Solomon Islands Government

Ministry of Environment, Climate Change,
Disaster Management and Meteorology

National Implementation Plan

for the Stockholm Convention on Persistent Organic Pollutants

2018

Acknowledgements

The development of the Stockholm Convention National Implementation Plan (NIP) is long overdue and this work would not have been possible without the financial support, technical assistance, contributions and involvement of a broad range of stakeholders. As the Ministry responsible for the implementation of the Stockholm Convention, the Ministry of Environment, Climate Change, Disaster Management and Meteorology extends its sincere appreciation to our stakeholders for your support and efforts to ensure Solomon Islands meets its obligations as a party.

The Ministry would like to thank the NIP Project National Coordinating Committee, Line Government Ministries, Provincial Government Officers, NGOs, Private Sector and other stakeholders who have contributed towards the formulation of this document and to establish a platform for Solomon Islands to manage chemicals including POPs in a sound and environmentally manner.

Special thanks go to Kapini Energy, David Haynes, Esther Richards and Alice Leney who have invested invaluable time in collating information and giving the NIP its final shape and ensuring that it is reflective of the views of all stakeholders and partners.

Finally, the Ministry would like to express its gratitude to the Global Environment Facility (GEF) through the United Nations Environment Program (UNEP) for the financial and technical contributions towards the formulation of the NIP.

Foreword

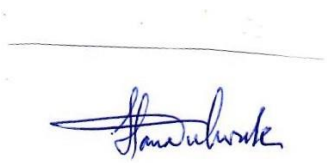
Environmental concerns and issues associated with poor waste and chemical management practices in the country have long been recognized by government at the national level. They are among the most pressing environmental issues the country is faced with since chemicals in particular Persistent Organic Pollutants (POPs) remain intact in the environment for long periods, become widely distributed geographically and, accumulate in the fatty tissue of humans and wildlife. Chemicals generally have harmful impacts on human health or on the environment.

The Stockholm Convention on Persistent Organic Pollutants is a global treaty to protect human health and the environment from POPs chemicals. Solomon Islands became a party to the Stockholm Convention on the 28th July 2004. The development of the *National Implementation Plan (NIP)* is a fulfillment of the country's obligation as stipulated under Article 7 of the Convention, which requires a party to transmit a National Implementation Plan (NIP) within two years of the Convention entering into force. The production of the report including the plan couldn't have been more appropriate given the country's delayed response as obliged under Article 7.

The NIP was developed in consultation with other ministries, representatives of each provincial government, NGOs, private sector, civil society and donor partners. It provides baseline data for the POPs, highlights the challenges, outlines the national priorities and establishes strategies to address them, as determined by current gaps. As a platform for sound chemical management including POPs, the NIP provides a useful tool for an integrated national chemical management framework in Solomon Islands. The NIP represents a step forward to ensuring sound chemical management and the protection of the human health and environment.

The Government of Solomon Islands would like to thank the GEF through the United Nations Environment Program (UNEP) for the technical and financial assistance provided for the development of the NIP. For the national priorities in the NIP to be successfully implemented, I sincerely invite the involvement and support of all key stakeholders towards this.

I am honoured to present the Solomon Islands National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants.



Hon Dr. Culwick Togamana

Minister for Environment, Climate Change, Disaster Management and Meteorology

Executive Summary

The Solomon Islands' National Implementation Plan (NIP) has been completed to facilitate fulfilment of Article 7 of the Stockholm Convention, which the country acceded to on the 28th of July 2004. It contains the available data and information about Persistent Organic Pollutants (POPs) including other organochlorine substances of interest that are present in the Solomon Islands. It draws on available data and field surveys, workshops and information that were gathered over the two-year tenure of the project under the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM) from February 2015-December 2017.

The NIP has been developed in accordance with the guidelines of the United Nations Environment Programme (UNEP), but with an emphasis on provision of background information regarding POPs in the Solomon Islands to set the context for management of these pollutants into the future.

The NIP highlights that the Solomon Islands has used or may have unintentionally imported a range of POPs in the past. DDT has been the most heavily used organochlorine pesticide in the country to date for vector control and in agriculture. Several other POPs may have been imported into the country as in firefighting foams or as constituents of consumer products including computers, building materials, and motor vehicles. Any environmental or human health impacts caused by the importation and use of these POPs in the country are yet to be properly assessed.

The NIP presents an opportunity for the Solomon Islands to address its entire chemical management framework to cater for current and future challenges, including POPs chemicals. The NIP also presents a number of pragmatic actions that Solomon Islands should pursue in the course of implementing the report. These include improved regulatory measures, infrastructure development, and improved waste management practices, as well as technical and scientific improvements including ongoing monitoring of POPs and pesticides to enhance the country's capacity to manage POPs challenges into the future.

The integration of a national chemical management framework building from the POPs project as a sustainable development goal for the country would help improve management of organochlorine and other pesticides to prevent impacts to its peoples and local environments. Key actions and priorities for future management at the national level of chemicals listed under the Stockholm Convention are summarised in Table 1.

Table 1: Solomon Islands POPs management priority summary (green = initial POPs, orange = new POPs)

No	Chemical (listed alphabetically)	Use	Annex	Solomon Island use	Action required	Action Plan number	Chemical use
1	Aldrin	Pesticide	A	Never used in Solomon Islands. Recognised under the Customs Island tariff system	Not required		Applied to soils to kill termites, grasshoppers, corn rootworm, and other insect pests. Rapidly converts to dieldrin
2	Chlordane	Pesticide	A	Used in the Solomon Islands 1960-1970's. Recognised under the Customs Island tariff system. Detectable locally in the GMP	Continue pesticide monitoring	AP10	Used to control plant pests and ants
3	Chlordecone	Pesticide	A	Never used in Solomon Islands.	Not required		Used in the past but there is no evidence of present day manufacture or use anywhere in the world
4	Decabromo-diphenyl ether (commercial mixture, c-decaBDE)	Industrial Chemical	A	Unknown	E-waste Management	AP7	Used as an additive flame retardant. DecaBDE containing plastics are used in housings of computers and TVs, wires and cables, and pipes
5	DDT	Pesticide	B	Most widely used POP in the Solomon Islands. Used in 1940s-2001 for malaria, and agricultural insect control. Recognised under the Customs tariff system. Detected in GMP in SI	Continue pesticide monitoring, assess alternatives	AP4	Used in recent times primarily for malaria vector control
6	Dieldrin	Pesticide	A	Used in the Solomon Islands 1960-1970s. Recognised under the Customs tariff system. Detectable locally in the GMP	Continue pesticide monitoring	AP10	Used to control plant pests
7	Endrin	Pesticide	A	Never used in the Solomon Islands. Detectable locally in the GMP	Continue pesticide monitoring	AP10	Sprayed on the leaves of crops such as cotton and grains and used for rodent control
8	Heptachlor	Pesticide	A	Never used in Solomon Islands. Recognised under the Customs tariff system	Not required		Primarily used to kill soil insects and malaria-carrying mosquitoes
9	Hexabromo-biphenyl	Industrial chemical	A	Unlikely to have been used in the Solomon Islands	Not required		Flame retardant used in 1970s. Due to its limited production and use, most HBB-containing materials were likely disposed of decades ago

No	Chemical (listed alphabetically)	Use	Annex	Solomon Island use	Action required	Action Plan number	Chemical use
10	Hexabromo-cyclododecane (HBCDD)	Industrial chemical	A	Unknown, but likely to be present, e.g. in previously imported polystyrene building products and packaging waste, which may still be occurring	Improved waste management	AP7	Fire retardant. Internationally, packaging waste has been found to be the main contributor to potential releases to soil due to uncontrolled landfill
11	Hexabromo-diphenyl ether (hexaBDE) and Heptabromo-diphenyl ether (heptaBDE)	Industrial chemical	A	Unknown, but likely to be present	E-waste management	AP7	Flame retardant typically added to housings of office equipment and business machines
12	Hexachloro-benzene (HCB)	Pesticide	A & C	Used in the 1960-1970s. Recognised under the Customs tariff system	uPOPs management	AP8	Used in the rice farms of Okea and Ilu, North Guadalcanal
13	Hexachloro-butadiene	Industrial chemical	A & C	Unlikely to have been used in the Solomon Islands	uPOPs management	AP8	HCBD was used as intermediate in the chemical industry
14	Alpha Hexachloro-cyclohexane (α-HCH)	Pesticide	A	Unlikely to be present in the Solomon Islands	Not required		Technical HCH was used as a pesticide in the 1940s
15	Beta Hexachloro-cyclohexane (β-HCH)	Pesticide	A	Unlikely to be present in the Solomon Islands	Not required		Technical HCH was used as a pesticide in the 1940s
16	Lindane (Y-HCH)	Pesticide	A	Used in the 1960-1970s. Recognised under the Customs tariff system	Continue pesticide monitoring, promote alternatives	AP10	Used for insect control in rice farms in Okea and Ilu, North Guadalcanal, and for head lice control
17	Mirex	Pesticide	A	Unlikely to be present in the Solomon Islands	Not required		Used mainly to combat fire ants. It has also been used as a fire retardant in plastics, rubber, and electrical goods
18	Pentachloro-benzene (PeCB)	Pesticide and Industrial chemical	A & C	Unknown	uPOPs management	AP8	Previously used as an intermediate in pesticide manufacture and as a fire retardant
19	Pentachloro-phenol (PCP) and its salts and esters	Pesticide	A	Unlikely to be present in the Solomon Islands	Not required		Used as a wood preservative but phased out in the 1980s and 1990s
20	Perfluoro-octane sulfonic acid (PFOS), its salts and Perfluoro-octane sulfonyl fluoride (PFOS-F)	Industrial chemical	B	Fire-fighting foams (e.g. as used at airports) are not believed to be present in the Solomon Islands. The presence of PFOS in consumer items will be difficult to detect without laboratory testing	Improved waste management	AP6	PFOS has been used for the protection of paper, leather, fabric, upholstery and carpets, and in floor polishes, photographic film, denture cleaners, shampoos, paints, and carpet cleaners. PFOS has also been used as an insecticide and as a component of fire-fighting foams

No	Chemical (listed alphabetically)	Use	Annex	Solomon Island use	Action required	Action Plan number	Chemical use
21	Polychlorinated dibenzo-p-dioxins (PCDDs)	By products	C	Unintentionally produced	uPOPs management	AP8	There are 75 different dioxins. Produced unintentionally due to incomplete combustion, and during pesticide manufacture
22	Polychlorinated dibenzofurans (PCDFs)	By products	C	Unintentionally produced	uPOPs management	AP8	There are 135 different furans. Produced unintentionally due to incomplete combustion, and during pesticide manufacture
23	Polychlorinated biphenyls (PCBs)	Industrial chemical	A & C	Not used in electrical equipment in SI since 1980s. Recognised under the Customs Island tariff system. Detected in the GMP	uPOPs management	AP3 and AP8	Used as heat exchange fluids, in electric transformers and capacitors
24	Polychlorinated naphthalenes	Industrial chemical	A & C	Unknown	uPOPs management and improved waste management	AP8	Of the known releases, combustion (primarily waste incineration) is considered the most significant current source. Releases from former uses (PCN or impurities of technical PCB) contained in landfills or old appliances (stockpiles) are plausible but difficult to assess
25	Short Chain Chlorinated Paraffins (SCCPs)	Industrial chemical	A	Unknown	Not required		SCCPs can be used as a plasticizer in rubber, paints, adhesives, flame retardants for plastics
26	Technical Endosulfan and its related isomers	Pesticide	A	Unlikely to be present in the Solomon Islands	Continue pesticide monitoring	AP10	Broad-spectrum insecticide currently used world-wide to control a wide range of pests on a variety of crops
27	Tetrabromo-diphenyl ether (tetraBDE) and Pentabromo-diphenyl ether (pentaBDE) (commercial pentabromo-diphenyl ether)	Industrial chemical	A	Unknown	E-waste management	AP7	Mainly as fire retardants in polyurethane foam (e.g. car seats, mattresses) and plastics, particularly those associated with electronic goods, As a result of these uses, the octa-BDEs are likely to be found in most stockpiles of e-wastes
28	Toxaphene	Pesticide	A	Never used in Solomon Islands	Continue pesticide monitoring	AP10	This insecticide is used on cotton, cereal grains, fruits, nuts, and vegetables. It has also been used to control ticks and mites in livestock

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Abbreviations

ASYCUDA	Automated System for Customs Data
BAT	Best Available Techniques
BEP	Best Environmental Practice
BFR	Brominated Flame Retardants
BHC	Benzenehexachloride
BSA	Brewer–Solomon Associates
BSIP	British Solomon Islands Protectorate
CBSI	Central Bank of the Solomon Islands
CE	Customs and Excise Act 2003
COP	Conference of Parties
DDT	Dichlorodiphenyltrichloroethane
EA 1998	Environment Act 1998
ECD	Environment and Conservation Division
EHD	Environment Health Division
ER 2008	Environment Regulations 2008
GEF-PAS	Global Environment Facility Pacific Alliance for Sustainability
GMP	Global Monitoring Plan
HBDEs	Heptabromodiphenyls, Hexabromodiphenyls
HCB	Hexachlorobenzene
HCC	Honiara City Council
HCHs	Hexachlorocyclohexane
IPM	Integrated Pest Management
JPRISM	Japanese Technical Cooperation for the Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries
MAL	Ministry of Agriculture and Livestock
MCILI	Ministry of Commerce, Industries, Labour & Immigration
MDPAC	Ministry of Development Planning & Aid Coordination
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MHMS	Ministry of Health and Medical Service
MFAET	Ministry of Foreign Affairs and External Trade
MFMR	Ministry of Fisheries and Marine Resources
MID	Ministry of Infrastructure Development
MoFR	Ministry of Forestry and Research
MoFT	Ministry of Finance and Treasury
MPGIS	Ministry of Provincial Government and Institutional Strengthening
NCC	National Coordinating Committee
NCMEC	National Chemical Management Executive Committee
NIP	National Implementation Plan
NPHL	National Public Health Laboratory
NVBDCP	National Vector Bourne Disease Control Programme
NSWMS	National Solid Waste Management Strategy and Action Plan 2009–2014
NWMPCS	National Waste Management and Pollution Control Strategy 2017–2026
ODS	Ozone Depleting Substances
PBDEs	Polybrominated diphenyl ethers
PCBs	Polychlorinated biphenyls
PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans
PFOS	Perflurooctane sulfonic acid
PMA	Penalties and Miscellaneous Amendments Act 2009
POPs	Persistent Organic Pollutants
PP 1941	Pharmacy and Poisons Act 1941
PRAC	Pesticides Registry Advisory Committee

PUF	Polyurethane Foam
SIEA	Solomon Islands Electricity Authority
SIG	Solomon Islands Government
SPC	Secretariat of the Pacific Community
SPMICO	South Pacific Malaria and Insects Control Organization
SPREP	Secretariat of the Pacific Regional Environment Programme
SW 1982	Safety at Work Act 1982
TBDEs	Tetrabromodiphenyl ether
UNEP	United Nations Environment Programme
uPOPs	Unintentional POPs
VBDCP	Vector Borne Disease Control Programme
WHO	World Health Organization

1. Introduction

The Stockholm Convention on Persistent Organic Pollutants[1] (the Convention) is an international treaty that requires Parties to phase-out and eliminate the production and use of (to date) 28 of the most persistent and toxic chemicals that have adverse impacts on human health and the environment.

