, rough timing is assigned to each task along with national lead and participatory responsibilities, and indicative baseline and incremental cost estimates and anticipated sources of funding.

1.11.2 Coordinating Strategy

The POPs chemicals are scattered over several economic sectors as well as over a very wide geographic area in Guyana. The coordinating strategy involves having all efforts coordinated and monitored by one institution within the Government, the Pesticides and Toxic Chemicals Control Board (PTCCB), while allowing various sectors (public and private) to implement their individual activities in a smooth and coordinated manner. The existing coordination of activities associated with the Stockholm Convention is the PTCCB. The overall implementation strategy for this NIP will be based on a model of inter-agency collaboration and cooperation, with a particular emphasis on the PTCCB and EPA as key implementation agencies. PTCCB will act in an overall coordinating role. Overall supervision will be provided by an Inter-Agency Committee involving the key institutional stakeholders, namely Ministry of Agriculture (MoA), Ministry of Natural Resources and Environment (MNRE), Ministry of Health (MoH), Ministry of the Local Government and Regional Development (MLGRD), Guyana Energy Authority (GEA), Guyana Revenue Authority – Customs and Trade Administration, as well as key external stakeholders, representatives of the chemicals importers and manufacturers, consumer products importers, Guyana Power and Light (GPL), and University of Guyana (UG). This interagency committee will take the lead in the implementation of the NIP, and its associated actions will include:

1. Undertaking regular monitoring and evaluation of the NIP implementation.
2. Updating the NIP after a period of five years or earlier if the prevailing situation in the country necessitates this action.

3. Coordinate the execution of action plans.
4. Facilitate fund raising for the project proposals in the present NIP update.
5. Facilitate information exchange with the General Secretariat of the Convention and the other relevant agencies.
6. Act as a National Focal Point for all information databases and dissemination pertinent to POPs.
7. Create linkages with international agencies to gain technical support on any recent advancements in the POPs issues.

The NIP itself is formalized as a national plan within the framework of the current National Development Strategy (NDS) for Guyana and is updated as amended as required under Article 7 of the Convention.

The NIP Action Plan detailed below is provided for in a one-time block of five years, 2023 – 2028, and would be accordingly amended as the next NIP is developed.

1.12 NIP Action Plan

This section presents the Action Plan for compliance and implementation of the Stockholm Convention by Guyana. The Action Plan for the 2023-2028 period is laid out under the following action plans. In general, the Action Plan has been structured based on the guidance provided in various Convention-sanctioned documents, including the guideline for NIP preparation (UNEP/POPS/COP.2/INF/7) and the guidance provided for estimating NIP Action plan indicative costs (UNEP/POPS/COP.4/INF/11). However, modifications to the structure have been made to best suit the national context and the scale of the POPs issue as documented in Section 2.

1.12.1 Activity 1: Institutional, Regulatory, and Technical Strengthening Measures

This activity has the overall objective of addressing overarching institutional, regulatory, and technical capacity gaps and issues that need to be addressed for the efficient and effective implementation of the NIP and the Convention's obligations. This action plan seeks to strengthen the existing institutional, regulatory, and analytical framework and include:

(a) Establishment of a formal Chemicals Convention Inter-Agency Coordinating Committee (ICC) covering all major institutional stakeholders. Its first priority would be towards satisfying the national obligations associated with the Stockholm Convention implementation, but would also serve a similar role in relation to the other two current Conventions that Guyana is a party to, as well as its participation in the International Conference on Chemicals Management.
(b) Enacting enabling legislations for the implementation of the Stockholm Convention on Persistent Organic Pollutants, which will also provide the regulatory framework for the management of all chemicals with emphasis on the chemicals listed by the Stockholm Convention and covers for chemicals

contained in consumer products and covers for imports, exports, use, recycling and disposal in accordance to the Articles of the Convention[48]; and

(c) Strengthening of analytical capabilities and staff proficiencies for POPs chemicals evaluation and monitoring, providing for improving the analytical facilities and staff competences of the laboratories in Guyana to undertake evaluation and measurement for POPs chemicals impact in the environment and health, as well as providing for monitoring and evaluation of POPs.

The following table, **Table 26**, summarises the proposed action plan for institutional, regulatory, and technical framework strengthening.

[48] Legal and regulatory activities are included in the respective action plan for the individual POPs

Table 26: Work plan to address strengthening of institutional, regulatory and technical frameworks to undertake the implementation of the Stockholm Convention and the management of POPs in Guyana.

Objectives	Activities	Performance Indicators	Time Frame	Implementers	Budget (US $)
Establishment of an Inter-Agency Coordinating Committee (ICC) to supervise NIP execution and oversee compliance with the Stockholm Convention's Articles in Guyana	Determine the Terms of Reference (TOR) of the ICC and its Composition.	Terms of Reference of the ICC.	**Within 6 months of NIP approval**	**PTCCB supported by the EPA**	**25,000**
	Invite Agencies to nominate representatives in line with the TOR and an alternate;	Letters of appointment.			
	Appoint an inaugural date for the initial meeting of the ICC;	Inaugural Minutes of the ICC.			
	Establishment of Unit and Staff to support the work of the ICC.	Staff and Unit Letter of Establishment and Mandate.			
	ICC approves the work plan for the implementation of the NIP and SC's Articles in Guyana.	Approved work plan for the implementation of the NIP and SC's Articles for Guyana.			
Enacting local enabling legislation for the Stockholm Convention	Review existing legislations on management of POPs in keeping with the Text of the Convention and determine gaps	Legislative Review Report.	**1 year**	**PTCCB, EPA, MoLA, MOLGRD, GRA**	**20,000**
	Conduct an assessment inventory of all chemicals in use and contained in consumer products	Chemicals Inventory.			
	Develop an overall chemical regulatory framework through amendments or new legislation to address gaps identified and management of assessed chemicals in the national inventory identified.	Legislative amendments and new legislations gazetted.			
Strengthening of Analytical Capabilities and Staff Capacities for POPs Chemicals Evaluation and Monitoring	Determine the certified evaluation methodology of the POPs chemicals under the Convention.	POPs chemicals evaluation reports.	**3 years**	**PTCCB / EPA / IAST / F & D**	**500,000**
	Evaluate the laboratories that can best perform these evaluations by chemical groups.	List of laboratories by groups and upgrade requirement.			

Objectives	Activities	Performance Indicators	Time Frame	Implementers	Budget (US $)
	Upgrade identified laboratory based on the findings of the evaluation.	Equipment procured and provided to identified laboratories.			
	Staff undertake training based on the laboratory upgrade	List of staff trained to undertake evaluation at the respective laboratories.			

1.12.2 Activity 2: Measures to Reduce or Eliminate Releases from Intentional Production and Use

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to eliminate the production, use, import, and export of the chemicals listed in Annex A; and to restrict the production and use of the chemicals listed in Annex B. There is no intentional production and use of POPs pesticides or chemicals in Guyana.

The recently listed chemical, dicofol, has not been assessed for Guyana and in this NIP update. Also, apart from PCBs, which are used in electrical equipment, such as old transformers and capacitors, there is no legal intentional use of POPs chemicals in Guyana.

1.12.3 Activity 3: Measures to Reduce Production, Import, Export, Use, Stockpiles Export and Waste of Annex A POPs Pesticides (Annex A, Part I Chemicals)

Article 3 of the Stockholm Convention requires that each Party take legal and administrative measures necessary to eliminate the production, use, import, and export of the chemicals listed in Annex A, but as noted, there is no Annex A Pesticide produced or used in Guyana.

All of the POPs pesticides listed by the Convention are legally prohibited with the exception of chlordecone and pentachlorobenzene (PeCB), both of which are not present or registered for use in Guyana. These two POPs pesticides are proposed to be added to the list of prohibited substances under the Pesticides and Toxic Chemicals Regulations as a subpart of this activity. Furthermore, dicofol and methoxychlor have recently been listed as POPs in Annex A.

The other areas this activity aims to address include determining enforcement measures to ensure proper handling, use, storage, and disposal of pesticides, thereby protecting human health and the environment, as well as associated liabilities. Further, the following will be addressed:

(a) Use of environmentally safe pesticides and encouragement of organic farming;
(b) Information on health effects associated with exposure to pesticides based on occupational monitoring;
(c) Responsible and safe use of highly hazardous pesticides (HHPs) and, where the risk is high and alternatives are available, examine prohibition (GFC targets);
(d) Environmentally safe disposal of hazardous pesticides and empty containers; and
(e) Increasing awareness and dissemination of information on POPs/HHPs pesticides.

The following table, **Table 27**, summarises the proposed work plan for the reduction and elimination of POPs pesticides.

Table 27: Work plan of the measures to reduce, import, export, use, stockpiles and wastes of POPs pesticides (Annex A) and highly hazardous pesticides (HHPs) for Guyana.

Objective	Activities	Indicator	Time frame	Implementers	Budget (US $)
Update the legislative framework and policy to include new listed POPs pesticides and possibly HHPs.	Amending the pesticides regulations to address all listed pesticides by prohibiting and regulating POPs pesticides and restricting current HHPs.	Updated legislation, regulation and list of banned pesticides	3 months	PTCCB, MOA, MoLA	10,000
Development of an adequate legislative framework and policy to better manage HHPs and counterfeit chemicals.	Implementation of GHS and related labelling.	GHS implemented	3-6 months	PTCCB, Importers, GRA (Customs)	20,000
	Develop regulatory measures to combat illegal trafficking of banned and counterfeit pesticides	Regulatory measures in place Ensure compliance and implementation	12 months	PTCCB, GRA (Customs), Guyana Police Force	
	Regulatory frame for good agricultural practice, IPM and organic farming	Regulatory measures in place	3-5 years	NAREI	
	Regulatory framework for Extended Producer (or importer) Responsibility (EPR) including management of empty pesticide container	EPR regulatory framework developed and published	2-3 years	EPA, PTCCB, Importers, All Stakeholders	
Develop/update POPs detailed pesticides inventory	Improvement of POPs Pesticide inventory possibly considering FAO PSMS (overall stockpiles; avoiding reoccurrence of obsolete pesticides stocks)	Updated inventory	On-going	PTCCB, Importers, Chemical Users	10,000
Life cycle management of POPs pesticides including handling, storage, transfer and disposal	General improvement of POPs pesticides/HHPs and general pesticide management	Life cycle management of pesticides established considering FAO guidance documents		PTCCB	10,000

Objective	Activities	Indicator	Time frame	Implementers	Budget (US $)
of POPs pesticides and POPs pesticides wastes	Establishing of empty containers collecting and management system, with specific attention to address the use and recycling of pesticides empty containers	Report on empty container program		EPA, PTCCB, Local Gov., relevant stakeholders	25,000
	Establishing of proper POPs and waste pesticide storages and securing them	Sufficient pesticide storage built (documentation)		PTCCB	25,000
	Establishing poison control centres and capacity to address emergencies and disasters related to POPs pesticides and HHPs (poisoning, spillage) and other hazardous chemicals	Poison control centre established and operative	2-3 years	PTCCB. MOPH, Ambulance Services, Health Facilities	125,000
	Assessing the country's capacity for disposing of obsolete POPs pesticides stockpiles and/or exporting the waste for environmental sound disposal	Capacity assessed and options of disposal documented (report)	1-2 years	FAO, PTCCB, EPA	15,000
	Disposal of POPs and pesticide wastes and other obsolete pesticides waste (27.5 t)	Pesticide wastes are disposed in an environmental sound manner	2-3 years	FAO, PTCCB, EPA, Local Gov.	275,000
Education and awareness of stakeholders (customs, farmers NGOs and the public)	Strengthen the inspection of pesticides for custom and for competent authority (market survey, sales, storage, usage and disposal including counterfeit and illegal pesticides).	Number of educated customs and competent authority	On-going	PTCCB, GRA	15,000
	Education of policy makers on health hazards of HHPs and the benefits of IPM and organic farming	Policy makers in relevant ministries understood relevance	On-going	EPA, PTCCB, NAREI, MOA	10,000

Objective	Activities	Indicator	Time frame	Implementers	Budget (US $)
	Education of farmers on HHPs, counterfeit pesticides and the use of IPM and organic farming	Number and share of educated farmers	On-going	PTCCB, NAREI, GRDB	15,000
	Education of citizens and NGOs on HHPs, counterfeit pesticides and organic farming and organic products	Number of educated citizens and NGOs	On-going	PTCCB, PSC, Importers	15,000
Assessment of HHPs (SAICM Synergy) including chlorpyrifos (POP candidate) and alternatives used and implementation of substitution and IPM and organic farming.	Compilation of information on alternatives to chlorpyrifos and HHPs (SAICM Synergy) including a risk assessment for HHPs and their alternatives using existing and possibly generating new data, including the risk to humans and biota and ecosystem indicators	Report on assessment on alternatives to chlorpyrifos and other HHPs.	6-8 months	PTCCB	15,000
	Supporting implementation and research on IPM/IVM, including the use of alternatives as a measure for reducing HHP use	Progress on IPM/IVM (report)			25,000
	Selection of the most sustainable alternative chemicals and non-chemical solutions in the different applications and including promotion of organic farming.	Report on alternatives to chlorpyrifos Target for organic farming			10,000
	Education and capacity building on alternatives and organic farming and implementation	Number of farmers educated Share of alternatives and organic farming			40,000
Established analysis and monitoring of POPs pesticides and HHPs (SAICM synergy)	Strengthening and developing laboratory capacity to analyse pesticides (including relevant POPs and Highly Hazardous Pesticides)	Laboratory capacity established and validated	6-8 months	PTCCB, University of Guyana,	100,000

Objective	Activities	Indicator	Time frame	Implementers	Budget (US $)
(products, environment, food, exposure)				GNBS, JANNAC	
	Assessment of occupational exposure to POPs pesticides and HHPs	Report on occupational risk		OSHA, Labour Department, MOPH	35,000
	Monitoring and establishing a pesticide monitoring programme (food, soils, water, consumer)	Report on POPs pesticide and HHP pollution situation and risk for human, environment and ecosystem		EPA, PTCCB, Food and Drug Agency	100,000
Established capacity of risk and socio-economic assessment	Development of knowledge, capacity, tools and indicators to better assess the risks and socio-economic impact of POPs/HHPs	Experts or institution with capacity in risk and socio-economic assessment	6-8 months		10,000
Identification and securing and potential remediation of POPs pesticides contaminated sites	Identification of (former) pesticide formulation, storage, use and disposal sites (in particular Guysuco)	Inventory report of potentially contaminated sites	2 -3 years	PTCCB	5,000
	Identify the level of contamination of soil and ground water and potential receptors and exposure risk at sites	Assessment report of potentially contaminated sites		EPA, PTCCB, Relevant Stakeholders	50,000
	Secure, monitor and possibly remediate contaminated sites	Sites secured and/or remediated (report)		PTCCB, EPA	150,000
	Database and conceptual site models of potentially contaminated sites	Database established (one database for all POPs or all contaminated sites)		EPA, PTCCB	15,000

Objective	Activities	Indicator	Time frame	Implementers	Budget (US $)
	Prioritization of sites (risks) for further assessment and securing	Sites prioritized		EPA, PTCCB	5,000

1.12.4 Activity 4: Measures to Reduce Production, Import and Export, Use, Stockpiles Export and Waste of Annex A POPs Chemicals - SCCP (Annex A, Part I)

This activity has the objective of aligning current Convention requirements for Annex A chemicals, short-chained chlorinated paraffins (SCCPs), with respect to import and use in Guyana.

SCCPs are not produced or knowingly intentionally used in Guyana. SCCPs are primarily used in metalworking applications and in polyvinyl chloride (PVC) processing. SCCPs are also used as plasticizers and flame retardants in a variety of applications, including in paints, adhesives and sealants, leather fatliquors, plastics, rubber, textiles, and polymeric materials. Most of these uses are exempted in the Stockholm Convention listing.

Within this NIP update, a first inventory for SCCP has been developed, and it can best be determined as a preliminary inventory (Tier II) due to the number of limitations encountered. The inventory for SCCP was conducted on the emissions associated with PVC, plastic, and Rubber. The composition drew data from a study conducted in China titled “Distribution and Emission Estimation of Short and Medium Chain Chlorinated Paraffins in Chinese Products through Detection-Based Mass Balancing” by Chen et al., 2021. The inventory, despite several limitations, revealed the presence of these materials in polymers used in PVC production, as well as in plastics and rubber, consistent with the study's findings.

The inventory found that the likely import of SCCPs (and MCCPs) in products, particularly PVC and rubber, is in tonnes scale (Section 2.3.5).

The action plan establishes the measures that will lead to managing and controlling SCCP contained in consumer products and for managing their life cycle – import, use, and disposal – in particular for polymers, plastics, and rubbers. Further evaluation is recommended for SCCP, in particular, Tier III studies, along with a determination of the presence arising from other products imported into Guyana.

The measures utilised for the management of these chemicals are:

(i) Establishment of regulatory and legal framework for management of SCCPs related articles and waste categories;

(ii) Conducting a comprehensive evaluation of SCCP presence in Guyana – articles, waste and consumer products - and monitoring of SCCPs pollutants in affected environments.

The summary of the workplan is shown in **Table 28** .

Table 28: Work plan of the measures to reduce the production, import, export, use, stockpile and waste of SCCPs.

Objectives	Activities	Performance Indicators	Time Frame	Responsible Agencies	Budget (US $)
Develop regulatory and legal framework for the management of SCCP and related articles and emissions	Conduct a situational analysis of the existing regulatory mechanisms and the capacities for addressing SCCP and associated emissions along with the associated contamination and implications.	Situational Analysis Report	1 year	PTCCB, EPA, MINTIC, MoLA	10,000
	Identify gaps and requirement for sound management of SCCP, alternatives and associated emissions.	Sound management of SCCPs report			5,000
	Amend existing legislation or develop new regulations to address the management of SCCP and SCCP emissions in Guyana.	Updated legislations		MoLA, PTCCB, EPA	5,000
	Develop and implement public awareness programme to address the guidelines for SCCP and its emissions and disposal management.	Public awareness plan		EPA, PTCCB	10,000
	Develop and implement a monitoring and evaluation programme and associated inventories for SCCP consumer products and use in the manufacturing process (PVC), its emissions and emissions associated with waste disposal and generation.	Monitoring and evaluation plan		EPA, PTCCB	100,000
Conducting a comprehensive inventory and monitoring of SCCP and MCCPs in products, waste and recycling and possibly affected environment (indoor dust, air, surface water and land) **<u>Please note</u>: The assessment of products in use is combined with the assessment of PCBs/PCNs in open application.**	Conduct TIER III confirmation for SCCP and MCCPs presence, quantification in products, waste and locations associated with the inventory conducted.	Tier III inventory	2 – 3 years	PTCCB, EPA	150,000
	Based on Tier III assessment, develop and implement a monitoring and evaluating programme for SCCP and associated emissions.	M and E programme for SCCP	2 – 3 years	PTCCB, EPA	25,000

1.12.5 Activity 5: Reduction and elimination of releases from intentional production and use (Article 3) - PCBs and equipment containing PCBs (Annex A, Part II Chemicals)

The current and previous inventories have shown that the PCBs are contained in operational and inoperative electrical equipment, consisting primarily of transformers and similar electrical equipment. Whilst the main focus is on PCBs, PCNs are also covered in this plan. PCNs have been listed in the Convention in Annexes A and C in 2015. PCNs have been used in the same application as PCBs, but mainly in the 1930s to 1960s, in closed applications, mainly in capacitors and less in transformers and hydraulic oils. PCNs can be managed within the same framework of PCB assessment and management.