Solomon Islands acceded to the Convention on 28 July 2004. Under Article 7 of the Convention, the Solomon Islands Government (SIG) is required to develop and endeavour to implement a National Implementation Plan (NIP), outlining how its obligations under the Convention will be met.

This NIP is a fulfilment of the Article 7 obligation. It is intended to be a pragmatic and living document that caters for the national context, with the flexibility to be updated whenever necessary to reflect government decisions, new amendments, and other changes from time to time.

The NIP covers the 28 POPs chemicals listed under the Stockholm Convention and is structured and formatted following the guidelines provided by UNEP. In short, the NIP discusses the local legislative and policy aspects and how they support the Convention obligations; presents an assessment of the national relevance of the listed POPs; and; outlines the actions (Appendix 1) that Solomon Islands will take to manage POPs and fulfil its obligations under the Stockholm Convention.

1.1 The 28 POPs

POPs are toxic chemicals that persist in the environment, bio-accumulate in the food chain, and have trans-boundary transportation capabilities, often ending up in locations and bio-accumulated in human populations that are removed from the source of generation.

The 28 POPs under the Convention (Table 1) include pesticides, industrial chemicals and unintentionally produced POPs (uPOPs), which are listed under three annexes as follows:

- **Annex A:** these chemicals are mostly (but not exclusively) pesticides scheduled for elimination; Parties may register specific exemptions to allow for the time that may be needed to adapt and take necessary measures required by the Convention.
- **Annex B:** Parties must take measures to restrict the production and use of these chemicals; Parties may register specific exemptions or restrict use of Annex B chemicals to an 'acceptable purpose' listed under the Convention.
- **Annex C:** Parties must take measures to reduce the unintentional release of chemicals in this annex, with the goal of continuous minimisation and, where feasible, ultimate elimination.

1.2 Stockholm Convention obligations

The Stockholm Convention comprises thirty (30) articles, some of which are not relevant for a small-island developing state like Solomon Islands. The key Convention obligations relevant to the Solomon Islands are:

- **Article 3:** Eliminate the importation and use of chemicals listed in Convention Annex A, B and C

[1] http://www.pops.int//default.htm

- **Article 5:** Reduce or eliminate unintentional production and release of the chemicals listed in Convention Annex C
- **Article 6:** Reduce or eliminate releases from stockpiles and wastes containing chemicals listed in Convention Annex A, B and C
- **Article 9:** Establish mechanisms to exchange information on POPs between Parties and Secretariat.
- **Article 10:** Promote awareness of POPs among policy and decision makers and educate the general public on the dangers of POPs to the environment and their health.
- **Article 15:** Participate in periodic reporting to the Conference of Parties (COP) Secretariat on the status and measures on POPs reduction taken nationally.
- **Article 16:** Participate in the Global Monitoring Plan (GMP) on POPs for the national presence of chemicals listed in Annexes A, B and C as well as their global and environmental transport.

In addition to these obligations, the Stockholm Convention also:

- reaffirms Principle 16 of the Rio Declaration which states that national authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should in principle bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment
- encourages Parties without regulatory and assessment schemes for pesticides and industrial chemicals to develop such schemes.

Table 2: POPs chemicals under the Stockholm Convention

Chemical	Date listed	Pesticide	Industrial chemical	By product
Annex A chemicals (elimination)				
Aldrin	May 2004	●		
Chlordane	May 2004	●		
Chlordecone	May 2009	●		
Decabromodiphenyl ether (commercial mixture, c-decaBDE	May 2017		●	
Dieldrin	May 2004	●		
Endrin	May 2004	●		
Heptachlor	May 2004	●		
Hexabromobiphenyl	May 2009		●	
Hexabromocyclododecane (HBCD)	May 2013		●	
Hexabromodiphenyl ether and heptabromodiphenyl ether	May 2009		●	
Hexachlorobenzene (HCB)	May 2004	●	●	
Hexachlorobutadiene	May 2015		●	
Alpha-hexachlorocyclohexane	May 2009	●		
Beta-hexachlorocyclohexane	May 2009	●		
Lindane	May 2009	●		
Mirex	May 2004	●		
Pentachlorobenzene	May 2009	●	●	
Pentachlorophenol and its salts and esters	May 2015	●		
Polychlorinated biphenyls (PCBs)	May 2004		●	
Polychlorinated naphthalenes	May 2015		●	
Short-chain chlorinated paraffins (SCCPs)	May 2017		●	
Technical endosulfan and its related isomers	May 2011	●		
Tetrabromodiphenyl ether (tetraBDE) and pentabromodiphenyl ether (pentaBDE)	May 2009		●	
Toxaphene	May 2004	●		

Chemical	Date listed	Pesticide	Industrial chemical	By product
Annex B chemicals (restriction)				
DDT	May 2004	●		
Perfluorooctane sulfonic acids and salts and Perfluorooctane sulfonyl fluoride	May 2009	●	●	
Annex C chemicals (unintentional production)				
Hexachlorobenzene (HCB)	May 2004			●
Hexachlorobutadiene (HCBD)	May 2017			●
Pentachlorobenzene	May 2009			●
Polychlorinated biphenyls (PCBs)	May 2004			●
Polychlorinated dibenzo-p-dioxins (PCDD)	May 2004			●
Polychlorinated di-benzofurans (PCDF)	May 2004			●
Polychlorinated naphthalenes	May 2015			●

1.3 NIP development process

This NIP was developed with the support of the 'Global project on the updating of NIPs for POPs' "Review and update of the National Implementation Plan for the Stockholm Convention on POPs in Solomon Islands" Project herein after referred to as the NIP Project . The NIP Project was funded under the Global Environmental Facility (GEF), co-financed by the Solomon Islands Government (SIG), implemented by the United Nations Environmental Program (UNEP), and executed by the SIG, through the Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM) as the national focal point.

The process of planning, developing and drafting the NIP commenced on 16 February 2015 and ran for 15 months. The project included baseline surveys, desktop studies, legislation and policy reviews, stakeholder consultations, workshops, and field surveys to carry out POPs assessments. Some of the fieldwork was carried out in provincial centres to validate possible POPs stockpiles and data from earlier reports. Additional information was added in December 2017 to provide a background to management of the 16 POPs.

The NIP Project was coordinated by the POPs Project office in MECDM, under supervision of the Project Managing Supervisor, Ms. Rosemary Apa working through the office of the Director of the Environment and Conservation Division (ECD), Mr. Joe Horokou and the office of the Permanent Secretary of MECDM, Dr Melchior Mataki.

An inception meeting for the NIP Project occurred between 4-5 March 2015, which paved the way for the establishment of a National Coordinating Committee (NCC) that has been steering the development of the NIP. A list of NCC stakeholders, and meetings held are provided in Appendix 2.

An executive approach was adopted to develop the NIP, noting the limited timeline for generating the document, but also the importance of inter-ministerial inputs crucial for NIP implementation.

The NIP is designed to build upon existing regulatory frameworks and institutional structures and recommends areas of improvement in national management of POPs and chemicals in general. It builds on national government policies, priorities and plans and coincides with two important national projects: the review of the *Environment Act 1998* and the National Waste Management and Pollution Control Strategy 2017-2026 (NWMPCS) and its core principles of waste minimisation and management.

Implementing the NIP will ensure that the Solomon Islands:

- meets its obligation under the Convention
- has better and effective systems in place to manage POPs and chemicals

- protects the vitality and functionality of its natural assets and people's health against the adverse impacts of POPs and chemicals
- integrates the management of POPs into national law
- reduces its global contribution on pollutant loading as a member of the global community.

2. Country baseline

2.1 Country profile

2.1.1 Geography and population

Solomon Islands consists of eight main island groupings, totalling approximately 28,400 square kilometres scattered across an Economic Exclusive Zone (EEZ) of more than 1.3 million square kilometres in the South-western Pacific Ocean. The country is located to the east of Papua New Guinea (PNG), the northwest of Vanuatu and approximately 2000km to the north east of Australia.[2] Solomon Islands has an equatorial oceanic climate with high humidity throughout the year. According to the last official census in 2009, the population of the country is over 550,000 people with a population density of 17 people per square kilometre.[3] The 2016 population is estimated to be over 650,000.[4]

Solomon Islands is one of five Melanesian countries in the Pacific, along with Fiji, PNG, Vanuatu and New Caledonia. Melanesians make up 95% of the population in the Solomon's, while the other 5% include indigenous Polynesians, Micronesians, Chinese and Europeans. The official language is English and is also the main institutional language in the country, though it is spoken by less than 2% of the population. Pidgin (Pidgin English, Solomon pidgin, neo-Solomonic) is the *lingua franca* used in much of the country that boasts over 75 languages[5].

The capital of Solomon Islands is Honiara, situated on the largest island of Guadalcanal. Other provincial centres exist and provide national government and support services linkages through respective provincial governments such as in health, education, business, agriculture, fisheries, law enforcement and the courts. Eighty percent of Solomon Islanders reside in the rural areas, in coastal villages and inland. Rural livelihoods consist mainly of farming for consumption and income, while coastal livelihoods include bait and dive fishing for reef resources.

The cost of energy in the Solomon Islands is one of the highest in the Pacific at around USD0.80 per kWh and reflects the price of general goods and services that are usually above the means of many local families. The national wage is from USD127 to USD1,153 per month[6]. The life expectancy for males is 50.2 years for males and 55.5 years for females.[7]

2.1.2 Political and economic profile

Solomon Islands gained independence on the 7th of July 1978 from Great Britain. It retains the constitutional monarchy, with the Queen as the Head of State, represented by the Governor General and has a Prime Minister as head of the executive branch of government. Legislative responsibilities are designated to the National Parliament which is a single chamber (unicameral legislature) modelled after the British Westminster System[8] and comprising fifty members from fifty constituencies in the country. The Supreme Court headed by the Chief Justice administers the judiciary. Government administration is

[2] http://www.ramsi.org/solomon-islands/[Accessed 8/10/15]
[3] 2009 Population and Housing Census National Report (Volume 2), Solomon Islands National Statistic Office
[4] https://prism.spc.int/regional-data-and-tools/population-statistics [accessed 5/12/2017]
[5] http://www.ethnologue.com/country/SB [Accessed 8/10/2015]
[6] Wages and Benefits Survey 2010. Solomon Islands Chamber of Commerce.
[7] Ibid p59
[8] http://www.parliament.gov.sb [Accessed 8/10/2015]

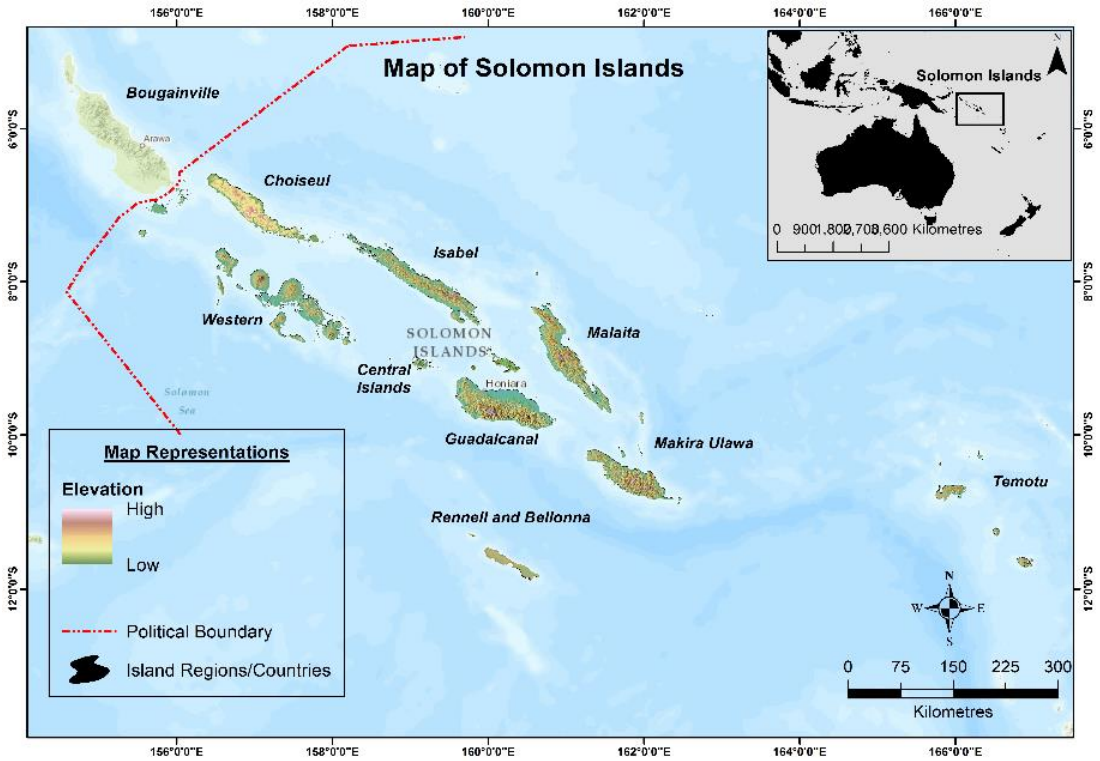

Figure 1: Map of Solomon Islands

de-centralized into ten provincial governments including Honiara city, to assist with the delivery of essential services to the populace.