PCBs and PCNs were also used in open applications like sealants, paints, and cables, which have been substituted by chlorinated paraffins largely in the 1970s, and a combined assessment seems appropriate (see **Table 28** and **Table 29**).

The proposed activities define specific actions with respect to managing PCBs/PCNs, both in the short and the long term, in a manner that is consistent with the obligations of the SC. The overall objective is to reduce and ultimately eliminate PCB use, prevent releases of the chemical into the environment, and provide for environmentally sound disposal or final elimination of PCB waste. The strategy and action plan focus on provisions and measures in the areas of: legislation, institutional setting, technical capacity, life cycle management, alternatives, as well as awareness.

In reality, the relatively modest scale of the issue in the country and the fact that most identified equipment is approaching 40 years old make this task relatively straightforward, and the country could have a realistic opportunity to achieve an accelerated PCB use phase-out before 2025. Responsibility for this activity would lie primarily with PTCCB on the regulatory side and with GPL[49] as the major holder of such equipment.

The following table, **Table 29Table 26**, summarises the proposed action plan for reducing production, import, export, use, stockpile, and waste of PCBs and PCNs.

[49] The Guyana Power and Light Incorporated (GPL) is a state owned entity under the Ministry of Public Works

Table 29: Work plan of the measures to reduce the production, import, export, use, stockpile and waste of PCBs.

Objectives	Activities	Performance Indicators	Time Frame	Responsible Agencies	Budget (US $)
Development and implementations of framework, policy and measures for control and management of PCBs and PCNs in closed and open applications (equipment, materials and wastes).	Defining a National PCB/PCN Elimination Plan, best within a National Hazardous Waste Management Plan and, define the responsibilities for institutions and companies for PCB/PCN containing wastes management and disposal	National elimination plan	1 year	GPL, PTCCB and EPA	10,000
	Strengthening the control and inspection for PCB/PCN-containing equipment still in use, and for interim storages and disposal facilities.	Inspectors trained on use of equipment	2 years	GPL, PTCCB and EPA	10,000
Development/update of a PCB/PCN inventory in closed and PCB/PCN in open applications where relevant. **Please note:** The assessment of open applications is combined with the assessment of SCCPs in these uses.	Completing inventory of PCB/PCN containing equipment (in use and out of use).	Inventory of transformers, capacitors and other equipment	3 years	GPL, PTCCB and EPA	20,000
	Assessment of the past use of PCBs/PCNs in open applications (e.g. sealants, paints, rubber, chloroprene, plastic additive, industrial oils) in the country and, where relevant, developing inventory of PCBs/PCNs in open applications.	Assessment report. Inventory of open applications	2 years	GPL, PTCCB and EPA	20,000
	Assessment of waste oil management and use and inventory of potentially PCB-/PCN- contaminated waste oils. Assessment of risk of (waste) oils for food, feed and environmental pollution.	Monitoring/inventory report	2 years	GPL, PTCCB and EPA	20,000
	Developing and regularly updating a database for PCB/PCN-containing equipment (in use and storage) and open applications (e.g. buildings/constructions)	Database	2 years	GPL, PTCCB and EPA	20,000
Life cycle management (handling, storage, transport and disposal) of PCBs/PCNs, PCB/PCN-containing equipment, open applications and PCB/PCN containing and contaminated wastes	Assessing the current situation and improvement needs of interim storage and disposal for PCB/PCN containing equipment and wastes	Assessment report	1 year	GPL, PTCCB and EPA	10,000
	Establishing ESM procedures for PCBs/PCNs equipment and wastes considering existing technical guidelines.	Authorities and staff trained	1 year	GPL, PTCCB and EPA	15,000
	Establishing inspection/control on the handling, storage, transfer and disposal of PCB/PCN-containing equipment and PCB/PCN-containing wastes	Inspectors trained Inspections report	1 year	GPL, PTCCB and EPA	25,000

Objectives	Activities	Performance Indicators	Time Frame	Responsible Agencies	Budget (US $)
	Phase-out PCB/PCN in closed and open applications and monitoring of the progress	Phase-out of equipment by 2025. Documented management and export	3 years	GPL, PTCCB and EPA	25,000
	Environmentally-sound management and disposal of PCB/PCN-containing equipment and waste	Disposal of equipment by 2027	4 years	GPL, PTCCB and EPA	25,000
Awareness, education and training of stakeholders (policy makers; customs, related industries, NGOs and the public) on PCBs/PCNs in closed and open applications (linked to the awareness on chemicals in products (SAICM synergy))	Awareness/education of policymakers and other stakeholders on health hazards of PCBs, and PCNs and the related risk for humans, environment and food.	Number of awareness activities conducted	2 years	GPL, PTCCB and EPA	15,000
	Strengthen the inspection-capacity for customs and other competent authority (import, use; mark/sales, storage, disposal).	Customs and inspectors trained (number of trainings; participants)	2 years	GPL, PTCCB and EPA	15,000
	Education of utility sector, maintenance workers and industry owning transformers, capacitors and other PCB/PCN-containing closed equipment and open applications on PCBs, PCNs and alternatives. Education of citizens and NGOs on PCBs and PCNs including open applications relevant for consumers (paints and sealants).	Workers and stakeholders trained (number of trainings; participants)	1 year	GPL, PTCCB and EPA	20,000
Established monitoring and analysis of PCBs and PCNs (closed and open applications, environment, food, exposure)	Monitoring and analysis of PCBs and PCNs for closed and open applications (see above)	PCB/PCN inventory in closed application	3 years	GPL, PTCCB and EPA	20,000
	Monitoring of occupational exposure (maintenance and management/remediation staff)	Monitoring data of potentially exposed staff	3 years	GPL, PTCCB and EPA	15,000
	Monitoring of PCBs/PCNs and SCCPs (human, environment biota, imports, food) by own capacity or regional/international collaboration	Monitoring data	3 years	GPL, PTCCB and EPA	20,000
Assessment and promotion of sustainable alternatives used for PCBs and PCNs in closed and open applications	Compilation of information on alternatives in closed and open applications of PCBs/PCNs and SCCPs and assessment of alternatives used	Reports (compiling available information from e.g. POPRC)	2 years	GPL, PTCCB and EPA	15,000
	Education on alternatives of PCBs/PCNs in closed and open applications	Trainings conducted (numbers of participants)	3 years	GPL, PTCCB and EPA	20,000
	Promotion of most sustainable alternatives in closed applications considering chemical and energy aspects	Selected alternative equipment	3 years	GPL, PTCCB and EPA	15,000
	Promotion of the most sustainable alternatives in (former) open applications of PCBs/PCNs	Selected alternatives	3 years	GPL, PTCCB and EPA	15,000

1.12.6 Activity 6: Measures to Reduce Production, Import, Export, Use, Stockpiles, and Wastes of PBDEs (Annex A, Parts IV, V, and IX), HBCD (Annex A, Parts I and VII), and HBB (Annex A, Part I Chemicals)

This activity aims to align current Convention requirements for Annex A chemicals – PBDE, HBCD, and HBB – with respect to their reduction and elimination from intentional production, import, export, use, stockpiles, and wastes in Guyana.

PBDEs, HBCD, and HBB were and are not produced or used in Guyana. However, PBDEs are present in a large number of consumer articles – either still in use or disposed of at the landfill sites. The inventory conducted noted their presence in electrical and electronic equipment (EEE) and older end-of-life vehicles. The report further informed of their possible presence in discarded consumer products such as synthetic carpet, textiles, upholstery foam in furniture and carpet padding, certain plastics parts and textiles in transportation, and drilling and certain plastics in construction, amongst others. This is the first inventory for Guyana, and it will serve to establish the benchmark for the action plan for the management of this group of chemicals in Guyana.

The action plan establishes the measures that will lead to managing and controlling PBDEs contained in consumer products and for managing their life cycle – import, export, use, recycling, stockpile, and disposal – in particular for EEE/WEEE and end-of-life vehicles.

The plan also provides for HBCD management, if discovered, though not established, in insulation for housing (polyurethane and polystyrene). HBB production stopped in 1976; it was historically used, e.g., in PUR foam in cars, where it might be present in classic cars from the US.

The action plan aims to promote the environmentally sound management of POPs in major use sectors (EEE/WEEE, ELVs, buildings, and textiles.

The measures utilised for the management of these chemicals are:

(i) Establishment of regulatory and legal framework for management of POP-BFRs (hazardous chemicals) and related articles and waste categories;
(ii) Updating and refining of the inventories for the BFRs;
(iii) Provide for the sound management of the life cycle of BFRs;
(iv) Monitoring of POP-BFRs and pollutants in affected environments and human; and
(v) Raising awareness on the impact of BFRs and the associated concerns.

The following table, **Table 30**, summarises the proposed action plan for reducing production, import, export, use stockpile and waste of BFRs.

Table 30: Action plan of the measures to reduce the production, import, export, use, stockpile and waste of POP-BFRs.