Solomon Islands strongly affiliate with all its Pacific neighbours, Australia and New Zealand, and is a member of several regional organizations, including:

- the Pacific Islands Forum (PIF) of Australia and New Zealand and Pacific Island states on economic cooperation
- the Melanesian Spearhead Group (MSG) of Melanesian countries supporting a wide range of programs ranging from trade, governance, human rights, regional security and environment protection.
- the Pacific Community (SPC), the region's primary science and technical organization
- the Secretariat of the Pacific Regional Environment Program (SPREP), the region's principal environmental organisation which has previously implemented POPs related projects in the Pacific.

Australia allocates significant monetary aid to the Solomon Islands, providing AUD178.9 million between 2015-2016 which equated to three-quarters of total national monetary aid income over that time.[9] Other development partners including New Zealand, the EU, Japan, and Taiwan also jointly provide aid across a number of sectors including the public sector, including trade, sports, gender development, education, national security, health, energy, fisheries, road and infrastructure.

Solomon Islands GDP has been steady at around 3.2% since 2012, driven by the resilient non-commodities sector (mainly construction, transport, manufacturing and services) supported by increased private sector investment, strong fiscal management, and the presence of the Regional Assistance Mission to Solomon Islands (RAMSI). The national GDP estimate for 2015 was around USD1 billion.[10]

[9] http://dfat.gov.au/geo/solomon-islands/development-assistance/Pages/development-assiatnce-in-solomon-islands.aspx [Accessed 8/10/2015]

[10] http://www.gfmag.com/global-data/the-solomon-islands-gdp-country-report [Accessed 8/10/2015]

Stable currency and improved balance of payments has also been due to the high aid assistance allocated to the country. Primary resources from commodities like copra, cocoa, logs and round timber, and tuna remain key economic sectors, including palm oil and an emerging minerals sector. Collectively in 2014, resource derived commodities contributed over SBD3.5 billion in export revenues.[11] Log (timber) exports were around 60%, tuna 13%, palm oil and kernels 7%, minerals 6%, copra, cocoa, timber and others 14%.[11]

The country's largest import is fossil fuel at 32%, followed by rice at 8% along with machineries, equipment and vehicles. China and Australia are the Solomon Islands' biggest trading partners for both imports and exports.

2.1.3 Profiles of economic sectors

The non-commodities sectors have taken over traditional commodities in recent years cushioning the economy at a steady rate of 2–3.7% since 2013. Fluctuations caused by bad weather and major flash floods in April 2014 led to the closure of the country's only gold mine. Inflation has receded from 7% following the floods and is now at 4%, helped by falling oil and food prices.[12]

The push for economic exclusive growth has created entrepreneurship opportunities and the rise of imported goods. New reforms and improvement in regulations, new technology, increasing public-private partnership and education are closing social disparities in the islands. More local Solomon Islanders are now engaged in businesses. This is important with respect to some of the newly listed POPs that are present in many of the imported consumables that people use every day. The importation of chemical products has increased by 110% over the last 10 years and constitutes 10% of the total national import expenditure. The relevant sectors are discussed below:

Minerals Sector

It was with the discovery of gold that the early discoverers in 1568 named the islands after the biblical King Solomon, believing the islands to be the source of his wealth. The minerals sector contributes 20% of the national export revenue with over 2,550kg (90,000oz) of metals exported each year, mainly gold and silver to Australia. With the closure of the Gold Ridge Mine on Central Guadalcanal in April 2014, 720 workers lost their jobs and the mineral sector exports plunged by 27% (13% GDP). By 2015, the Central Bank of the Solomon Islands (CBSI) recorded no production for gold or silver.

The country is also known for its bauxite, alumina, copper and nickel deposits which have attracted large mining companies such as the Japanese-based Sumitono Metal Mining operating in the country with vested interests in nickel mining. In 2016, ASIA Pacific Investment Development exported 71,200 tonnes of bauxite from Rennel Island. Deep-Sea mining is also attracting interests with over 67 offshore prospecting licenses and 12 on-land licenses issued in 2015 by the MMERE.[13] The Solomon Islands are rich in minerals that are yet undeveloped. The resumption of the country's mineral sector will be dependent on how quickly gold production can be resumed at Gold Ridge[14] and on the future of mining explorations being undertaken in the country.

Forestry

Forests make up 80% of the land cover in the Solomon Islands. The forest sector comprises the dominant natural forest sector and the smaller plantations sector. Most of wood harvested from natural forests is exported as unprocessed round logs and secondarily as milled timber. In the last 10 years, logs exports have dramatically risen to 2.5 million cubic meters, double the volume exported in 2005. This is because many local land-owning groups view logging as an easy means for earning revenue despite the

[11] CBSI June Qtr. Review
[12] CBSI Annual Report 2014
[13] Prospecting Licensing Office, MMERE
[14] By February 2016, Gold Ridge Mines was taken over by GCIL and have commenced procedures towards full operations.

environmental and social costs. A study undertaken by Sinclair Knight Merz (2012) showed that in the 11 years to 2005, an average of 704,000 cubic meters of logs were exported each year increasing to 1.45 million cubic meters annually between 2006 and 2011. A total of over 8.7 million cubic meters of logs were exported during the entire period.[15]

The same study estimates that since 2006, logging has impacted on 348,000ha of primary and secondary commercial forests and 17,000ha of non-commercial forests. In 2014, CBSI reported that logging was still a SBD1.5billion a year industry. Most of the logging is occurring in the Solomon's western province, ironically the province with the best tourism potential. The rise of locally-owned portable saw mills accounted for almost 2% of total export value in 2014.[16] Despite reports that logging will decline, according to the Permanent Secretary of the Ministry of Forestry and Research (MOFR), 2015 was a peak year of log harvest which generated SBD16 million in revenue, or approximately 60% of the national revenue[17], forcing the government to put a stop to all applications for new felling licenses.

The future of the Solomon Islands forests lies in the promotion of plantations or village plantations supported by the government. Retention of significant natural forest areas into the future will provide for important eco-system services.

Agriculture

Agriculture is a major export earner for the Solomon Islands and is relied on heavily by the majority of Solomon Islanders as a source of income and food. Of the total land mass of 27,000 square kilometres, 3% is used for arable and permanent agriculture.

In 2014, agriculture contributed 13% of the national export revenue, consisting mainly of exports of palm oil (33,752 tonnes), copra[18] and coconut oil (19,339 tonnes), and cocoa (4,758 tonnes). Fluctuating world market prices for primary commodities have led to the production of high value goods such as kava, vanilla, honey, ngali nuts, virgin coconut oil and coffee for niche markets as far away as Europe, America and Japan. Rice farms that once sprung up in the early 2000 have all but ceased operation due to the laborious work and unfavourable economics compared with cheaper imports.

An increasing population and rising standard of living puts increasing demands on food production, leading to increasing intensification of agricultural activities. Traditional farming and pest control practices based on cultural, physical and natural techniques are being replaced by chemical methods, with concomitant rising concerns over the unregulated and overuse of pyrethroid based pesticides.

New Britain Palm Oil, operated by the Guadalcanal Plantation Palm Oil Limited (GPPOL), is the largest commercial farm and importer of pesticides. New Britain Palm Oil is also a certified grower under the Roundtable on Sustainable Palm Oil (RSPO) certification scheme (current as of 15 December 2017). The RSPO scheme provides assurance that the standard of palm oil production is sustainable, and certification requires adherence to a set of principles that include restrictions and guidance around pesticide use.

The Pesticides Registry Advisory Committee (PRAC) that oversees the screening of imported pesticides are understaffed and under-resourced, and have expressed the need for more effective monitoring powers, particularly with respect to the distribution, storage, use and handing of pest-control chemicals.

There have been frequent national pest outbreaks in recent years, including the proliferation of the Giant African Snail on Guadalcanal since 2007, the coconut rhinoceros beetle (*Orycte rhinoceros*) in Honiara and the eastern Solomon's in 2015, coconut leaf miner in Temotu, and the cocoa pod borer. Despite eradication efforts, these pests remain issues for the economy with national coconut and cocoa plantations being placed under threat by these pest species. New management interventions are required to safeguard the nation's primary commodities against these pests.

[15] Solomon Islands National Forest Resources Assessment: 2011 Update, SKM March 2012.
[16] CBSI June 2015 Qtr. Report
[17] The Weekend Sun, *'Unsustainable logging increases despite reports of a decline'* 21 May 2016
[18] Dried meat or dried kernel of the coconut used to extract coconut oil

POPs chemicals were used in the agriculture sector from the 1950s, particularly for pest management. Proper pesticide management for optimum plant and soil health, and protection of workers, the general public and the local environment are priorities.

Fisheries

The tuna industry in the Solomon Islands commenced in 1971. It was believed by the British Protectorate government on handing over independence in 1978, that fisheries, particularly the tuna fishery, could single-handedly sustain the country's economy into its future. To date, the fisheries sector and the export of tuna make a larger contribution to the economy and national GDP compared to the agriculture and commodities sectors combined, through valuable foreign exchange and employment.

Solomon Islands trade mainly the skipjack, yellow fin, albacore and big eye tuna. The only tuna loining and canning processing facility is located in Noro, Western Province and is run by Soltuna Limited. Soltuna generate around SBD450 million annually and employs around 2,500 locals. Canned tuna including loins is exported to the EU, UK and Italy and has previously been sold to the USA.

There is huge potential for future earnings from pelagic fisheries for Solomon Islands. It is estimated that the Western and Central Pacific catch has a full value of around US180 million, and 7% of this total catch comes from the Solomon Islands.[19] Currently the majority of the total catch is taken by foreign vessels under licensing agreements and processed elsewhere, with valuable income lost to countries such as Korea, Japan, US, New Zealand and Fiji.

Solomon Islands has made steps to improve wealth generation from its fisheries resources and recently enacted the *Fisheries Management Act* in April 2015. The Act covers management of fisheries and ecosystem resources, securing markets, and strengthening monitoring and enforcement. Solomon Islands is also a signatory of the Nauru Agreement, a regional body of coastal small-island states formed to have control and to better manage tuna stocks and fishing rights in the South Pacific.

Aside from agriculture, fisheries (particularly bait and coastal fisheries) contribute to the daily income and diet of many Solomon Islanders. Maintaining the integrity of the nation's ocean resources and safeguarding them against the impacts of chemical and pesticide run-off, sewerage releases, solid wastes, oil spills and waste fuel discharged from vessels are paramount to the protection of human health and marine eco-systems and life. To this end, Solomon Islands has proposed to sample fish as a national matrix for POPs analysis under the GMP 2 starting in 2016, in order to monitor the concentration of POPs chemicals in common foods.

2.1.4 Environmental overview

The 'State of Environment 2008' (SOE 2008) outlines the geology and geomorphological, land, fauna and marine features of the country as some of the best in the world, though recognises the country's ongoing environmental challenges, both social and economic.

There are over 990 islands in the Solomon Islands with more than 4000km of combined coastline, from pristine beaches, coastal lagoons, mangroves and riverine environments, plains and flat lands, swamps, brackish lakes; undulating hills and mountains of forests and jungles, with some peaks such as Mt Popomanaseu on the island of Guadalcanal rising to over 2000m. The sparseness and distribution of these islands create tremendous diversity and endemism for terrestrial, freshwater and marine animal and plant species.

The Solomon Islands rain forest eco-region, for example, is rated among the World Wildlife Fund's global priority Eco-Regions and has been described as, *"the Solomon islands rain forests are true oceanic islands with high vertebrate endemism, including single Island endemics, restricted range animals and 148 species of land and freshwater birds with an astounding 69 bird species found nowhere else in the*

[19] www.ifc.org/wcm/connect/7452, accessed 27/02/2016.

world".[20] Solomon Islands forests are one of the world's centres for plant diversity with 4,500 species of plants.

According to the SOE (2008), vertebrate and invertebrate endemism include 90 endemic birds, 53 known mammals, 80 kinds of reptiles, 21 from species, 130 species of butterflies, 25 endemic snail species and an estimated 46,000 insect species. Coral species diversity is also high, second in the world only to Raja Ampat in Indonesia and Solomon Islands reef are part of the coral triangle of the Western Pacific. More than a thousand reef dwelling fish species have been found.

The country is also home to biotopes that are world renown like the Marovo lagoon in Western Province which is the world's largest double barrier reef and Lake Tenganno on Rennel Island, which is the world's largest raised coral atoll and currently listed as a World Heritage site.

This unique biodiversity scattered across the country is vulnerable to natural disasters and is also under threat from a growing and relatively young population, which highlights the need for resilient development. Human settlements are projected to put pressure on the functionality and integrity of vital natural assets, as more roads and infrastructure are being built, more trees logged, more land committed to residences and buildings, more businesses open, and the pollution and waste aspect of these developments magnify.

A case in point is the Marovo lagoon which missed out on World Heritage listing due to the presence of heavy logging in the area. The increasing demand for water, sanitation, housing, education and healthcare, especially in Honiara, adds to the environmental pressures. Donor programs to alleviate some of these sectors have had mixed success, in part due to the failure to recognise the national context.

Waste management

Waste management is a current environmental concern and a relevant POPs issue due to the generation of dioxins and furans (and other uPOPs) during open burning, and the disposal impacts of chemical wastes and consumer articles containing POPs. Some of the new POPs are found in the components of everyday products, such as car parts, furniture, packaging, LCDs, and textiles.

Data on waste generation in Solomon Islands is scarce and limited to Honiara. Mataki[21] estimated a daily household waste generation rate in 2009 of around 0.59kg per person, equivalent to 38 tonnes per day for the Honiara population. Collection coverage was only 45%, and the household waste stream was dominated by organics (94%).

In 2011, a Honiara study[22] estimated the daily household waste generation rate to be about 54 tonnes per day (about 0.86kg per person) with a bulk density of 448 kg/m^3. These figures do not include commercial waste and have likely increased over the years.

Solomon Islands imports 70% of its motor vehicles from Japan, which are used vehicles mostly manufactured before 2000 and they often become end-of-life vehicles after a few years following importation. These end-of-life vehicles are potentially POPs containing, with, for example, flame retardant chemicals potentially contained in car upholsteries and seats.

Solomon Islands as a developing country, also receives donated goods, including drugs and chemicals, from other countries every year. Some of these goods immediately become wastes (e.g. expired drugs). Others are usually second-hand damaged goods not fit for use in the countries of origin and become waste in the Solomon Islands after only a few months of use.