Objectives	Activities	Performance Indicators	Time Frame	Implementer	Budget (US $)
Establishment of a regulatory framework for the management of POP-BFRs (PBDEs, HBCD, and HBB) and related articles and waste categories	Assessment of regulatory frameworks for POP-BFRs and the products and wastes containing these substances.	Overview of international regulations compiled	2 years	PTCCB, MoHA, GFS, MoLA, EPA, GRA, MoLG, MoH&W	20,000
	Development of regulatory framework for EEE/WEEE management	Regulatory frameworks for EEE/WEEE developed	5 years		10,000
	Development of a regulatory framework for vehicles management (importation, end-of-life management).	Regulatory frameworks for vehicles developed	5 years		10,000
	Development of a regulatory framework for POPs in insulation and other plastic in construction and demolition.	Regulatory frameworks for POPs in insulation foams and other C&D plastics developed	5 years		10,000
Updated and refined inventory of POP-PBDEs and HBCD containing articles and wastes and updated databases for information management	Update PBDE and HBCD inventories and other updates where necessary.	Updated inventory report	2 years	PTCCB, EPA, GFS, GRA	10,000
	Develop dynamic materials and stock flow assessment (MFA/SFA) inventory for POPs, other chemicals of concern (e.g. mercury, lead, CFCs) and resources in EEE/WEEE, vehicles, and construction.	Dynamic substance flow analysis of POP-BFR and other CoC-containing products and waste (report)	3 years		25,000
	Data management system for product and waste categories containing BFRs (for general waste management)	Databank for EEE/WEEE, vehicles, established	2 years		15,000
Sound Life Cycle Management of POP-PBDE and HBCD-containing product and waste categories (EEE/WEEE, end-of-life vehicle, insulation foam) and integrate in the larger framework of plastic/polymer management	Compilation of information of management for POP-BFR-containing products and waste including fate of other pollutants.	Report	2 years	PTCCB, EPA MLGRD, MoH&W	10,000
	Assessment of management, recycling and destruction option of waste categories containing POP-BFR (WEEE; ELV, insulation foam, furniture).	Assessment report	2 years		15,000
	Compile information on safe handling of POP-BFR polymers in EEE, ELV, and insulation foam etc. and use available guidelines or develop national guidance for the management of the waste and the resources.	Report and selected guideline or developed guidance	2 years		5,000

Objectives	Activities	Performance Indicators	Time Frame	Implementer	Budget (US $)
	Development of sound management (financing, collection, storage, treatment, considering the waste hierarchy) of POP BFR-containing plastic and other polymer in EEE/WEEE within the framework of hazardous substance management in EEE life cycle	EEE plastic and POP-PBDE management is addressed within WEEE management	3 years		10,000
	Development of sound management of POP-BFR-containing plastic and other polymers in end-of-life vehicles within the framework of hazardous substance management in the life cycle of ELV	ESM of plastic and polymers within ELV management established (report)	3 years		10,000
	Development of sound management of POP-BFR-containing plastic and other polymers in buildings and construction within the framework of POPs (PCBs, PCP, POP pesticide in wood, SCCPs) and hazardous substance management in buildings and construction.	ESM of plastic/polymer from construction & demolition waste (report)	3 years		15,000
	Development of sound management of POP-BFR-containing plastic and other polymers in other uses found relevant				
	Identify destruction and energy recovery options for POP-BFR-containing waste.	Phase-out/destruction options identified.	5 years	GRA, PTCCB, EPA, MoLGRD	10,000
	Develop phase-out/destruction options for identified POP-PBDE sources.	Phase-out/destruction options programmes in place	5 years		10,000
Awareness of major stakeholders on POP-BFR-containing products and waste created (integrated in the overarching framework on awareness of "Chemicals in Products" and "Management of hazardous chemicals in the life cycle of EEE" (SAICM synergy)	Develop awareness-creation strategy on impact (health, recycling, environment) of POP-BFRs and other hazardous chemicals in the life cycle of EEE, vehicles, buildings, textiles, and other impacted product categories.	Development of awareness-raising materials	5 years	PTCCB, EPA	25,000
	Developing awareness-raising materials on POP-BFRs and other hazardous substances in EEE, ELVs, buildings etc.				50,000
	Awareness-raising campaigns for stakeholders (policy makers, authorities, industry, recyclers, research and public) on POP-BFRs within a larger	Awareness-raising workshops and	5 years		25,000

Objectives	Activities	Performance Indicators	Time Frame	Implementer	Budget (US $)
	awareness campaign on chemicals in products, marine litter and SCP.	dissemination of information (Number of stakeholders reached)			
	Awareness-raising campaigns to reduce/eliminate open burning of EEE/WEEE and ELV polymer scrap by the informal sector				25,000
Building knowledge and capacity for management of POP-BFR-impacted materials and waste categories within the life cycle management of hazardous substances in EEE, vehicles, buildings, furniture, textiles	Carry out policy and regulatory needs assessment and develop recommendations.	Policy and regulatory needs assessment (report)	3 years	PTCCB, EPA, MOH&W, MoLGRD	15,000
	Capacity-building of authorities and institution for developing the regulatory framework for life cycle management of EEE, ELVs, construction sector and others	Training materials developed	3 years		15,000
	Capacity building for implementation of the regulatory frameworks for managing WEEE, ELVs, and other impacted wastes				15,000
	Develop procedures on inspections and maintenance of stockpiles and waste of plastic and other polymers in EEE.	Procedures on inspections and maintenance of stockpiles and waste developed.	3 years		15,000
	Training/education of customs authorities on control of import of WEEE, ELVs, and other potentially-impacted products.				15,000
	Development of education and training materials for the life cycle management of POP-BFRs and other hazardous substances (considering already available materials) in EEE, vehicles, buildings, furniture, and textiles for relevant sectors	Education and training materials for life cycle management of POP BFRs	3 years		20,000
	Capacity-building of life cycle management for POP-BFRs and training of recyclers and waste management sector for relevant sectors within the life cycle management of hazardous substances in EEE, vehicles, buildings, furniture, textiles.	Capacity-building and training activities conducted (number of workshops)	3 years		20,000

Objectives	Activities	Performance Indicators	Time Frame	Implementer	Budget (US $)
Establishing monitoring of POP BFRs and pollutants in the technosphere and other priority areas	Assessment of options for monitoring of POP BFRs (own/regional capacity or international collaboration Establishment of monitoring approach for POP-BFRs.	Monitoring of POP-BFRs and other pollutants in the technosphere and other priority areas (report)	5 years	PTCCB, EPA, MoH&W, MoLGRD, GRA	75,000
	Monitoring of major product categories and wastes and recycling.				75,000
	Improvement of inventory by monitoring approach where knowledge gaps have been identified. Monitoring of humans, biota and environment for POP-BFR for effectiveness-evaluation and in priority areas (e.g. contaminated site).				25,000

1.12.7 Activity 7: Measures to Reduce Production, Import, Export, Use, Stockpiles and Wastes of Annex B POPs Chemicals - DDT (Annex B, Part II Chemicals)

Guyana does not produce, import or use the Convention's listed Annex B POPs chemicals – DDT. DDT is regulated as restricted and is proposed to be prohibited under the Pesticides and Toxic Chemicals Control Act (No. 13 of 2000).

This activity is designed to make the necessary regulatory adjustments to existing Pesticide and Toxic Chemical Control Regulations to formalize the prohibition as permitted under the Convention. Primary responsibility for this activity would lie with PTCCB in consultation with Ministry of Health.

Table 31 summarises the workplan to prohibit DDT in Guyana.

Table 31: Work plan to address the prohibition of DDT.

Objectives	Activities	Performance Indicators	Time Frame	Implementer	Cost
Prohibition of Imports of Annex B chemicals (technical materials) and formulations.	Update regulatory framework for prohibition of chemicals listed under Annex B. The following chemical will be prohibited under the relevant regulations in accordance with the laws of Guyana: (a) Dichloro Diphenyl Trichlorethane (DDT).	Copy of the *Official Gazette* with the amended Regulations.	6 months	PTCCB, MoH	10,000

1.12.8 Activity 8: Measures to Reduce Production, Import, Export, Use, Stockpiles and Wastes of Annex B POPs Chemicals - PFOS/PFOSF and its related substances and products containing them (Annex B, Part III Chemicals)

The inventory report found that there is no production or use of PFOS in Guyana, but there are possibilities that PFOS and its related substances could have been used in the past.

There is no requirement for any exemption for PFOS.

There are no major gaps identified since there is no major confirmed use of PFOS in Guyana; however, the firefighting foam needs to be tested to confirm its status. Whilst this inventory was unable to determine the exact use of PFOS and PFOS-related materials, there are several sites that may require testing for PFOS contamination, such as the firefighting training areas and the dumpsite around the country.

Currently, there is no monitoring capacity in Guyana to assess contaminated sites or potentially PFOS-containing products. The main issues to be considered in the action plan are contaminated sites and groundwater. Additionally, the identification, management, safe handling, and treatment of waste potentially containing PFOS are issues that need to be addressed in Guyana.

PFOS and related substances have been substituted mainly by other per- and polyfluorinated substances (PFAS), including PFOA and PFHxS. PFOA, PFHxS, and related compounds have been listed as POPs in 2019 and 2022, respectively. Furthermore, all PFAS are an issue of concern under SAICM. To promote the synergy of the SC and SAICM, the action plan is extended to PFOA, PFHxS, and other PFAS where appropriate.

This activity aims to implement necessary regulatory adjustments to existing Pesticide and Toxic Chemical Control Regulations or other suitable legislative frameworks, formalizing the prohibition and permitting acceptable use as outlined in the Convention of PFOS and related substances. Further, the work plan will also address the life cycle management of PFOS, including products, stockpiles, waste, disposal, monitoring, evaluation, and the associated public awareness programmes. Primary responsibility for this activity would lie with PTCCB, the EPA, and the Department of Customs and Trade Administration of the GRA as applicable.

The following table, **Table 32**, summarises the proposed action plan for reducing production, import, export, use, stockpile, and waste of PFOS and its related substances.

Table 32: Work plan of the measures to reduce the production, import, export use, stockpile and waste of PFOS and its related substances.

Objectives	Activities	Performance Indicators	Time frame	Implementer	Cost
To establish policy and regulatory framework for management of PFOS, PFOA, PFHXS and related substances and other PFAS (SAICM synergy)	Assessment of regulatory frameworks used by other countries for controlling PFOS, PFOA, PFHxS and related substances and other PFAS	Assessment report	1 year	PTCCB, EPA, GFS, MoLA.	10,000
	Amend existing laws, or develop new laws related to the control and management of PFOS, PFOA, PFHxS and other PFAS.	Law and policy in place	1 year	GFS, EPA, PTCCB, MoLA	10,000
	Custom control and improvement of the traceability of PFOS, PFOA, PFHxS and other PFAS in imports (including in products)	Custom officers trained	6 months	GRA (Customs), MinTIC	15,000
	Extended producer/user responsibility for management of PFOS, PFOA, PFHxS and other PFAS throughout product life cycle	EPR in place	6 months	GFS, Psa, Industry, Importers	5,000
Updated and refined inventory of PFOS, PFOA, PFHxS and other PFAS (SAICM synergy) use and containing articles and wastes and developed/updated databases for information management.	Updating inventory considering PFOS, PFOA, PFHxS and other PFAS in firefighting foams, consumer products, industrial uses, wastes and historic releases (link to contaminated sites). (Option) Material and substance flow analysis of PFOS, PFOA, PFHxS and other PFAS	Updated inventory with robust data and list of data gaps	3 months	PTCCB, GRA,	15,000
Life cycle management of PFOS/PFAS containing products, stockpiles and waste.	Compilation of information of management situation of PFOS, PFOA, PFHxS and other PFAS containing products in the country	Report	6 months	PTCCB, EPA	15,000

Objectives	Activities	Performance Indicators	Time frame	Implementer	Cost
	Assessment of management and destruction option of PFOS, PFOA, PFHxS and other PFAS containing stocks and wastes	Management and destruction options assessed (report)	6 months	PTCCB, EPA	10,000
	Strategy for control and management of PFOS, PFOA, PFHxS and other PFAS-containing products and wastes	Strategy incorporated in National Chemical and Waste Management Plan	1 year	EPA, PTCCB	5,000
	Environmentally safe storage of PFOS, PFOA, and PFHxS-containing products and waste	PFAS containing waste stored in ESM	1 year	EPA, PTCCB	50,000
	Stop recycling of POP-PFAS containing products	Report on recycling situation & intervention	On-going	EPA	5,000
	ESM of POP-PFAS containing products; destruction or export of PFOS containing waste considering Basel Convention synergy and extended producer responsibility;	PFOS stocks and waste disposed; Compliance and enforcement of the SC	1 year	EPA, PTCCB, GRA	10,000
Training and awareness raising for stakeholder groups on POP-PFAS and other PFAS and establishing approach for information exchange	Development of related education and awareness materials for stakeholder groups (considering already available materials)	Education materials developed Awareness created	1 year	PTCCB, GFS, EPA	25,000
	Inform and educate stakeholders including users (e.g. fire fighters; paper/leather/furniture/aviation industry), policy makers and public on the environmental and health impact, environmentally sound management and on alternatives of PFOS and related substances.	Number of workshops/seminars conducted	1 year	EPA, GFS, PTCCB, GCAA	10,000

Objectives	Activities	Performance Indicators	Time frame	Implementer	Cost
	Training/education of customs authorities on POP-PFAS (and other POPs and other hazardous substances; SAICM Synergy) in articles and products.	Number of trained personnel Education/awareness of	1 year	GRA– Customs, EPA, GFS, PTCCB	10,000
Established monitoring of POP-PFAS and other PFAS in priority areas	Assessment of options for monitoring of POP-PFAS and other PFAS (international collaboration or development of own capacity?)	Monitoring approach for PFOS and related substances has been established.	2 years	NAREI, GWI, PTCCB, MOA-GLDA, GRDB	10,000
	Monitoring of major drinking water supplies	Monitoring of Priority areas including major drinking water reservoirs conducted			25,000
	Improvement of inventory by monitoring approach where knowledge gaps have been discovered including products				10,000
	Monitoring of chemicals and chemicals in products/articles known to contain PFOS and its related substances.				25,000
	Monitoring biota and soil samples for POP-PFAS especially around suspected contaminated sites (see contaminated site action plan).				50,000
Established assessment, management, database of potentially POP-PFAS and other PFAS contaminated sites and securing /remediation	Develop/update legislation to set criteria for determining contaminated sites. Legislation on liability related to contamination and clean-up procedures (general activity on contaminated site framework)	Contaminated site criteria defined and legislation developed	1 year	PTCCB, EPA	10,000

Objectives	Activities	Performance Indicators	Time frame	Implementer	Cost
	Develop/adopt guidelines for identification, assessment and prioritization of POP-PFAS contaminated sites[50]	Guidelines on identification developed	1 year	PTCCB	5,000
	Training in identification and management of contaminated sites	Workshops conducted; staff trained	6 months	PTCCB, GUYSUCO, EPA, NAREI, GRDB	15,000
	Database and maps of potentially contaminated sites and prioritization of the sites (risks) for further assessment and clean-up	Database developed Priority sites determined	2 years	PTCCB	20,000
	Analytical confirmation of POPs contamination for the identified locations	Pollution assessed	1 year	PTCCB, EPA	100,000
	Develop strategies for the environmentally sound management of POPs contaminated sites	Strategies for addressing sites developed	1 year	EPA	10,000
	Take measures to secure the sites and stop human exposure and environmental releases	Measures to secure sites implemented	1 year	EPA	15,000
	Identification of clean-up measures and initiate clean-up procedures for high priority sites considering polluter pays principle and EPR	High priority sites with exposure remediated	1 year	EPA	15,000

[50] A handbook on PFOS/PFAS contaminated sites has been developed by the German federal state working group ###

1.12.9 Activity 9: Registration of specific exemptions and the continuing need for exemptions (Article 4)

Article 4 of the SC requires the establishment of POPs register for the purpose of identifying parties that have specific exemptions listed in Annex A or B. All registrations of specific exemptions are subject to periodic review. The listed POPs with specific exemptions and acceptable purposes are HBCD, decaBDE, SCCPs, PFOS, DDT, Lindane, PCP and recycling of PBDEs.

This activity is linked to undertaking the procedural tasks associated with reporting any specific exemption for restricted use and registering the listed chemicals for any specific exemptions and acceptable uses, subject to a decision to do so.

Guyana is not a producer and does not need exemptions for production. However, it is not clear if for PFOA, UV-328, and possibly SCCPs, and the upcoming POPs MCCPs and chlorpyrifos, any exemptions for the use are needed. Therefore, an action plan for assessment and possible restriction has been developed.

Table 33: Work plan for the assessment and possibly register for specific exemptions and acceptable purposes (Article 4)

Objectives	Activities	Performance Indicator	Time frame	Implementer	Cost
To establish an informed registration process for needed exemptions	Organize stakeholder consultation to establish criteria for assessment and selection of exemptions for chemicals listed under Annex A or B	Stakeholder consultation held and outcomes documented	2 years	PTCCB, EPA, MINTIC, GRA,	20,000
	Assess if exemptions are needed for SCCPs, PFOA and POP candidates MCCPs and Chlorpyrifos	Country assessment of current listed POPs with exemptions (report)	2 years		20,000
Registration for exemption if a certain POPs exemption is needed	Inform Secretariat of the Stockholm Convention/ COP on the exemption needed after thorough assessment of the need and the alternative options	Notification submitted and exemption listed	2 years		20,000
	Periodic review to assess the need for continued exemptions and alternatives and stop exemption and use more sustainable alternatives as soon as feasible	Review report	2 years		20,000

1.12.10 Activity 10: Measures for the reduction or elimination of releases from unintentional production (Article 5)

Article 5 of the Stockholm Convention pertains to the measures to reduce and eliminate releases from the unintentional production of POPs. This Article states that each Party shall, at a minimum, take measures to reduce the total releases derived from anthropogenic sources of each of the chemicals listed in Annex C of the SC, with the goal of their continuing minimization and, where feasible, ultimate elimination.

The uPOPs inventory for 2019 estimated the total releases of PCDD/PCDFs (also indicating other uPOPs releases) for Guyana at 27.5 g TEQ, which is an increase in emissions compared to the revised 2010 inventory of 23 g TEQ. The main sources identified were Waste Incineration with 2.33 g TEQ to air, Heat and Power Generation with 3.06 g TEQ in air, and Open Burning Processes with 17.42 g TEQ for air and 3.24 gTEQ for land.

In this action plan, activities are proposed to reduce the releases of uPOPs (PCDD/PCDFs, PCBs, PCNs, PeCBz, and HCB) in Guyana from the main sources. The plan also provides for the use of internationally accepted benchmarked emission and release limits for PCBs and PCDD/F under existing air, waste, and hazardous waste environmental protection regulations. Further, the plan proposes the regular updating and maintenance of the PCDD/F release inventory and implementation of regulatory and mitigation practices for the major source categories. With respect to the latter, open waste burning represents the major source category, and the activity should have a strong linkage to the country's current and future efforts to modernize solid waste management collection and disposal. EPA, with PTCCB support, would lead this activity, noting that significant roles will be played by those responsible for solid waste management and, to some degree, agricultural practices involving the burning of agricultural residues.

The strategy and action plan seek to focus on provisions and measures in the following areas:

(a) Strengthening of the regulatory framework associated with Annex C chemicals, which will provide for the establishment of emission and release standards, separation of waste, illegal burning of waste, development of inventories, utilization of Best Available Techniques (BAT) and Best Environmental Practices (BEP), and monitoring and evaluation programmes;

(b) Improving waste management, this will aid in the reduction of releases from open burning and avoid the threats posed to the air, water, and soil. The EPA Waste Regulations can be used to establish limits and determine the management of the waste, along with the Solid Waste Management Bill 2014; and

(c) Improved agricultural practices in rice and sugar cane production, the burning of biomass within these two operations is a large contributor to uPOPs, and there are a number of technologies available to reduce the same. Guysuco and GRDB are currently extending this initiative to field

operations. For GRDB, full implementation may require regulations, but alternatives must be thoroughly researched first.

The following **Table 34**, summarises the proposed action plan for reducing and eliminating uPOPs emissions.