Solomon Islands also has a major problem with plastic bags, that are imported as advertising paraphernalia and as such, do not create any cost to the importer, but are now widely distributed as

[20] http://wwf.panda.org/about_out_earthrecoregions/solomons_moist_forests.cfm, accessed 23/11/2015.
[21] Mataki, Melchior (2011) A critical assessment of the paradigms for solid waste management in Pacific Island countries. PhD Thesis, Murdoch University.
[22] Honiara Waste Characterization Studies 2011.

rubbish into the country's waterways, ocean, streams and landscape. Open burning of wastes remains the method for destroying rubbish in a lot of suburbs and public roadsides.

Solomon Island's National Waste program commenced in 2005, and in 2009 the first National Solid Waste Management Strategy and Action Plan (NSWMS) was developed. Early waste management issues included the lack of legislation, absence of sanitary landfills, unsegregated dumping including medical and chemical wastes, lack of incinerators, poor collection coverage, absence of baseline data, absence of recycling facilities or businesses and even lack of government support throughout the country.

A number of improvements were made since 2009 under the JPRISM funded national waste program. Notable were the conversions of the Ranadi open dump in Honiara and the Gizo dumpsite in the Western Province into Fukuoka semi-aerobic landfills. For the first time, waste management was supported in the government allocations under MECDM, including respective municipals in Honiara City (HCC) and in Gizo municipal. Awareness campaigns delivered through public billboards, school programs, communities and radio also promoted the importance of good waste practices. Officers from the MECDM and HCC were sent to Japan for training and stakeholder collaboration has improved, evident in the establishment of the JPRISM committees in Honiara and Gizo.

In 2015, the SI government reviewed the NSWMS to include new waste streams such as chemical and hazardous wastes, liquid, and e-wastes. Support from the European Union through programs such the Pacific Hazardous Waste Project (PacWaste) implemented by SPREP were also instrumental in supporting this revision. The revised National Waste Management and Pollution Control Strategy 2017-2026 was endorsed by Cabinet in 2017.

Energy

Only 20% of the population in Solomon Islands has access to electricity, which is confined to Honiara and most provincial centres. Five percent of the rural population access power through off-grid systems, using either portable petrol and diesel generators or solar systems. Most households use biomass for cooking and kerosene lanterns for lighting. CBSI data shows that energy production has grown steadily from about 83,500 MWh in 2010 to 86,800 MWh in 2015, and fossil fuel imported in 2014 comprised a quarter of the total import expenditure.

Solomon Islands has embarked on renewable energy options to help curb its heavy reliance on fossil fuel. Two major hydro projects currently underway are the Tina Hydro Project on Guadalcanal, capable of supplying 70% of the Honiara 20MWh demand; and the Fiu Hydro Project in Auki, Malaita Province. The total national hydro energy potential is estimated to be 326MWh.[23] The potential of geothermal, coconut oil-based biofuel, and wind have also been investigated in previous studies.

Climate change

Climate Issues are a national priority for Solomon Islands because it has multiple low-lying islands and atolls that are vulnerable to the impacts of sea level rise and extreme weather patterns. Climate variability in the Solomon Islands is partly due to the El Nino Southern Oscillation (ENSO) phenomenon known to have distinct oceanographic, temperature, rainfall and cyclonic conditions.[23] In future years, maximum temperatures are expected to continue to increase, rainfalls are expected to increase, and cyclones are expected to occur less frequently but with greater intensity.

In 2007, the forest and energy sectors in the Solomon Islands were collectively responsible for greenhouse gas emissions totalling 5,526GgCO_2-eq.[24] Solid waste and wastewater management, and land cropping were other notable sources of emissions. During the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change, Solomon Islands committed to reducing its national GHG emissions by 12% below 2015 levels by 225.[25] This reduction is to be achieved through

[23] SI INDC Synthesis Report 2015
[24] SI National Climate Change Policy 2012-2017
[25] https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/cop21cmp11_hls_speech_solomon_islands.pdf, accessed 14/12/2017.

developments in hydropower generation, and sustainable forest management, and improved waste management.

Water Resources and Sewage

The main sources of water in the Solomon Islands include rivers and streams that supply the urban centres and remote areas, rainwater, and drilled wells that are relied on by small islands.

Potable water sources include standpipes and public taps (23.6% of the population), rainwater (13.3% of the population), protected spring (5.4% of the population) and bottled water (0.1% of the population). The percentage of the population that uses unprotected well, surface water and unprotected springs for drinking are 8.2%, 19.8% and 12.4% respectively, including for cooking and washing.

The Solomon Islands Water Authority operating under the brand name Solomon Water (SW), and the Rural Water Supply and Sanitation (RWSS) Project are the main providers of piped water.[26]

In 2015, Solomon Water supplied more than 12M m^3 of water to its 8,000 connected customers (about 56,000 people[27]) in Honiara, Auki, Noro and Tulaghi. In the rural peripheries, the Water Sanitation and Hygiene latest snapshot[28] revealed that on average, 54% of the total population have access to an improved water source that is available within 30 minutes of their home.

Nationwide, only 14.3% of the population has access to improved types of sanitation facilities (which include flush to septic tanks, 3%, flush to pit, 7.4%, VIP latrine, 0.6% and pit latrine with lab, 3.3%) while 80.3% of the population still defecate out in the open.

The only sewerage system in the Solomon Islands exists in Honiara and only services around 30% of the capital's population in areas including Ranadi industrial, the Central Business District, Naha, Vura, Kukum, Bahai and Rove. There are also communal septic tanks located at Vara Creek, Tuvaruhu and Rove.

The sewerage system is managed by Solomon Water, while the remaining households and businesses that are connected to traditional septic tanks are regulated by the Honiara City Council (HCC).

The sewerage network was constructed between 1968 and 1981 and consists of 13 disjoint networks that operate mainly under gravity transporting raw untreated sewage into the sea via 11 oceanic outfalls located between Rove and KGVI area, and two outfalls located on the Mataniko River. The outfalls located at Point Cruz and KGVI are pumped into the sea.

The environmental and human health impacts of raw sewage discharge are concerning. Mataniko River for example is a high-density area of residential houses and informal settlements, where most of the residents use the river for bathing, washing and recreation.

Other SIG managed projects such as the Solomon Islands Water Sector Adaptation Project (SIWSAP) have also provided support to improve the resilience of rural water supply, particularly in response to the impacts of climate change, by installing over 69 water tanks or rainwater harvesting systems and also constructing nine (9) groundwater wells in 2015.[29]

2.2 Institutional Policy and Regulatory Framework

2.2.1 Policy framework

The policy framework for environmental and sustainable development in the Solomon Islands is outlined in three key documents, which are discussed below:

[26] National Census Report V1, 2009
[27] Based on 2009 population census of seven persons per household.
[28] Rural Water Supply and Sanitation Snapshot Report.
[29] Minister of MMERE, SIWSAP National Feedback Session Workshop, Mendana Hotel, 15th August 2016.

Democratic Coalition for Change Government Policy Statement and Translation Document (DCCG Policy)

The DCCG Policy, published in January 2015, is the DCC Government's working paper for its five-year tenure in office. It covers all sectors of government and all proposed action points under its fundamental and productive reforms. The key actions relevant to the NIP are summarised in Table 3.

Table 3: DCCG Policy actions relevant to the NIP

Policy reform	Strategic actions	POPs relevance and impacts
Fundamental		
Customary land	Review of *Lands and Titles Act* and Development of Recording and Registry of Customary Lands	Waste disposal facilities including POPs depends on availability of land and ease in doing
Productive		
Agriculture	Establishment of up to 5000ha of rice farms	Likely increase of pesticide imports, establish IPMs for rice developments
	Surveillance activities and control and eradication of national pests and disease occurrence	Improved regulation for pest management including regulations for pesticides and agro-chemicals and tougher quarantine measures
	Development of Agriculture Bill	Specific legislation for agro-chemicals expand monitoring and enforcement powers to cover import, distribution, use and disposal
Tourism	Robust legislative framework for sustainable tourism development	EMPs to be integrated into tourism development proposals to capture chemical management
Trade and commerce	Encourage urban and rural business	Increase chemical imports and importation of goods potentially containing banned or restricted POPs
	Enact small-medium enterprise legislation	Strict product labelling laws on all imported goods to be in English and the disclosure of product content, ingredient and safety information
	Review and strengthen consumer protection	
	Labour protection	Facilitate and ratify relevant ILO conventions for people working with chemicals (e.g. ILO Convention 170)
Lands and housing	Proper planning of townships with proper amenities and utilities	Proper demarcation of business and industries involved in chemicals from residences and public
		Improve building code standards and compliance for industries and buildings storing chemicals
Forests	Downstream processing of forest products and timber	Prohibit POP-based chemicals for timber treatment such as PCPs and encourage alternatives
Health and medical	Review of *Pharmacy and Poisons Act*	Tougher regulations for monitoring and enforcement, chemical trading, use and handling
		Restrict distributor outlets
		Centralise permit and licensing system with MAL and MECDM
		Review chemicals under PP Act schedules and update national inventory
	Promote competent authority at EHD	Improve analytical capability of NPHL for pesticide residue and chemical analysis
		Tougher regulations and standards for imported food products

Policy reform	Strategic actions	POPs relevance and impacts
Development and planning	Establish 20-year national strategy	Chemical management to be integrated into NDS and understood for its impact to health, the environment and the economy
Environment and conservation	Review *Environment Act 1998*	Introduce specific clauses for POPs chemicals and give oversight to MECDM for national chemical management
	Promote proper waste management and disposal	Include chemical and hazardous waste streams

National Development Strategy 2016-2035

The National Development Strategy 2016-2035 (NDS) sets out the strategic development priorities for the Solomon Islands. It is implemented through a rolling five-year Medium-Term Development Plan, which outlines the projects and programmes to be implemented through the provincial governments and the annual work plans of government line ministries. In short, the NDS justifies government priorities, budget allocation and spending.

The current NDS calls for: *sustained and inclusive economic growth*, *poverty reduction*, *environmentally sustainable development*, *quality health and education for all*, and *stable government*.[30]

NDS objectives 3 and 4, emphasise improving the healthcare system of the country and upholding measures against environmental degradation. To this effect, the Solomon Islands Government has clear goals for upholding international initiatives such as the Stockholm Convention that safeguard its people's health and natural environment.

MECDM Corporate Plan 2015-2017

The corporate plan of the MECDM, underpins the NDS, and sets out the delivery strategies and goals of the Ministry until 2017. Part 7.2 (iv) of the corporate plan priorities the implementation of the Stockholm Convention.

2.2.2 Regulatory framework

Solomon Islands has no specific legislation addressing the management of POPs chemicals, however there is a limited overall framework for chemical management, focused mainly on agricultural chemicals, pharmaceuticals, drugs, and poisons.

This limited framework is spread across several government departments and several pieces of legislation, which are summarised in Table 4, with a more detailed overview provided in Appendix 3.

Table 4: Summary of key legislation relating to chemicals management

Legislation	Objectives of the legislation	Administering agency
Safety at Work Act 1982	Regulates the manufacture, supply and use of chemicals and pesticides as they relate to workplace health and safety	Ministry of Agriculture and Livestock (Crop Health Unit)
Safety at Work (Pesticide) Regulations 1983	Establishes the Pesticides Registration Advisory Committee, and regulates the importation, supply and use of pesticides	
Pharmacy and Poisons Act 1941	Regulates the importation, sale, supply and use of pharmaceuticals, drugs and poisons	Ministry of Health and Medical Services (MHM):

[30] National Development Strategy 2016-2035, April 2016.

Customs and Excise Act 2003	Regulates imports and exports and collection of duties. Prescribes goods whose importation are prohibited and restricted, including goods prohibited under any other law in the Solomon Islands	Customs and Excise Division, Ministry of Finance and Trade
Environment Act 1998 Environment Regulations 2008	Regulate waste management, discharge of pollutants to the environment, and development activities	Environment and Conservation Division, MECDM
Environmental Health Act 1980 Environmental Health (Public Health Act) Regulations	Provides basic regulation of environmental health issues including waste and wastewater discharge, and food and drugs for human consumption.	Environmental Health Division, MHMS
Pure Food Act 1996	Regulates food safety and quality	Environmental Health Division, MHMS
Labour Act 1960	Regulates the duty of care of employers to their employees, including health and safety, including upholding relevant International Labour Organisation (ILO) conventions	MCILI
Consumers Protection Act 1995	Regulates consumer protection and fair trade practices	MCILI
Shipping Act 1988	Control of seaman and shipping registry and safety	MID
Mines and Minerals Act	Control mining and exploration activities	MMERE
Legislation administered	Objectives of the legislation	Administering agency

The import and control of all other chemicals is currently unregulated. Other important legislation exist that pertain to the wellbeing of workers, consumers and product standards (see Table 4), however, these are either not enforced or require regulations to be enforced.

This situation has created the conditions for the unrestricted importation of most chemicals, including POPs chemicals covered under the Stockholm Convention.

A legislative review carried out under the NIP Project by the Hatlar Group in September 2015, found that there was no overall oversight and control for imported chemicals. Other identified gaps in the control and management of POPs and chemicals in the Solomon Islands include the following:

- There is a lack of clarity on the different roles and responsibilities for chemical management by the existing stakeholders, including government, private sector and public users. The control and oversight of the import, sale, supply and use of chemicals is fragmented between several departments and across several pieces of legislation.
- There are no approved product standards, which in combination with a lack of overall oversight means that chemical products enter the country without proper labels and instructions.
- There is a lack of regulation and tracking of chemical storage and transport, including where, when or how chemicals are transported, stored, used or disposed of.
- There are knowledge gaps within the general population on the risks posed by certain developments, activities, practices and substances. While there is general concern for environmental protection and pollution prevention, these concerns are typically outweighed by the need for economic development.
- There is a shortage of local waste disposal options, including those for chemical disposal.
- Enforcement agencies perceive a degree of complexity and a lack of power to enforce existing controls, which are contrary to the powers given under the relevant legislation. Enforcement guidelines are required to help relevant agencies enforce the existing laws.

2.2.3 Roles of ministries and government agencies in POPs management

The following national government agencies administer legislation relating to POPs and chemicals management in Solomon Islands:

Ministry of Finance and Treasury (MoFT)

The MoFT administers monetary, budget and fiscal policy advice to the national government. Apart from financial reporting, revenue collection and government payments, MoFT has several services that are important for POPs inventory and data, in particular new POPs including the national statistical services, national vehicle registry and customs division with oversight on border protection.