Table 34: Work plan of the measures to reduce and eliminate uPOPs emissions.

Objectives	Activities	Performance Indicators	Time frame	Implementers	Cost
To establish policy and legal framework for reduction and minimization of unintentional POPs	Undertake law and policy assessment on PCDD/F and other uPOPs and possibly co-pollutants	Laws/policy assessed report	2 years	EPA, GNBS, MoH, GRA, Production Sector, MoLA, MoA, GRDB, OP.	10,000
	Amend existing laws, or develop new laws where needed, related to the management of uPOPs, possibly within an integrated pollution prevention and control approach	Law and policy developed	5 years		5,000
	Develop emission standards or limits for uPOPs for sources and in environmental media or food considered relevant	Emission standards issued and enforced			10,000
	Conduct awareness and training for stakeholders on legal issues of uPOPs and integrated pollution prevention and control	Developed awareness programme			25,000
Updated sources inventories for PCDD/F and possibly other listed UPOPs with data management and harmonization with related release inventories.	Regularly update and refine uPOP inventory and reporting as appropriate	Inventory regularly updated and reported	Every 3 years	PTCCB, EPA, Production Sector, GRDB, NPA, GPL, GEA, NAREI	10,000
	Incorporate new listed unintentional POPs where useful				5,000
	Quantify other co-pollutants (e.g., PAHs; carbon black)				75,000
	Development of a mechanism ensuring appropriate storage and management of data	Established mechanism for data	3 years	EPA, GGMC, MNRE, EPA, Production Sector	10,000
	Development of an integrated database of pollutant releases (uPOPs, mercury, GHG; carbon black) health risk	Database with integrated information			20,000

Objectives	Activities	Performance Indicators	Time frame	Implementers	Cost
	Option: Development of a PRTR	PRTR developed			
Reduced releases from open burning of wastes (private burning & landfill fires) and biomass burning by improvement of waste management (waste hierarchy; circular economy).	Update the national waste strategy, considering the waste hierarchy and circular economy	Waste hierarchy is included in the national waste strategy	2 – 5 years	EPA, MOPH, IAST, UG, GLDA, GFS, MOLG.	10,000
	Regulatory framework for the control of open burning	Open burning prohibited			15,000
	Development of waste catalogue and related management options considering the waste hierarchy	Waste catalogue published			20,000
	Implementation of sound management of waste with increased reuse, recycling, and recovery (3/Multi R concept towards a more circular economy).	Recycling quotas			10,000
	Construct engineered landfills for the remaining waste disposal	Sanitary landfills for the remaining waste			150,000
	Develop guidance and awareness materials for the detection, extinguishing, and prevention of landfill/dumpsite fires.	Guidance and awareness materials developed			25,000
	Closure of dump sites and stop illegal dumping of waste (fines).	Major dumpsites closed			100,000
	Develop an awareness for landfill operators on the impacts of open waste burning and implement an education program for control	Awareness of waste burning			25,000
	Awareness raising program and fines for open waste burning on the private level				

Objectives	Activities	Performance Indicators	Time frame	Implementers	Cost
	Assess and develop approach for reducing open biomass burning	Open burning reduced by 50%			25,000
	Development of a national strategy of biomass use	National renewable /biomass strategy			15,000
	Promote and implement the strategy by using biomass including agriculture residues in energy production (biomass boilers, biogas etc.)	Share of biomass in energy mix increase			20,000
	Production of compost and organic fertilizers.	Composting target (xx%)			25,000
	Assessment bio-refinery concept (sustainable chemistry)	Bio-refinery concept in national R&D program		GPL, GEA, GRDB, MOLG, EPA, NAREI	25,000
Substitution of chemicals and materials containing UPOPs and that are sources of unintentional releases of PCDD/F and other UPOPs	Reduction of the use of 2,4-D and set limit for PCDD/F in 2,4-D	2,4-D use quantity reduced	5 years	GNBS, PTCCB, EPA, MOA	20,000
	Identify the use of chemicals containing uPOPs and evaluate their release of (e.g. pesticides/pigments containing UPOPs or resulting in UPOPs potential release).	Chemicals containing UPOPs identified and quantified			200,000
	Identify and promote feasible and affordable alternatives to chemicals and materials contributing to UPOPs release.	Sustainable alternatives identified and promoted (report)			25,000
To reduce and minimize release of UPOPs from hospital waste incinerators	Implement BEP including capacity building and where required BAT in medical waste incinerators	BAT/BEP report for medical waste incinerators	3 – 5years	EPA, MOPH, MOLG, GNBS, Regional Waste	25,000

Objectives	Activities	Performance Indicators	Time frame	Implementers	Cost
	Assessment of alternative technologies to treat medical waste	Assessment report		Management Facilities	20,000
	Selection and implementation of sound treatment of medical waste including also non-incineration technologies	Efficient medical waste management system established			20,000
	Develop guidelines for sound management of medical waste (WHO “Safe management of wastes from health-care activities”)				15,000
	Strengthen institution and human resource capabilities to implement environmentally sound medical waste management	Number of trained institutions and staff			50,000
Implementation of BAT/BEP and IPPC in Ferrous and non-Ferrous metal production and minerals production processes to reduce and minimize release of PCDD/F, UPOPs and other priority pollutants	Assessment of the small-scale aluminum for BEP options for uPOPs reduction and need and options for BAT and implement measures	Report on assessment of BAT BEP option for Al smelting	1 year	EPA, GRA, SCRAP METAL	20,000
	Stop the open burning of copper cables and introduce alternative technologies (cable stripping and cable chopping)	Copper recovery is conducted with cable stripping and chopping (documentation)			20.000
	Assessment of metal recovery rate and loss of metals and gap for circular economy	Assessment Report			10,000

Objectives	Activities	Performance Indicators	Time frame	Implementers	Cost
	Develop and promote institutions with technical capacity to support the implementation of metal and other resource recovery and cleaner production (BEP) and BAT	Institutional capacity enhanced for circular economy, cleaner technologies, and BAT			25,000
To phase out and support alternatives to wood and charcoal for cooking	(Life cycle) Assessment of alternative energy sources in households for cooking and heating	Alternative energy sources for cooking are used	5 years	GRA, GEA	25,000
	Promotion of the use of alternatives to wood and charcoal for cooking/heating, including gas, solar systems and ovens				25,000
To conduct awareness raising and establishing network	Development of education and awareness materials on the health and environmental impact of Dioxins and other uPOPs	Education materials developed	On going	PTCCB, EPA	15,000
	Sensitize and educate stakeholders and the public on the environmental and health impact of uPOPs and co-pollutants	Number of education workshops/seminars conducted.			20,000
	Awareness raising campaigns on dioxins, uPOPs, and other pollutants of concern for relevant stakeholders and sources (open burning, industrial sources, industries, waste wood).	Awareness created			20,000
Established monitoring of PCDD/F and other uPOPs and relevant pollutants from Annex	Assessment of the need and the options for monitoring dioxins and other uPOPs from priority sources and for human exposure (food, feed, soils).	Assessment report on the options for monitoring of UPOPs	3 years	MOA, MOPH, EPA, GRA, FOOD AND DRUG	15,000

Objectives	Activities	Performance Indicators	Time frame	Implementers	Cost
II and III sources and human exposure					
	Establish international co-operations or strengthen the national capacity for uPOPs monitoring considering instrumental analysis and/or bio-assay.	Cooperation established or monitoring capacity developed			15,000
	Monitor priority foods and environmental samples for Dioxins and possibly other uPOPs (e.g., samples with potential human exposure for residents around suspected contaminated sites).	Sampling capacity developed or strengthened			75,000
Assessment and management of contaminated sites	Develop/update legislation to set criteria for determining contaminated soils and sediments.	Legislation established	3-5 years	GNBS, EPA, NAREI, GRDB, LEGAL AFFAIRS, PSC, MOA	15,000
	Extended producer responsibility for contaminated sites	EPR scheme established			15,000
	Develop/consider guidelines for the identification and assessment of POPs contaminated sites (considering available guidelines)	Guidelines for contaminated sites written/translated			15,000
	Training in the identification and management of contaminated sites	Number of staff trained			25,000
	National database of contaminated sites, including prioritization of the sites for assessment and possible clean-up	Developed database			15,000

Objectives	Activities	Performance Indicators	Time frame	Implementers	Cost
	Assessment/monitoring of POPs contamination for the identified locations (considering prioritization list)				150,000
	Develop strategies for the environmentally sound management of POPs-contaminated sites	Data and risk assessment on the priority sites (report)			25,000
	Secure contaminated sites considering priority ranking.	Priority sites secured and exposure reduced /eliminated			10,000
	Identification of clean-up measures and initiate clean-up procedures for the high-priority contaminated sites	Project proposal for hot spots remediation			10,000
	Monitoring for contaminated, secured, and cleaned sites	Monitoring data of sites			75,000

1.12.11 Activity 11: Identification and management of stockpiles, waste and articles in use, including reduction of releases and appropriate measures for handling and disposal (Article 6)

This activity represents the highest level of priority in the NIP Action Plan. It is directed at addressing the principal POPs and related chemical waste legacies in the country and ensuring that the programs and infrastructure are in place to manage future chemical waste, including POP waste.

Human health and environmental well-being are threatened by the releases associated with chemical-contaminated stockpiles and waste, including their associated toxic releases, particularly persistent organic pollutants. Therefore, activities are geared towards the development of appropriate, safe, and environmentally sound management strategies to reduce and, where applicable, to eliminate these releases or emissions. Several actions are listed within the individual POPs action plans to curb and manage these identified releases.

Whilst there are no POPs pesticides stockpiles in Guyana, there are still items and wastes that contain POPs such as PCBs, SCCPs, PFOS, and PBDEs. These items contributing to this situation are: (W)EEE plastics, polymers of end-of-life vehicles and buildings, firefighting foams, carpets, furniture, and textiles.