Customs and Excise Division, MoFT

The Solomon Islands Customs and Excise Division under MoFT is the national border protection agency and control all imports and exports into and out of the Solomon Islands for customs purposes and, sometimes on behalf of other Government agencies under the *Customs and Excise Act 2003*.

Environment and Conservation Division (ECD), Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM)

The MECDM through the ECD is the National Focal Agency for the Stockholm Convention and NIP development and is responsible for environmental protection in the country under the *Environment Act 1998* and *Environment Regulations 2008*. ECD's responsibilities include waste management, conservation and wildlife protection, and the administration of development consents. There are currently ten officers serving ECD, including the Director and Deputy Director with mainly environmental science backgrounds. The MECDM also has three other technical divisions: Climate Change Division, Disaster Management and Meteorology Division.

Ministry of Agriculture and Livestock (MAL) - Crop Health Unit, Research Division

The Pesticide Registry Advisory Committee (PRAC) established under the Crop Health Unit of the Research Division of MAL, is responsible for screening and administering approvals for the importation of pesticides and most agro-chemicals into the country under the Saf*ety at Work Act 1982*. Most of the Annex A POPs pesticides would be controlled under the PRAC. Currently the Division has about five working staff including the Director with backgrounds in entomology and general sciences. The Crop Health Unit's responsibilities extend beyond pesticides and this is a constant challenge for the staff.

Ministry of Medical and Health Services (MHMS)

The MHMS is responsible for all health services delivery in the country and is heavily subsidized. Through a primary based approach, it covers public health programs such as the Malaria Control Programs, Environmental Health and Rural Water Supply, and health education programs. It is one of the largest ministries in the country.

Importantly, the MHMS is responsible for chemical and drug regulation under the *Pharmacy and Poisons Act 1941* and *Dangerous Drugs Act 1941.* The legislation is quite out dated but is probably the most comprehensive chemical legislation in the country to date. The *Pharmacy and Poisons Act 1941* regulates the imports of drugs and poisons through a Pharmacy and Poisons Board (PP Board) that assesses applications for importation. Roles include licensing and registration of pharmacists; inspection of importers, wholesalers and dispensers of medicines, and development of storage and distribution guidelines for scheduled drugs and poisons.

The PP Board also has ongoing challenges with non-compliance, inadequate resources for monitoring and enforcement, proper work guidelines, instrumentation, and manpower. There are overlapping interests with certain poisons that are often imported without consent, which continue to support the call for a national chemical body to be enacted consisting of all key stakeholders involved in chemical regulation.

Environmental Health Division (EHD)

The EHD, under the MHMS health improvement program, is responsible for administering the

Environmental Health Act 1980, Environmental Health (Pubic Health Act) Regulations and *Pure Foods Act 1996*. Their work covers mainly food quality and standards, water quality and is supported by the National Public Health Laboratory (NPHL) and reproductive and public health. Since 2010 the EHD has been collaborating with the MECDM on the GMP projects on POPs and undertaking national sampling.

National Public Health Laboratory (NPHL)

The NPHL was set up as a community-based research facility for testing of food and water quality and other minor tests such as blood tests and metal analysis. One of its original intentions and strong demands has been in provision of quality testing to assist increasing the sanitary status of food for local and overseas consumption, popular amongst local food exporters. The facility is under the jurisdiction of the MHMS and has a microbiology, biology and chemistry department and is currently working its way to gaining accreditation status under the ISO 17025. The NPHL works closely with the EHD, HCC and provincial EHDs in aiding them with implementing the relevant health regulations.

National Vector Borne Disease Control Program (NVBDCP)

The NVBDCP provides information to the country health managers regarding the feasibility and acceptability of various malaria surveillance interventions to prevent the introduction and reintroduction of malaria around the country. This entails ascertaining facilitators and barriers likely to influence future programs. National opinion surrounding the future use of DDT and related vector control chemicals would be under the jurisdiction of the NVBDCP. The NVBDCP has been an active participant with the NIP project and coordinates with mirror agencies in all the provinces including Honiara city in the implementation of National malaria eradication activities.

Ministry of Commerce, Industry, Labour and Immigration (MCILI)

The MCILI administers laws relating to consumer protection, labour and immigration. With respect to POPs management, MCILI specifically administers the *Safety at Work Act 1982; the Consumer Protections Act 1995* and the *Labour Act 1960*. The Labour Division of the MCILI comments on intended International Labour Organisation (ILO) conventions that it views as important for the country.

Ministry of Foreign Affairs and External Trade (MFAET)

The MFAET promotes and protects Solomon Island interests and its citizens abroad through its diplomatic missions. It seeks to enhance Solomon Islands' security and prosperity by promoting political, economic, trade, social and cultural relations with the rest of the world. With respect to POPs, MFAET is responsible for trade negotiations, for example the ongoing PACER Plus[31] negotiations which could result in better administration of borders and ports including documentation and equipment, adoption of product and food standards (e.g. Food Standards Australian New Zealand), harmonization of regulatory requirements with more developed partner countries, and local institutional and technical capacity building.

Ministry of Provincial Government and Institutional Strengthening (MPGIS)

The MPGIS is responsible for looking after provincial governments across the country under the *Provincial Government Act 1997* (PGA 1997). There are nine Provincial Governments in the Solomon Islands, established under the PGA 1997, which the MPGIS administers to ensure effective, efficient, and accountable Provincial Governance in the Solomon Islands[32]. Importantly, the Provincial governments represent more than 80% of Solomon Islanders living in the rural areas. The MPGIS plays an important role of bridging between the national and provincial governments in the country.

[31] Pacific Agreement on Closer Economic Co-operation and Development (PACER) Plus is a proposed regional free-trade area being negotiated between Australia, New Zealand and Pacific Island Countries including Solomon Islands.
[32] http://www.mpgis.gov.sb [Accessed21/5/2016]

2.2.4 Relevant international obligations

Solomon Islands is a Party to several International treaties listed in Table 5. While many are legally binding on the Solomon Islands in international law, they have not been fully implemented through domestic laws. Like other Pacific nations, the constraints to full implementation include institutional, technical and capacity weakness, poor technology transfer, gaps in human capacity and expertise, limited finance, fluid politics and weak political will (or lack of awareness at the political decision level). Of particular interest to this NIP are the Solomon Islands obligations as a Party to the regional Waigani Convention.

Waigani Convention

The 1995 *Waigani Convention to ban the importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement of Hazardous wastes within the South Pacific Region* (Waigani Convention) is a regional treaty that bans the importation of hazardous and radioactive waste into Pacific Island Forum countries.[33] It also prohibits Australian and New Zealand from exporting such wastes to the Pacific Island Forum Countries.

The Waigani Convention is the Pacific regional implementation of the international *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal* (Basel Convention), however it extends coverage to radioactive wastes, and to the exclusive economic zone (200 nautical miles) of Parties rather than the territorial sea (12 nautical miles) under Basel Convention.

As of January 2018, the Waigani Convention Parties are Australia, New Zealand, Cook Islands, Fiji, Kiribati, Federated States of Micronesia, Niue, PNG, Samoa, Tonga, Tuvalu, Solomon Islands and Vanuatu. As a Party to the Waigani Convention, Solomon Islands is obligated to:[34]

- ban the importation of hazardous and radioactive wastes from outside the Convention area
- prohibit shipment to and from non-Parties, unless there is a special arrangement
- take measures to reduce the generation of hazardous wastes at source, taking into account social, technological and economic needs
- develop a national hazardous waste management strategy
- as far as possible, develop adequate treatment and disposal facilities for hazardous wastes
- follow established procedures for the trans-boundary movement of hazardous waste to other Parties for environmentally sound disposal.

Table 5: International agreements relating to chemicals management

Agreement	SI Status	National Implementation Activities
Agenda 21 – Commission for Sustainable Development	Endorsed	Development of the *Environment Act 1998*, National Waste Management and many activities in climate change, disaster management, and fisheries
Basel Convention	Not a Party	See activities for 'Waigani Convention' below
Rotterdam Convention (hazardous chemicals and pesticides)	Not a Party	Principles recognized in recommendation for new pesticides law for SI
Chemical Weapon Convention	Party	No specific activities
MINAMATA Convention	Not a Party	Banning of mercury containing equipment and use
Montreal Protocol (ODS)	Party	Ban of ODS substances and articles
London Convention on the Prevention of Marine Pollution by dumping of wastes and other matter 1972	Party	Principles contained in National *Shipping Act 1988*

[33] Cook Islands, Fiji, Kiribati, Federated States of Micronesia, Republic of the Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Solomon Islands, Samoa, Tonga, Tuvalu, and Vanuatu.
[34] http://sprep.org/Multilateral-Environmental-Agreements/waigani-convention [accessed 16/12/2015]

Agreement	SI Status	National Implementation Activities
ILO Convention concerning Safety in the use of Chemicals at Work 170 (ILO C170)	Not ratified	Recommended for ratification by Labour Division
Waigani Convention (hazardous wastes)	Party	Development of NWMPCS, POPs in PICs project participation
Convention for protection of natural resources and environment of the South Pacific Region 1986	Party	Coastal management, waste management, climate change, and other environmental management activities

2.2.5 Improving management of POPs chemicals under the existing institutional, policy and regulatory framework

Based on the foregoing review, the Solomon Islands can accommodate several of its obligations under the Stockholm Convention with a few improvements to the existing institutional, policy and regulatory framework (Table 6). These recommendations are developed further in the NIP Action Plans.

Table 6: Improvements to the existing framework for POPs management

Suggested improvement	Applicable institution, policy or legislation
Introduce new provisions that give MECDM oversight for chemicals imported into the Solomon Islands	*Environment Act 1998* *Safety at Work Act 1982* *Consumers Protection Act 1995*
Create an inter-departmental Chemical Management Unit to oversee implementation of chemical regulation and strengthen the regulation of development activities	*Environment Act 1998* Environment Regulations 2009 MECDM
Introduce a specific ban on the importation and use of POPs chemicals listed in Annexes A and B of the Convention	*Customs and Excise Act 2003* *Safety at Work Act 1982*
Improve the oversight and regulation of labelling, storage and transport of hazardous substances	*Safety at Work Act 1982* *Consumers Protection Act 1995*
Remove loopholes and ambiguity in legislation that constrain powers of entry and the serving of notices by Authorized Officers	All legislation (as listed in **Error! R eference source not found.**)
Implement a licensing regime to regulate discharges to the environment	*Environment Act 1998* Environment Regulations 2009
Improve the regulation of chemicals in the workplace by ratifying the ILO *Convention concerning Safety in the use of Chemicals at Work*	*Safety at Work Act 1982*

3. National POPs baseline

3.1 Overview

A national assessment, including review of documents, was conducted to determine if the chemicals listed in Annexes A, B and C of the Stockholm Convention were used, or if they are likely to be an issue for Solomon Islands through unintentional generation and emission or importation. Current knowledge on the use of Stockholm Convention listed chemicals in the Solomon Islands is summarised in Table 7.

Table 7: Status of Stockholm Convention POPs in the Solomon Islands

Chemical	National status
Aldrin Chlordecone Endrin Heptachlor Mirex Toxaphene	Understood to never have been used
Endosulphan Hexabromodiphenyl Hexachlorobutadiene alpha-HCH beta-HCH Petachlorobenzene Pentachlorophenol	Unlikely to be present
DDT Chlordane Dieldrin HCB Lindane	No longer used in the country
PCBs	Likely to have been used in the past
Decabromodiphenyl ether PFOs and PFOS-F Hexabromocyclododecane Hexabromodiphenyl ether & heptabromodiphenyl ether Polychlorinated naphthalenes Tetrabromodiphenyl ether & Pentabromodiphenyl ether Short-chain chlorinated paraffins (SCCPs)	Unknown, possibly present

Solomon Islands does not manufacture chemicals of any sort, including POPs although the quantity of chemicals imported has increased in recent years. The assessment discusses the Convention articles against each Annex and group of POPs, which will be useful for later reviews and national knowledge.

The newly listed POPs are also introduced and their risk to the Solomon Islands people and environment is assessed at this stage. This discussion provides a summary representation of the issue of POPs in the Solomon Islands, together with the needs, priority areas and the future of chemical management in the Solomon Islands.

3.2 POPs management initiatives

3.2.1 POPs Reduction Project (current)

The Pacific POPs Release Reduction through Improved Solid and Hazardous Wastes Management Project (POPs Reduction Project) aims to reduce emissions of POPs, particularly those that are produced unintentionally, in the 14 Pacific Island Parties to the Stockholm Convention.

This 5-year, US$3.75 million project commenced in 2013, and is funded by GEF supported with l'Agence Française de Développement co-funding, implemented through UNEP and the Food and Agriculture Organization (FAO), and executed by SPREP.

3.2.2 POPs in PICs Project (historical)

The POPs in PICs project, funded by the Australian Government and implemented by SPREP and GHD Pty Ltd between 1997 and 2006, identified and removed hazardous substances including POPs, from 13 Pacific Island Countries (PICs) including the Solomon Islands. POPs in PICs consisted of an inventory exercise (Phase 1) and a collection and disposal exercise (Phase 2). In total 9,973kg of hazardous substances (Table 8) were removed from the Solomon Islands, and destroyed at a specialized destructive facility, BCD Technologies in Brisbane, Australia at a cost of A$53 per kg.[35]

Table 8: Hazardous substances removed from Solomon Islands under the POPs in PICs project

Date	POP	Location	Findings	Amount
POPs in PICs Phase 1 – Reconnaissance and scoping of hazardous chemicals in the PICs				
14 Jul 1998	DDT	MHMS Hardware- Ranadi, Honiara	10 x 35Kg DDT boxes	3,500kg
	DDT	MHMS Hardware- Ranadi, Honiara	Empty 200L Corroded drum with label DDT ICI Batch 40135 25% EC	Nil
	DDT	MHMS Rural Water Supply shed- Ranadi, Honiara	5 empty drums of DDT in polythene bags	Nil
	DDT	MHMS Rural Water Supply shed- Ranadi, Honiara	DDT powder drums	
	DDT	MHMS Rural Water Supply shed- Ranadi, Honiara	200L drums of DDT ICI batch 40135 25% EC (10 full, 3 empty)	2000 litre
	DDT	MHMS Rural Water Supply shed- Ranadi, Honiara	4 cardboard boxes of 75Kg of DDT powder	300kg
	DDT	MHMS Rural Water Supply shed- Ranadi, Honiara		
1 May 1999	DDT	Munda	DDT cartons	400kg
1 May 1999	DDT	Gizo	DDT powder	4,000kg
POPs in PICs Phase 2 – Collection disposal and destruction of hazardous substances from PICs				
7 Nov 2002	PCB	SIEA, Honiara	Transformers	16 tested for PCBs using test kits
7 Nov 2002	PCB	SIBC, Honiara	Full capacitor drums	2 x 44 gal drums
22 Oct 2002	DDT	Tulaghi Malaria Shed	Empty DDT boxes and packets	Nil
24 Oct 2002	DDT	Auki Malaria Shed	DDT 75% WDP	577.5kg
28 May 2002	DDT	Buala Malaria Shed	DDT 75% WDP	230kg
7 Nov 2002	DDT	MHMS Honiara Shed	No DDT drums were found	Nil

[35] POPs in PICs Phase II GHD Pty Ltd, September 2009

3.3 Assessment of POPs Pesticides

A range of organochlorine chemicals were used in the Solomon Islands around the 1940s until the early 2000s on the plantations, rice farms and as vector control for malaria. Most were common pesticides of their time such as DDT, dieldrin, isobenzene, lindane, chlordane, hexachlorobenzene, 2,4-D, and 2,4,5-T.

HCB was used in the Solomon Islands on the rice farms of Okea and Ilu, North Guadalcanal in the 1960s and 1970s, to control aphids, caterpillars, plant bugs, grasshoppers, thrips, weevils and corn borers in the farms. BHC was also used as fungicidal insecticidal seed protectant containing a small percentage of mercury. It was applied as dust powder to a tin or packet of seeds and shaken until all the seeds were covered with a fine coat of the powder.

Records show that 20% gamma BHC emulsion as 'gammalin 20', 26% gamma BHC "Agrocide 26 BP" and 50% crude BHC containing 6.5% gamma BHC "Benzachlor" were used on the rice farms and supplied by R.C Symes Pty Ltd, an Australian-owned business.

DDT came to the Solomon's during the war around 1944 and remains the most used POP in the Solomon Islands to date. DDT use was abandoned in 2001 following global bans, but is still used for research purposes under the National Vector Borne Disease Control Program of the MHMS.

Under phase 1 of the POPs in PICs project, 8,200kg of DDT stockpiles were identified, however only 807.5kg were collected and destroyed. The missing pesticide (more than 7,000kg from the MHMS hardware shed Ranadi, and rural water supply shed Ranadi) was presumably sold to the general public for agricultural purposes, used for malaria control or simply dumped in the Ranadi landfill.

It is highly unlikely that other POPs pesticides such as aldrin, chlordecone, endrin, HCH, heptachlor, mirex, PCP, and toxaphene were ever used in Solomon Islands and have never been sighted or documented in any report. No further assessment of these POPs chemicals will be undertaken in this NIP. A detailed historical narrative of POPs pesticide use in the Solomon Islands is provided in Appendix 4.

3.3.1 Contemporary pest and pesticide management in Solomon Islands

Chemical use in agriculture is increasing and pesticides are often sold and used indiscriminately. A report commissioned by MAL under the SI Rural Development Program (RDP) in 2010 described pest and pesticide management in the Solomon Islands as being in a 'parlous' state[36]. The study identified the common pesticides (Appendix 5) that are available on the open market and accessible to local farmers, none of which are listed under the Stockholm Convention.

Surveys[37] of 30 farmers in Temotu and Western Provinces conducted in March and May 2016 by research officers of MAL, found that 65.5% of pesticides sold in Temotu were 'unknowns' used by 91% of the famers they interviewed (Figure 2).

Unknowns were defined as pesticides that farmers bought and knew nothing of as they were repackaged by the seller in unlabelled 350ml plastic bottles. In the Western Province, pesticide use was around 11%, however some farmers may have been reluctant to admit pesticide use. Of those who admitted using pesticides, 7% used Farmicon and 4% were using pesticides with non-English labels. The results would be typical of other Solomon Islands Provinces, with Malaita and rural Guadalcanal being the largest concentration of rural famers.

The overwhelming majority (99%) of farmers interviewed advised that they did not use personal protective equipment when applying chemicals to their crops.

[36] Sadanand Lal. Pest Management Plan Consultancy Report, MAL, SIRDP component 2, December 2010
[37] Presentation: Pesticide Survey in Temotu and Western Province. MAL Research. PRAC Meeting 27th May 2016

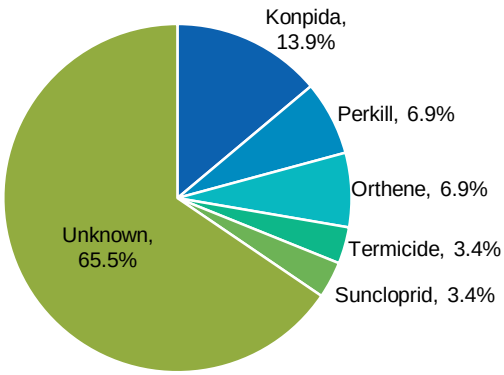

Figure 2: Survey of pesticide use in Temotu Province, March 2016

There are at least three main suppliers of pesticides in the country. Island Enterprise Limited, a local company that sources pesticides from Australia, New Zealand and PNG; Farmset Limited, a PNG owned venture that sources its pesticides from its parent company in PNG; and the Taiwan Technical Mission (TTM) which imports a lot of its pesticides from Taiwan. All these suppliers are accessible by local famers with provincial outlets, where most of these pesticides come in ready-to-use formulations.

The RDP Report found that no policy on pest and pesticide management exists, and farmers lacked access to good information. It also made the following recommendations regarding the future of pest and pesticide control in the Solomon Islands:

- Empower PRAC under the 'Safety at Work (Pesticide) Regulation Legal Notice No 60 of 1982' to regulate pesticides imported into the country
- Immediately install a national pesticide database giving amnesty arrangements to pesticides currently in the country
- Train pesticide inspectors from MAL to be conversant with the current regulation to effectively enforce pesticide regulation in the country
- Revise the current pesticide regulation and replace it with a new 'pesticide law' to improve the functions of pesticide legislation and bring better control on import, distribution, handling, sale and safe use of pesticides.
- Develop IPM for key crops planted in the country such as slippery cabbages, Chinese and ball cabbage, watermelons, beans and other crops where pesticides are applied readily
- Conduct basic pest management programs and train-the-trainer programs in all provinces to educate local farmers about pest identification, crop health basics, and pesticide application (dosage, frequency, use and handling)
- Establish a national IPM committee to develop relevant IPM policies.

To date, at least 20% of the above recommendations have been adopted, most notable was the reactivation of the PRAC in 2010 and its role to screen pesticides imported into the country. However overall, the future of pest and pesticide management in the Solomon Islands continues to languish, pending government commitment, support and prioritization. The PRAC continues to face difficulties in implementing its role including:

- The lack of participation by essential SIG ministries in PRAC meetings
- The illegal importation of pesticides and chemicals by certain companies and individuals. According to project surveys this is often the result of businesses becoming frustrated over delays in assessing import applications, choosing to pay penalties rather than run out of stock
- The unregulated and increasing number of outlets selling pesticides to the general public
- Officers responsible for the Pesticide Secretariat having other duties
- Lack of research facilities and land to do simple experiments on new pesticides including residual analysis.

In collaboration with stakeholders, the overhaul of chemical management must effectively include training, codification of chemicals under the Customs tariff system, and an efficient updating arrangement to keep track of convention changes as new chemicals are being declared.

3.3.2 Assessment of PCBs and polychlorinated naphthalenes

PCBs are industrial chemicals previously used as heat exchange fluids, in electric transformers and capacitors, and as additives in paint, carbonless copy paper, and plastics. All Parties have until 2025 to eliminate PCB-containing equipment, capacitors and other receptacles containing liquid PCBs that have as low as 0.005% PCBs in content and volumes greater than 50ml.[38] Polychlorinated naphthalenes were present as impurities in PCBs and are also released unintentionally during uncontrolled combustion of waste and are required to be managed as uPOPs.

Under the POPs in PICs project, 16 transformers were tested for suspected PCBs (including one from Gizo) using Dexsil Chlor-N-Oil 50 test kits. Initially, five tested positive but were later verified as false positives by Hills Laboratory in New Zealand. Two full drums of capacitors were also suspected of containing PCBs, however, they were not tested prior to being shipped with the rest of the consignment to Brisbane for destruction at BCD Technologies.

The Solomon Islands Broadcasting Service (SIBC), and the Solomon Islands Electricity Authority (SIEA) (now Solomon Power) are the main users of transformers and capacitors. Both organizations participated in the POPs in PICs Project and the NIP Project surveys. Both have confirmed that the use of PCB-containing oils was discontinued in the late 1980s when regional electrical companies ceased the importation and use of PCB-containing oils. The negative PCB results for the 16 transformers tested supports this claim.

Solomon Power, the country's only electricity supplier, now uses the *Mobilect Series 39*, from the reputable ExxonMobil Company for its transformers and switchgears. They use about 1,665 litres (440 gallons) annually. Many of the old transformers taken out of the grid were said to be stripped and sold to scrap dealers that export to Asia.

PCBs were widely used in electrical capacitors, which are most likely to be found in pre-1980 fluorescent light fittings. Further work is required during the implementation of this NIP to ascertain the presence or otherwise of PCB light fittings and other articles.

3.3.3 Assessment of POP-PBDEs, HBB, and HBCD

A number of the recently listed POPs may be present in firefighting foams or as composites of everyday products ranging from vehicle and furniture upholsteries, foams and mattresses, household cleaners and detergents, textiles and leather, dyes, and packaging. These chemicals are summarised below:

- Decabromodiphenyl ether: a flame retardant added to plastics in computer housings and in plastic coatings around cables and wires.
- Hexabromobiphenyl: a flame retardant used in the 1970s. It only had limited international use and is unlikely to be present in the Solomon Islands.
- HBCD: a common flame retardant added to polystyrene products used in the building industry for insulation and in soft furnishings and packaging products. These types of products are likely to have been imported into the Solomon Islands, but the presence of the flame retardant can only be established through laboratory testing.
- Hexabromodiphenyl ether and heptabromodiphenyl ether: flame retardants which were added to the housings of office equipment and computers.
- TBDEs and PBDEs: fire retardants contained in polyurethane foam of car seats, mattresses, plastic associated with the electronics industry.

None of these products are manufactured in the Solomon Islands, and all are imported, often from China and Japan.

[38] Stockholm Convention Annex A Part II (a) (i, ii, iii)

For example, a total of about 10,000 cars are imported into the Solomon Islands annually, including 4,000–5,000 used cars from Japan. Most cars are manufactured and registered before 2000 and could potentially be contaminated with a range of POPs chemicals such as TBDEs and PBDEs contained in car upholsteries (e.g. seats), and foam-moulded body parts.

The chemical additives potentially presented in the imported products are unable to be detected without the use of sophisticated techniques, and the only practical management option for suspect items in the Solomon Islands is to improve national waste and chemical management practices to dispose of these potentially contaminated goods securely. Additionally, many imported products, including food products, do not have proper labelling, and/or are not written in English, making safety and content details hard to deduce. A majority of the issues arising from the lack of management of these newly listed chemicals are due to the lack of enforcement of existing legislations, and current gaps and a clear coherent structure for managing chemicals in the country.

3.3.4 Assessment of PFOS, its salts, and PFOS-F

PFOS, its salts, and PFOS-F are industrial chemicals widely used in electrical and electronic parts, fire-fighting foam, photo imaging, hydraulic fluids, and in textiles for their water and oil repellent properties. They are also the unintended degradation product of certain chemicals. Stockholm Convention Parties must take measures to restrict the production and use of these compounds, and ultimately eliminate them when suitable alternatives are available, or promote research to develop safer alternatives[39].

The Solomon Islands does not manufacture PFOS and its related substances; the likely national sources are imported products containing the chemicals, including:

- firefighting foam used in fire extinguishers and at airfields
- electrical and electronic parts of some colour printers and photocopiers
- toner and printing inks
- paper and packaging
- textiles and upholstery
- coatings and coating additives
- rubber and plastics.

Island Enterprise Limited, one of Solomon Islands leading hardware suppliers and the only national business offering fire protection and equipment services to businesses and private houses, was found to use ABC dry chemical powder for the refilling of fire extinguishers for its customers which is sourced from China. ABC dry powder is a specialized fluidized and siliconized ammonium phosphate-based powder that is applicable for all Class A, B and C fires and is not PFOs. The Royal Solomon Islands Fire Service Department uses *Fomtec Aqueous Film Forming Foam (AFFF) 3%* promoted as biodegradable, and not having PFOs. However, there are extinguishers with no English label and mounted on certain public town buildings of Asian origin. The presence of PFOS in other sources is suspected and requires further investigation. It is also important that any environmental contamination caused by the past use of firefighting foams is assessed.

3.3.5 Assessment of unintentional POPs

Unintentional POPs (uPOPs) are formed as the result of incomplete combustion of materials containing chlorine, or as the by-products of chemical reactions, and include:

- polychlorinated dibenzo-p-dioxins and dibenzo-furans (dioxins)
- hexachlorobenzene
- polychlorinated biphenyls
- pentachlorobenzene (PeCB) hexachlorobutadiene (HCBD)
- polychlorinated naphthalenes.

[39] Stockholm Convention Annex B Part III 4 (a) and (c)

Under the Stockholm Convention, Parties must take measures to reduce the unintentional release of these chemicals, with the goal of continuous minimisation and, where feasible, ultimate elimination.

There are a number of potential sources of uPOPs emissions in the Solomon Islands (Table 9). Estimating the releases of uPOPs from these sources in accordance with the UNEP Toolkit,[40] requires national activity data (e.g. rate of production) for each source, which were not available during the preparation of the NIP. In lieu, a simpler qualitative discussion to identify priority uPOPs emission sources in the Solomon Islands is provided in the sections that follow.