In the case of obsolete pesticides, the tasks set out basically optimize capability and resources to address what is already a generally well-managed issue. This involves a program to collect and provide secure consolidated storage for obsolete pesticides that would not otherwise be afforded an adequate level of care and custody. Another task provides for their environmentally sound disposal of current stockpiles, likely through export to qualified facilities available in North America or Europe.

These wastes containing POPs chemicals need to be effectively managed to reduce contamination. Activities for the management of POPs specific waste are listed in the individual action plans and will be considered linked to the activities in this proposed generic action plan for POPs stockpiles.

The overall goal is to develop and implement a programme to manage stockpiles and wastes, reducing releases in accordance with internationally accepted guidelines and practices for handling, storage, transportation, and final disposal.

The following **Table 35**; summarises the proposed action plan for measures for reducing releases from POPs' stockpiles and waste, and its overall management.

Table 35: Action Plan for addressing measures for the reduction of releases from POPs stockpiles and wastes through identification and management of stockpiles, waste and consumer articles, including releases and appropriate measures for handling and disposal. (Article 6).

Objectives	Activities	Performance Indicators	Time Frame	Implementers	Budget (US $)
Identification of options and limitations for the ideal destruction and management of POPs and hazardous chemicals.	Evaluation of the available options and limitations of the destruction capacity of the identified waste in the country, regionally, and internationally, and should include the needs assessment for improving destruction capacity in Guyana.	Report of the evaluation, including the needs assessment of the local capacity to address the destruction	2 years	PTCCB, EPA, GL&SA. MINTIC, GRA, MoPW, GCC	10,000
Developing measures for the safe handling, separation, and sound disposal of stockpiles of chemicals and consumer articles	Establish appropriate separation, recycling, and recovery schemes for POPs-containing waste, such as WEEE and other consumer products.	Separation of waste fractions implemented to cover e-waste, vehicles, WEEE, and other related substances.	2 years	PTCCB, EPA, GL&SA. MINTIC, GRA, MoPW, GCC	75,000
	Establish a collection scheme for POPs containing consumer articles still in stock.	Schemes advertised and promoted (awareness)			50,000
	Develop a guideline for the transport of POPs waste along with supporting manuals for safe handling and disposal.	Manuals and guidelines			20,000
Environmentally sound storage of POPs stockpiles, hazardous chemicals, and waste	Identify appropriate storage facilities for the interim storage of stockpiles and other hazardous waste	Storage site identified and appropriate manuals developed to guide the facilities	3 – 5 years	PTCCB, EPA, GL&SA. MINTIC, GRA, MoPW, GCC	20,000
Destruction, disposal, or export of POPs waste, other hazardous chemicals, and waste	Destruction of POPs containing waste and other similar materials in an environmentally sound manner.	Stockpile of waste reduced and recorded	3 – 5 years		250,000
	Identification and export of POPs and other similar waste that cannot be destroyed locally.	List of POPs waste and export certificate of waste.			75,000

1.12.12 Activity 12: Identification of contaminated sites (Annex A, B, and C Chemicals) and, where feasible, remediation in an Environmentally Sound Manner (Article 6)

Parties to the Stockholm Convention are required under Article 6 to endeavour to develop appropriate strategies for identifying sites contaminated by chemicals listed under Annexes A, B, and C. The POPs inventories conducted in 2019 identified potentially contaminated sites. These sites include all the identified and used waste disposal sites, sites where POPs have been previously stored, and sites where PCB transformers are located.

Guidelines for assessing contaminated sites will need to be developed following the confirmation of the locations. The prioritization of the sites will follow, and then the remediation treatment will have to be determined based on the assessment and strategy developed. Each site identified will require a determination of the extent of the contaminants on-site, as well as the impact on the neighbouring communities. **Please note:** The UNEP Stockholm Convention BAT/BEP group has developed a guidance for assessing and remediating POPs contaminated sites[51].

Responsibility for this activity is generally shared between PTCCB and EPA, with the current holders of contaminated sites having substantial roles in operationally addressing them.

The following **Table 36**, summarises the proposed action plan for reducing releases from POPs-contaminated sites, including remediation measures. Details on individual POPs contaminated site activities are included in the individual action plans. In the implementation, the activities should be coordinated.

[51]https://chm.pops.int/Implementation/BATandBEP/POPsContaminatedSitesGuidance/tabid/8779/Default.aspx

Table 36Action Plan for Reduction of Releases from Contaminated Sites (Annex A, B, and C Chemicals) through identification, assessment, containment, and remediation in an environmentally sound manner (Article 6).

Objectives	Activities	Performance Indicators	Time Frame	Implementers	Budget (US$ $)
Regulatory framework for contaminated sites developed	Guidelines to establish criteria (soil, air, and water) and legislation for determining contaminated sites were implemented	Legislation and guidelines are published in the *Official Gazette*.	2 years	PTCCB, EPA, MLGRD	10,000
Methodology developed to identify, assess, and prioritise contaminated sites for Annexes A, B, and C chemicals	Development of the methodologies (soil, ground, and surface water) to identify, assess, and prioritise contaminated sites.	Methodologies documented	2 – 3 years	PTCCB, EPA	25,000
	Methodologies used to develop and prioritise a list of contaminated sites	List of prioritized contaminated sites.			250,000
Develop remediation plans for contaminated sites	Identify remediation technology available based on the contaminants and develop strategies for the environmentally sound management of each identified site	Management strategy developed for each identified contaminated sites.	3 – 5 years	PTCCB, EPA, MLGRD	250,000
Secure Pops contaminated sites to reduce and eliminate exposure of the population and biota, including livestock	Standard procedures for securing and labelling contaminated sites	Procedures for securing and labelling contaminated sites.	1 year		10,000
	Securing sites found to be POP contaminated, having exposure risk, and ensuring that securing measures are permanent and controlled	Documentation of securing POPs-contaminated sites and sustainability.	1 – 3 years		TBD*

* To be determined (TBD) and depends on the number of sites found contaminated and in need of securing.

1.12.13 Activity 13: Undertaking information exchange and stakeholder participation (Article 9)

Article 9 of the Stockholm Convention states that countries have a responsibility to facilitate the exchange of information related to:

(a) Reducing or eliminating the production, use, and release of POPs; and
(b) Alternatives to POPs, including information relating to their risk as well as their economic and social costs.

This section discusses and makes recommendations pertaining to the exchange of information between Guyana and other Parties to the Stockholm Convention.

Please note: Information and recommendations on the provision of information to the general public will be addressed under Activity 14: Public Awareness, Information and Education, as well as those outlined under the individual action plans previously discussed. PTCCB would be the primary responsibility for this activity.

Table 37 summarises the proposed action plan for facilitating information exchange on POPs and stakeholder participation.

Table 37: Action Plan for measures to address facilitation of information exchange on POPs and stakeholder participation

Objectives	Activities	Performance Indicators	Time Frame	Implementers	Budget (US $)
Information exchange on POPs in the Region and Internationally	Develop and implement a mechanism through which information generated by the MEAs and regional countries is received by the country and its stakeholders and vice versa.	Information is updated via the identified mechanism.	1 year	PTCCB, EPA, BCRC, SC, CGPCB	15,000
Access of information and documents for national stakeholders	Develop and implement a mechanism supported by possibly a website, where documents, information and POPs update are available	Stakeholder access information	1 year	PTCCB, EPA	25,000
Improved information exchange on a national level between stakeholders	Develop and implement a mechanism through which national stakeholders can share and request information.	Stakeholders share and access relevant data and information.	1 year	PTCCB, EPA	10,000

1.12.14 Activity 14: Public awareness, information and education (Article 10)

Article 10 of the SC on awareness, information and education, requires Parties to promote and facilitate awareness among policy and decision makers, the public and other stakeholders with regard to POPs. Parties should ensure that all relevant available information on POPs is made available to the public and that the information is kept up to date.

In recognition of the above, this activity seeks to develop a comprehensive program to enhance awareness, public and stakeholder involvement in addressing it, and ensuring that chemical management, including that undertaken for POPs, is incorporated into education programs. The various tasks defined under the activity aim to increase overall institutional awareness and commitment to addressing POPs and chemicals management issues, develop an ongoing, broadly based external stakeholder consultation mechanism for NIP implementation, implement a general public information and consultation program, and undertake targeted educational initiatives. The primary responsibility for this activity would be assigned to the PTCCB and EPA, with overall direction provided by the ICC.

Table 38 summarises the measures for public awareness, information, and education on POPs chemicals.

Table 38: Action Plan for Public Awareness, Information and Education on POPs Chemicals

Objectives	Activities	Performance Indicators	Time Frame	Implementers	Budget (US $)
Institutional awareness and information dissemination	ICC and NIP status reports publicised	Media articles	1 year	PTCCB, EPA	15,000
POPs and Chemicals education	Sound chemicals management including POPs specific issues introduced into higher education curriculums	School curriculum include POPs issues.	2 years	PTCCB, EPA	25,000

1.12.15 Activity 15: Research, development, and monitoring (Article 11)

Article 11 of the SC mandates Parties, within their capabilities, to undertake research, development, and monitoring at the national and international levels.

The primary focus of this activity would be to support the development of national programs for ambient environmental and health impact monitoring with respect to chemicals, including POPs. This recognizes the very limited current national activity in these areas and their longer-term importance. Monitoring of POPs in products becomes increasingly important for restricting imports of POPs in products, finding POP-containing products on the market, in use, and at the end of life, including recycling. The activity also includes a task related to undertaking R&D supporting contaminated site remediation, again something that represents a long-term investment in addressing environmental concerns, including POPs characteristics. The primary responsibility for the three tasks in this activity would be distributed between the EPA, the Ministry of Health, the Ministry of Agriculture, and UG. It would be anticipated that this activity may be attractive to bilateral donors and partnerships as a source of financing.