Table 9: Potential priority sources of uPOPs emissions in the Solomon Islands

Source category	Activity
Waste incineration	▪ Medical waste incineration ▪ Waste wood & biomass incineration
Heat & power generation	▪ Fossil fuel power plants ▪ Biomass power plants ▪ Domestic cooking (biomass)
Production of mineral products	▪ Asphalt mixing
Transport	▪ 2- & 4-Stroke engines
Open burning processes	▪ Biomass burning ▪ Waste burning ▪ Accidental fires
Miscellaneous	▪ Drying of biomass ▪ Crematoria ▪ Smoke houses ▪ Dry cleaning ▪ Tobacco smoking
Disposal & landfills	▪ Landfills & landfill mining ▪ Waste dumps ▪ Composting
Contaminated sites & hotspots	▪ Accidental fires

National frameworks implemented by trained and empowered officials

A number of high-level strategies which explicitly address uPOPs management are required to successfully reduce uPOPs emissions at the national level. This includes development and enforcement of national policies, strategies, plans and legislation, and strengthening of institutional arrangements to support and promote best practice waste management, including uPOPs emission reduction. Regular collection, collation and release of data related to uPOPs management practices is also critical.

Improved public awareness and worker safety and training

Implementation of best practice occupational health and safety measures for formal and informal workers in the waste management sectors, and improved public awareness of the health impacts of uPOPs are priority management initiatives for national uPOPs reductions. This includes dissemination of information about resource recovery programmes that increase e-waste recycling and composting rates and reduce backyard burning.

[40] UNEP Toolkit for Identification and Quantification of Dioxins and Furans and Other Unintentional POPs

Open Burning

Open burning is by far the largest contributor to uPOPs emissions in the Pacific, contributing around 63% of the total reported emissions. Open burning includes uncontrolled burning of biomass (agricultural crop residues including sugarcane which may or may not have been treated with pesticides; forests; and grasslands); and waste (mainly domestic or municipal solid waste burned in landfills, dumps, backyards, public spaces).

The resulting uPOPs are primarily released directly to air and land, with indirect releases to water if rainfall washes away the uPOPs contaminated ash particles into receiving waters. Fires on open dumpsites and backyard burning (in backyards and public spaces) are still common occurrences, especially in areas that lack access to reliable waste collection services (SPREP, 2015).

Waste dumps are often burnt intentionally to reduce odours or vermin, or to reduce waste volume and create space for incoming waste. Open burning practices in the agricultural sector, such as slash-and-burn agriculture, are also still commonly practiced. A legislative ban on open burning is only currently in place in public areas around Honiara.

Open burning in the Solomon Islands would comprise landfill burning, residence and public waste burning, incinerators, accidental fires, forest burning and agricultural residue burning, biomass and wood burning.

Three percent of the 27,000 km^2 of total Solomon Islands land area is used for agriculture and devoted to arable and permanent crops. Fire is used for slash and burn practices, and forest and agriculture residue burning is a common practice of most local farmers and families.

Accidental fires are not a common occurrence on the Islands apart from the north Guadalcanal plain grasslands that has one or two incidences a year. Fires for food garden clearance however are common practice in the Solomon Islands.

Incineration of healthcare waste

Poor management of hazardous healthcare waste (including syringes, live vaccines and cultures, laboratory samples, body parts and fluids, and sharps) poses occupational and public health risks to patients, health workers, waste handlers, waste transporters and communities (SPREP 2013). In addition, healthcare waste disposal via low temperature incineration is estimated to be the second largest contributor to Pacific uPOPs releases, accounting for 17 % of the emissions reported by PICs in their NIPs.

Healthcare waste can contain high concentrations of organic (polyvinyl chloride and specific pharmaceuticals) and inorganic (saline solution and body fluids) chlorine that may alter combustion characteristics, and enhance PCDD/PCDF formation in lower temperature burns (UNEP, 2013). Under these conditions, stack emissions can include both “conventional” pollutants such as particulate matter, sulfur oxides, nitrogen oxides, volatile organic compounds and carbon monoxide, as well as dioxins and furans. The incinerator ash will also usually contain dioxins, furans and heavy metals. Progressive installation and enforcement of BAT technology for healthcare waste destruction (i.e. double incinerator chamber, and 850-1100°C incineration) is essential to minimise formation of dioxins and furans from this source in the Solomon Islands.

Apart from healthcare incinerators procured under the PacWaste Programme (2015), the Solomon Islands currently lacks BAT incineration facilities in most medical or waste departments. Customs authorities have also raised the issue of charitable donations from outside countries for Solomon Islanders, most of which are damaged, out dated and expired articles including chemicals and hospital drugs that are not suitable for use. Many of these imported items become unusable after a few months of arrival and end up as wastes compounding the issue.

Electrical Power Generation

Use of conventional fuel sources for power generation and heating results in emissions of uPOPs (primarily to the air) from a range of sources including fossil fuel power plants (including used oil);

household heating and cooking with biomass (wood, coconut husks/shells, and other biomass); and from household heating and cooking with fossil fuels (coal, oil, gas). Overall, uPOPs emissions from heat and power generation sources contribute approximately 10% of the total uPOPs emissions reported from Pacific Islands.

Power generation from fossil fuel remain the main source of electricity and power in the main urban centres of the country. Twelve percent of total households surveyed in the 2009 Census were connected to the national power grid. The national power demand in 2015 was 15MW with a national capacity of 31.8MW. Total fuel consumption a year to meet power demand is around 23 million litres a year. According to national census report of 2009, the main source of energy for household cooking is combustion of wood/coconut shells, (93% of the 91, 251 households surveyed). This is mainly due to the high cost of propane gas, high costs of imported food products, and is also due to the traditional 'motu and bonbon' being preferred to stove cooking.

The main source of energy for lighting in the Solomon Islands is the kerosene lamp which is used by 75% of all households. Twelve percent of households used electricity sourced from the main grid for lighting, and 9% got their energy from using solar panels. Solar power is becoming increasingly important for rural users to provide lighting and electricity of small electrical goods such as mobile phones; with some areas having a very high penetration, for example Rennell-Bellona, where solar energy is used by 75% of all households. With falling solar panel costs, the penetration of solar energy into rural areas can be expected to increase rapidly over the next decade.

Waste disposal

Waste disposal is not a source of uPOPs, but rather a pathway whereby uPOPs from other sources already present in the waste becomes concentrated and is released to air, water and land (UNEP, 2013). Based on the available data, waste disposal and landfilling contribute approximately 9% of the total reported uPOPs releases in Pacific island countries. Waste disposal to land, is the predominant method of solid waste disposal in the Solomon Islands.

In Gizo Township and Honiara, waste dumps have been upgraded to more sanitary landfills based on the semi-aerobic Fukuoka landfill method supported under JPRISM, while other Provinces still practice open dumping. Due to the upgrades, landfill fires on the Ranadi landfill have been reduced. In other provinces, landfill fires are very much the daily practice and should be quickly eliminated.

The Honiara landfill currently receives an average of around 100 tonnes of waste a day, up from the 30–50 tonnes/day received in previous years.

Solomon Islands also has a significant issue with the disposal and burning of plastic bags. Plastic bags come in as advertising paraphernalia and do not impose any cost the importer, which makes the situation worse.

It is particularly important that waste management practices are implemented to ensure that polystyrene packaging and building materials, leather, fabric, upholstery and carpets, floor polish, photographic film, denture cleaners, shampoos, paints, and carpet cleaners and fire-fighting foams are stored and disposed of safely. This will help ensure that wastes potentially containing HBCD and PFOS are contained and safely managed.

Improved management of E-waste

E-waste is discarded electrical and electronic equipment that is at the "end of its life" or is no longer suitable for use includes computers, printers, photocopy machines, television sets, washing machines, radios, mobile phones and toys (SPREP 2012). E-waste is made from sophisticated blends of plastics, metals, and other materials and may contain a range of hazardous substances including heavy metals (such as mercury, cadmium and lead), Brominated Flame Retardants (BFRs, including those that are listed under the Stockholm Convention) and other substances. Consequently, planned management and disposal of e-waste in the Solomon Islands is important for the maintenance of long-term community and environmental health.

The problem of e-waste generation is increasing rapidly due to the fairly recent introduction of television and mobile phones. The recent availability of cheap solar power systems has also meant that small consumer electrical goods with built-in batteries are becoming widespread in rural areas as they can be recharged from small solar systems. Falling costs of smart phones and tablet computers, which can be used for both communication and entertainment, mean that these items are increasingly common, particularly with the large rural population. An overview of e-waste generation in the Solomon Islands is provided in Appendix 7.

With the useful life of electronic equipment being around three years, significant quantities of e-waste are beginning to be generated: for example, it is estimated from import data of 2008–2016 that well over a million mobile phones have been imported into the Solomon Islands during this period, and some 35,000 computers. These items are easy to recycle, but the challenge is initially collecting them for export. This will require a dedicated system targeted at e-waste, and a clear pathway to communicate to the public that e-waste should be recycled.

Primary processing (i.e. dismantling) of e-waste before export will be required. No shredding of plastic cases or circuit boards, or burning of cables to remove insulation must take place, so as to minimise releases of uPOPs from the recycling operations. BFRs, typically of the PBDE class of chemicals, should not be widespread as electronic consumer goods in the Solomon Islands are a relatively new phenomenon. Furthermore, equipment compliant with the European Union (EU) Directive on Restriction of Hazardous Substances in Electrical and Electronic Equipment should not contain BFRs.

POPs of concern in e-waste are primarily deca-BDE, which is found in electronics and computers and high impact polystyrene, and Octa-BDE, which is found in wire and cable insulation (both styrene copolymers). However, much of the e-waste in the Solomon Islands is of recent origin; commercial penta-BDE and octa-BDE mixtures were banned within the European Union in 2004, and no new manufacture or import was allowed in U.S. after January 1, 2005. Thus, the commercial penta-BDE and octa-BDE mixtures have not been manufactured globally since 2004. With regard to commercial deca-BDE mixtures, their use in electrical and electronic equipment was phased out within the EU in mid-2008.

Public cigarette and cigar smoking

Total reported emissions of dioxins from sources including drying of biomass, crematoria, smoke houses, dry cleaning residues, and tobacco smoking account for 171 mg TEQ/year, or 0.2% of the total reported dioxin emissions from Pacific Island countries. Tobacco leaf naturally contains both organic carbon and chloride ions (regardless of the presence or absence of pesticide residues or chemical/flavouring additives in the tobacco) and consequently, as for any thermal process, smoking of cigarettes and cigars produces dioxins. Investigations of popular brands of cigarettes gave “emissions” of 0.1-1.0 pg I-TEQ/cigarette (Ball et al, 1990; Löfroth & Zebühr, 1992). Cigars are estimated to release higher dioxin emission of approximately 0.3 pg I-TEQ. Essentially, this means that dioxin intake from smoking could be up to one third of that coming from food, and smokers are likely to have a measurably elevated dioxin intake compared to non-smokers. Non-smokers are also likely to be exposed to dioxins from passive intake of cigarette smoke. Smokers also place themselves at significant health risk from the many other toxic and carcinogenic components present in cigarette smoke.

Public transport systems

With comparatively few private vehicles in the Solomon Islands, and much rural transport conducted by boat, the great majority of petrol and diesel related uPOPs emissions in the country come from the public transport sector:

- 4-stroke engines: there are few cars which are predominately in Honiara with a few in provincial centres; motorcycles are not common. Small generator sets with 4 stroke engines are common in rural areas.
- 2-stroke engines: predominant in small outboard motor engines which are widespread in rural areas for transport, as water transport is very common given the lack of rural roads and the large number of islands.

- Diesel Engines: found in light trucks (under 5t gross weight) and inter-island ships. There are very few heavy trucks, and these are in Honiara. Some earthmoving equipment and logging equipment are also present. The Maritime Division currently has a register of over 250 shipping vessels operating in the Solomon Islands.

Based on the available data:

- A total of about 10,000 cars are imported into the Solomon Islands annually, including between 4,000 and 5,000 used cars from Japan.[41]
- Over 250 shipping vessels are registered with the Solomon Islands Maritime Safety Administration. Diesel use in local shipping is estimated at 30 million litres per year.[42]
- Fossil fuel accounts for 30% of total import expenses for the country. More than 120 million litres of diesel and gasoline were imported in 2015.[43]

uPOPs emissions from transport (road and off-road vehicles) result from incomplete combustion of fuel in engines. The presence of dioxins in car exhaust was first reported in 1978, although the exact magnitude of dioxin in vehicles emissions remains uncertain. Worldwide, motor car emissions can account for up to12% of total national annual national dioxin emissions.

The levels of dioxins and furans in exhaust gases from vehicles depend on many factors including the type of engine, its maintenance condition and age, technologies of emission reduction applied (catalysts), type and quality of fuel (gasoline, diesel, heavy fuel oil, biofuel), driving conditions, and ambient conditions (UNEP, 2013).

Based on the available data, uPOPs emissions from transportation comprise about 0.1 % of total reported emissions, or 115 mg TEQ/year in the Pacific. A more detailed analysis of uPOPs emissions from the transport sector in the Solomon Islands cannot be completed due to the lack of detailed data.[44]

A coordinated approach is required to reduce uPOPs emissions from the transportation sector in the Solomon Islands. This should include promotion of BAT and BEP in the transportation sector, as well as strengthening relevant regulatory, monitoring, and enforcement frameworks to restrict older polluting vehicles, improve imported vehicle maintenance and reduce uPOPs emissions.

[41] SI Customs Data for 2014-2015 (PC-Trade) taken for imported vehicles.

[42] POPs survey estimate from vessel interviews taken by Mr Richard Konai, March 2016

[43] http://prdrse4all.spc.int/node/4/content/2010-2015-solomon-islands-fuel-imports-measured-volume-ltr-and-value-sbd, accessed 20/12/2017.

[44] The Statistics office, IRD transport division, Maritime Division and Customs were consulted for information sighted in this report. Information overall from these departments can further be improved and linked. Emissions data from MID or MECDM is not possible.