The establishment of POP monitoring and suggested monitoring activities is included in the individual action plans of the POP groups. The establishment of POP monitoring will be coordinated, and an assessment of regional and international options will be conducted.

Table 39 shows the measures for addressing POPs research, development, and monitoring

Table 39: Action Plan for Research, Development and Monitoring.

Objectives	Activities	Performance Indicators	Time Frame	Implementers	Budget (US $)
Establishment of a national monitoring capability for chemicals in the environment.	Development and implementation of a national environmental monitoring system for POPs chemicals.	National environmental monitoring plan	3 – 5 years	PTCCB, EPA	250,000
Establishment of national monitoring capability for chemicals-related human health impacts.	Development and implementation of a national health impact monitoring system for POPs chemicals.	National chemicals related health impact monitoring plan	3 – 5 years	PTCCB, MoH	250,000
Establish a basic R&D capability for chemicals-contaminated site remediation technology	Development of a research program for on-site remediation technology.	Proposals for R&D program on assessment of contaminated site remediation technology	3 – 5 years	PTCCB, EPA	250,000

1.12.16 Activity 16: Technical and financial assistance (Articles 12 and 13)

This activity is intended to cover tasks related to soliciting multi-lateral and bi-lateral international technical assistance for the NIP implementation activities recognizing the limitations of national resources. While elaborated further in below, one task would focus on multi-lateral sources, the primary one being the GEF, but also potentially including United Nation agency programs directly (FAO, UNEP, UNDP) and linkages to loan programs from international financial institutions (IFIs) such as the Inter-American Development Bank (IDB) and the World Bank. The second task focuses on bi-lateral assistance and partnerships including traditional North American donors but also countries like China and Brazil. The lead responsibility for this activity would be PTCCB along with the Ministry of Finance (MoF) but strong participation on an opportunity specific basis from the principle institutional and non-government stakeholder beneficiaries.

Table 40 outlines the activities required to address technical and financial assistance.

Table 40: Action Plan for Technical and Financial Assistance.

Objectives	Activities	Performance Indicators	Time Frame	Implementers	Budget (US $)
Request for multi-lateral technical and financial assistance for NIP implementation and POPs management	Developing and submitting technical and financial proposal to funding agencies to support NIP implementation and POPs management in Guyana.	Technical and Financial Proposal document.	1 year	PTCCB, EPA	15,000
Request for bilateral technical and financial assistance for NIP implementation and POPs management.	Developing and submitting bi-lateral technical and financial proposal to funding agencies to support NIP implementation and POPs management in Guyana.	Bi-lateral proposal document	1 year	PTCCB, EPA	15,000

1.12.17 Summary of the Implementation Cost

A summary of the implementation cost for the NIP is seven million, one hundred and ten thousand dollars. The breakdown under the respective priorities is shown in **Table 41**.

Table 41: Summary of estimated cost under the priority areas for the implementation of the NIP.

Activities	Description Of Priority Areas	Cost (US $)
1	Institutional, regulatory and technical strengthening measures;	545,000
2	Measures to reduce or eliminate releases from intentional production and use (Annex 3);	-
3	Measures to reduce production, import and export, use, stockpiles export, and waste of POPs pesticides (Annex A Part I Chemicals);	1,130,000
4	Measures to reduce production, import and export, use, stockpiles export, and waste of POPs chemicals - SCCP (Annex A Part I Chemicals);	305,000
5	Reduction and elimination of releases from intentional production and use PCBs and equipment containing PCBs (Annex A Part II Chemicals);	370,000
6	Measures to reduce production, import, export, use, stockpiles and waste of POP-PBDEs (Annex A Parts IV, V and IX), HBCD (Annex A Part I and VII) and HBB (Annex A Part I chemicals);	600,000
7	Measures to reduce production, import, export, use, stockpile and waste of Annex B POPs chemicals – DDT (Annex B Part II Chemicals);	10,000
8	Measures to reduce production, import, export, use, stockpile and waste of Annex B POPs chemicals – PFOS/PFOSF and its related substances and products containing them (Annex B Part III Chemicals);	505,000
9	Registration of specific exemptions and the continuing need for exemptions (Article 4);	80,000
10	Measures for the reduction or elimination of releases from unintentional production (Article 5);	1,650,000
11	Identification and management of stockpiles, waste and articles in use, including release reduction and appropriate measures for handling and disposal (Article 6);	500,000
12	Identification of contaminated sites (Annexes A, B and C Chemicals) and, where feasible, remediation in an environmentally sound manner (Article 6);	545,000
13	Undertaking information exchange and stakeholder participation (Article 9);	50,000
14	Public Awareness, information and education (Article 10);	40,000
15	Research, development and monitoring (Article 11); and	750,000
16	Technical and financial assistance (Article 12 and 13).	30,000
	TOTAL	**7,110,000**

1.12.18 Time frame for the Implementation Strategy and Action Plans

The individual action plans and activities developed and compiled in Section 3.3 contain individual timeframes for implementation of the individual activities. Time frames are short-term (2 years or less) and medium-term (3 to 5 years).

1.12.19 Resource Requirements

The estimated budget for the implementation of the NIP is XYZ dollars, as shown in **Table 41**. The implementation costs are not covered completely under funding agencies such as GEF and UNEP. Therefore, additional sources of funding must be sought and defined as the projects are separated under the different work plans.
One of the ways forward is the prioritizing of the importance of the work plans, and the government can examine prioritizing the mobilization of international financing for the NIP implementation, as protecting the health of the population by reducing the environmental impact of POPs via waste and disposal methodologies. This can be coordinated as follows:

(a) The SC NIP will be coordinated and integrated where appropriate with other related national plans and programs on waste management, resources management, sustainable development, climate change, or programs or projects on science and technology, to attract investments and increase capital efficiency.
(b) The management of POPs-contaminated stocks and wastes, extended producer responsibility (EPR) contributions can become an important funding source for the environmentally-sound management of waste fractions. Several waste fractions related to POPs can be addressed by an extended producer responsibility frame:
    (i) E-waste, including e-waste plastic/polymers;
    (ii) End-of-life vehicle (including the polymers); and
    (iii) Empty pesticide containers and stockpiles.

The implementation of extended producer responsibility (EPR) needs the development of a definitive policy and regulatory framework. There is a range of POPs included in consumer products, and similar to the “plastic bottle import tax” currently implemented, there can be a similar tax on consumer products based on the “economic cost” associated with the management of the waste, including EEE, vehicles, or batteries.

Recycling and recovery schemes that are environmentally and human health safe can be considered for products meeting the requirement, provided they are developed and monitored. The separation of recyclable plastic at the same time reduces the volume of the plastic fraction to be treated.

Synergistic relationships among the UN Conventions can also be explored to assist with overall funding of the budget or part of the implementing measures.

The NIP will be implemented through mobilisation of various finance resources such as state budget, bilateral grant aid, GEF grants, extended producer responsibility contribution, “polluter pays principle” contributions, loans, and financing from organisations and individuals.

The elaboration, allocation, and cost estimate decisions, as well as the management, use, and settlement of funds for implementation of the National Plan, should be conducted in accordance with regulations.

Strengthening international cooperation should be carried out in various areas, including technical cooperation, grant aid for project development, capacity improvement, institutional enhancement, project support, and addressing health and social benefits issues for stakeholders.

Table 41 gives an overview of budget estimates for priority activities for POPs management in Guyana. These budgets are indicative and are rough estimates. Some activities cannot be estimated since the necessary data are not available, but are generated during the implementation of the NIP. It must be made clear and reinforced that quantification, confirmation, and the locations along with the point of impact – air, water, and soil - of the contaminants must be carried out first. This information will then provide the exact cost associated with the implementation of the plan and remediation work, etc.

1.13: Endorsement of the Updated National Implementation Plan

MINISTER OF AGRICULTURE
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August 27, 2025

Executive Secretary,
The Secretariat of the Stockholm Convention on Persistent Organic Pollutants (POPs)
International Environment House 1,
11-13 Chemin des Anémones,
1219 Châtelaine, Geneva
Switzerland

RE: National Implementation Plan (NIP)
For Guyana, Updated 2019

In my capacity as *the Minister of Agriculture, acting on behalf of the Government of Guyana, I am pleased to endorse the National Implementation Plan* and confirm that the NIP is in accordance with my government's national priorities and our commitment to the Stockholm Convention. Furthermore, I am directing the Pesticide and Toxic Chemicals Control Board in its capacity as Stockholm Convention Focal Point to submit the NIP to the Convention Secretariat in fulfilment of Guyana's obligation as a Party.

This NIP highlights the following aspects that reflect both the county's policy commitment to addressing the POPs issue and, more generally, to sound management of chemicals in a lifecycle approach:

- Reaffirmation of the county's commitment to meeting the objectives of the Stockholm Convention, namely "to protect human health and the environment from persistent organic pollutants," as is implicit in its status as a Party to the Convention.
- Adoption of a "precautionary approach" with respect to efforts made toward meeting this objective.
- Integration of the country's efforts to address POPs within its broader efforts, ensuring sound chemical management under the framework of the Stockholm Convention and other relevant Multilateral Environmental Agreements.

- Recognition of the interconnections and need for coordination between the Stockholm Convention and its implementation, with obligations and implementation activities associated with the Rotterdam and Basel Conventions.
- Pursuit of an NIP implementation strategy based on ensuring cooperative inter-agency efforts under the coordination of PTCCB, a high level of stakeholder involvement, and open and transparent public consultation and disclosure, and
- Prioritization of critical areas identified in the NIP.

The NIP has been prepared by the Pesticides and Toxic Chemicals Control Board in consultation with a broad range of national stakeholders, with its preparation financed by the Global Environmental Facility, whose support is gratefully acknowledged.

Kind Regards,

.....

Hon. Zulfikar Mustapha
Minister of Agriculture

Minister of Agriculture