Table 10: Solomon Islands uPOPs management priority summary

No	uPOPs Chemical (listed alphabetically)	Use	Annex	Solomon Island Use	Action required	Chemical use
11	Hexachlorobenzene (HCB)	Pesticide	A & C	Used in the Solomon Islands in the 1960-1970's. Low ambient air concentrations and relatively high breast milk concentrations recorded in through the GMP. Recognised under the Customs Island tariff system	uPOPs Management	Previously used on the rice farms of Okea and Ilu, North Guadalcanal
12	Hexachlorobutadiene (HCBD)	Industrial chemical	A & C	Unknown	uPOPs Management	No longer internationally produced. HCBD was used as intermediate in the chemical industry
17	Pentachlorobenzene (PeCB)	Pesticide and Industrial chemical	A & C	Unknown	uPOPs Management	No longer internationally produced
19	Polychlorinated biphenyls (PCBs)	Industrial chemical	A & C	Recognised under the Customs Island tariff system. Low ambient air concentrations and breast milk concentrations recorded in through the GMP. Not used in electrical equipment in SI since 1980s	uPOPs Management	Used as heat exchange fluids, in electric transformers and capacitors
20	Polychlorinated naphthalenes (PCNs)	Industrial chemical	A & C	Unknown	uPOPs Management and Improved Waste Management	Combustion (primarily waste incineration) is considered the most significant current source. Releases from former uses (PCN or impurities of technical PCB) contained in landfills or old appliances (stockpiles) are plausible but difficult to assess
27	Polychlorinated dibenzo-p-dioxins (PCDDs)	By products	C	Low ambient air concentrations and breast milk concentrations recorded in through the GMP. Release inventories for dioxins and furans should be updated at least once every 5 years (Article 5)	uPOPs Management	There are 75 different dioxins. These chemicals are produced unintentionally due to incomplete combustion, as well during the manufacture of pesticides
28	Polychlorinated dibenzofurans (PCDFs)	By products	C	Low ambient air concentrations and breast milk concentrations recorded through the GMP. Release inventories for dioxins and furans should be updated at least once every 5 years (Article 5)	uPOPs Management	There are 135 different types of furans. These chemicals are produced unintentionally due to incomplete combustion, as well during the manufacture of pesticides

3.3.6 POPs stockpiles and contaminated sites

POPs use in the Solomon Islands, especially DDT, was concentrated on the island of Guadalcanal during the Second World War. After the war, DDT was used during the establishment of rice farms and in the ongoing effort to eradicate Malaria. Malaria eradication programs also took place in the other provinces. Figure 3 depicts the immediate area where rice developments on Guadalcanal occurred, namely in Okea, Ilu and Matepona. Aerial applications meant the entire area was exposed to DDT during operations in the 1960s and 1970s. To date, this area is partly used for oil palm cultivation and the rest is largely undeveloped.

Other stockpiles and contaminated locations of interest are the malaria sheds used to store DDT and malaria control chemicals in other provinces, which were identified under the POP in PICs Project:

- Matepona Pesticide Shed, North Guadalcanal
- Ranadi Health warehouse, Honiara
- Randi, Rural Water Supply Shed, Honiara
- Tulaghi Malaria Shed
- Buala Malaria Shed
- Forestry Shed, Munda
- Auki Malaria Shed

Many of these buildings still exist and some are still in use. Some of the properties have been further developed and new houses erected in the same area. However, no DDT or other POPs chemicals have been recorded as being present anymore, as most were removed during the POPs in PICs Project.

There are no regulations or guidelines to protect or manage these sites, no remediation has ever been done, and other than the *POPs in PICs* activities, there has been no further sampling or study to measure potential POPs residual contamination or releases.

Solomon Islands also has issues with the lack of management of old chemical stockpiles in many of its boarding and secondary schools, and hospitals.

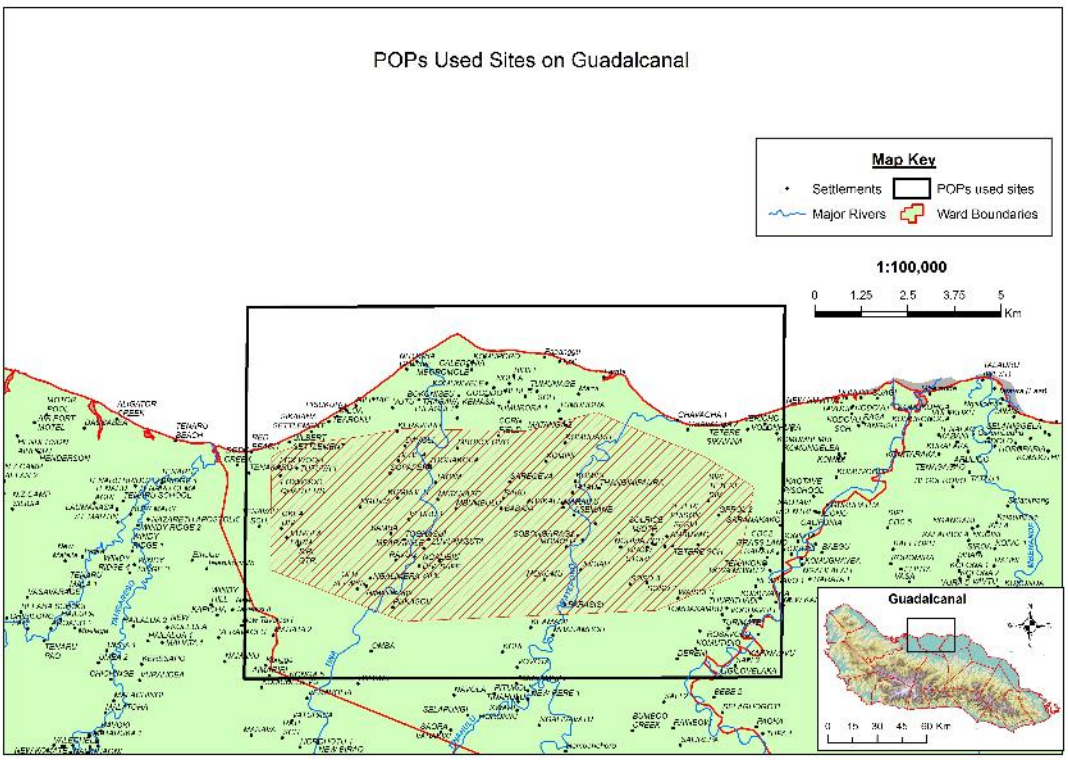

Figure 3: Area of historical POPs use on North Guadalcanal

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

DDT

Solomon Islands has worked on several intervention policies and strategies for combating malaria over the years including insecticide treated nets, indoor residual spraying, larval control, integrated pest management (IPM), diagnosis, treatments and surveillance. In 2013 for example, 0.12% of the 18,404 confirmed cases of malaria led to deaths.[45] The estimate however including unreported confirmed cases was put at between 35,000-49,000 with an estimated <50% deaths.[45]

The current decline in the effectiveness of the use of the pyrethroid lambda-cyanohalothrin for malaria vector control may warrant the limited reintroduction and use of DDT for targeted malaria control activities. This would require notification of the Stockholm Convention Secretariat for placement on the DDT register.

uPOPs

Future releases of uPOPs are expected to decline due to ongoing regional and national efforts, including:

- the regional GEF-PAS POPs Reduction Project (section 3.2.1)
- the national waste management program which includes the endorsement and implementation of the NWMPCS to complement the NIP and provide broader interventions to improve waste and chemical management
- National activities directed by the NIP uPOPs Action Plan
- Solomon Islands' alignment with the regional *Clean Pacific Strategy 2025.*

3.3.8 Existing POPs monitoring programmes

The first Global Monitoring Plan on POPs Project (GMP1) was developed to enable the effectiveness of the Stockholm Convention to be evaluated. GMP1 supported the collection of comparable monitoring data on the presence of POPs in various regions in the world including Oceania, in order to identify changes in their concentrations and regional and global transport patterns over time.[46]

GMP1, which occurred between September 2009 and January 2011, involved the collection and analysis of samples from human milk and ambient air. The GMP1 results for the Solomon Islands is presented in Table 11.

The results of GMP1 sampling in the Solomon Islands (UNEP 2015) revealed:

- relatively high concentrations of chlordane (12.3 pg/m^3) and DDT (604-1930 pg/g m^3) recorded in ambient air samples around Honiara, Munda, and Lata.
- relatively low concentrations of PCDD/PCDFs (nd-9.0 fg/m^3), PCBs (3.7-19.8 pg/m^3) and HCB (10.1-13.8 pg/m^3) recorded in ambient air samples.
- relatively low concentrations of PCDD/PCDFs (40.6 pg/g fat) and PCBs (4 ng/g fat) recorded in human breast milk samples.
- relatively high concentrations of heptachlor (0.5 ng/g fat); Beta-HCH (4.9 ng/g fat) and HCB (15.9 ng/g fat) recorded in human breast milk samples.
- very high concentrations of DDT (4316 ng/g fat; (sum 6 DDTs)) recorded in human breast milk samples.

The high DDT concentrations detected are likely a legacy of the historical use of DDT in the Solomon Islands. DDT levels detected in 2011 in human breast milk samples in the Solomon Islands were third

[45] www.who.int/malaria/publications/country-profile_slb_en.pdf, accessed 6/5/16
[46] http://chm.pops.int/Implementation/GlobalMonitoringPlan/Overview/tabid/83/Default.aspx, Accessed 22/4/2016

highest in the world behind Tajikistan (about 8,000 ng/g fat, measured in 2009), and Ethiopia (about 11,000 ng/g fat, measured in 2012) where DDT is still used to prevent malaria-related deaths.[47]

Table 11: GMP1 results for Solomon Islands

POPs	Concentration in air	Concentration in human milk
Aldrin	<LOQ	<LOQ
Chlordane	< LOQ – 12.3 pg/m^3	<LOQ
DDTs, sum of 6 isomers	604.5 – 1929.9 pg/m^3	4316.5 ng/g fat
Dieldrin	11.1 – 45.0 pg/m^3	1.0 ng/g fat
Endrin	<LOQ	<LOQ
Heptachlor	<LOQ	0.5 ng/g fat
HCB	10.1 – 13.8 pg/m^3	15.9 ng/g fat
Mirex	<LOQ	ND
PCDD/Fs, sum of 17 isomers	ND – 9.0 fg/m^3	40.6 pg/g fat
PCBs, sum of 6 isomers	3.7 – 19.8 pg/m^3	4.0
Beta-HCH	<LOQ	4.9 ng/g fat
Gamma-HCH	<LOQ – 11.6 pg/m^3	0.7 ng/g fat

LOQ = less than the limit of quantification; ND = not detected

Source: UNEP (2015). *Global monitoring plan for persistent organic pollutants: Second regional monitoring report Annex – Asia-Pacific Region*, Geneva, Switzerland.

A second round of the 4-year GMP on POPs project (GMP2), funded by GEF and implemented by UNEP, commenced in 2016. GMP2 will include the new POPs and examine new sampling matrices including surface waters, fish and a national sample to be identified by each country.

3.3.9 POPs information, awareness, education, and communication

The key target recipient groups for POPs information include farmers and the agricultural sector, importers, government line ministries, and consumers. As POPs chemicals are a relatively new topic for many, there is a generally low level of awareness across the target groups. The lack of an effective national chemical management system, poor prioritisation by supporting agencies such as the PP Board and PRAC, and outdated legislation indicate that chemical management in general is a low national priority, and indicates the probability of a low level of awareness among stakeholders.

The experience of the NIP project indicates that stakeholder government Agencies need to fully understand the issue of POPs and their impact on the human populous and environment and the social and economic impacts. Better awareness at the government level would mean better awareness at the public level and for Solomon Islands, immediate target groups must be the very stakeholder ministries and agencies, institutions, businesses who will be tasked to manage POPs. NGOs and Church groups should also be part of this. Second to the need to understand POPs, is the importance to collaborate and network the same line ministries and agencies to appreciate and understand their role in managing POPs, which categorically would require allocating budget support for POPs work, exploiting outside funding opportunities, sharing of man power and training opportunities, raising awareness and understanding their roles in the issue.

Communicating the importance of chemicals and POPs management will require the translation of highly technical subject matters to a population with a low literacy rate of about 20%. Radio, video, and pictures

[47] UNEP, 2017, *Second global monitoring report - Global monitoring plan for persistent organic pollutants*, Geneva, Switzerland.

seem to be the favoured methods for national POPs outreach. Long-term awareness strategies will have to involve working with schools and school curriculums.

The MECDM have previously received enquiries on POPs from foreign governments through their respective embassies and consulate offices in Honiara. This channel of communication would be an ideal mechanism of information exchange with other countries. In the Pacific regional context, Solomon Islands and the rest of the PICs are connected directly or through regional organisations such as the SPREP, where information and data can be accessed and shared in a coordinated fashion.

3.3.10 Relevant activities of non-governmental stakeholders

NGOs in the Solomon Islands focus mainly on social development issues, and the elevation of people's livelihood contributing towards overall national development. For a capacity-constrained country like Solomon Islands, NGOs are valuable partners to assist with disseminating information to the grass-roots level and implementing activities on the ground. NGOs can also help to identify the perceptions of the stake-holder groups on how decisions and policies can best be tailored to benefit them.

NGOs in the Solomon Islands include church-based groups, special interest groups, community-based and broad-based development organizations. Their spheres of influence are quite diverse and cover a number of sectors in the economy and government departments including commerce, agriculture, trade, and the environment, family planning, domestic violence, forestry, marine conservation, youth issues, women's issues, community peace building, and water and sanitation.

The Kastom Garden Association (KGA) and Zai Na Tina Organic Farm are two NGOs that have been particular active with the NIP development. Both promote food security through grass-root approaches emphasising sustainable organic and natural methods of farming. Both discourage the use of chemicals for managing pests on crops and try to help famers with alternative treatments. They also provide project monitoring and evaluation, assist farmers with marketing and value adding of local products, small livestock, facilitate partnership programs with government agencies and local groups[48].

As agricultural practices intensify to cope with a growing population, greater collaboration and partnership with the relevant NGOs will become increasingly important to ensure that the right messages about chemicals management best practices get to the right people.

3.3.11 Technical infrastructure for POPs

Solomon Islands does not have national infrastructure and technical capacity to test for POPs chemicals, nor with the exception of GMP and DDT related work is there any POPs research and development activities being completed in-country.

The leading laboratory is the NPHL owned and operated by the government through MHMS, but its capabilities are limited to elemental analysis, water quality and food analysis. The facility currently houses an atomic absorption spectroscopy instrument that is in need of ongoing maintenance.

Private laboratories are very few, and lack equipment that is needed. Typically, private laboratories rely on presumptive kits and portable equipment. The Solomon Islands National University (SINU) is also in its early stages and does not offer courses in the physical sciences. However, the NPHL and SINU would be platforms to build for the future of POPs analysis in the Solomon Islands.

Advanced analyses that cannot be done locally are typically conducted in Australia, New Zealand or Fiji. This is the case for medical samples and services required from time to time by the ECD/MECDM for a number of environmental monitoring requirements. Current and previous analyses of POPs concentrations have also been conducted at foreign laboratories under the GEF funded GMP projects.

[48] http://kastomgaden.org/about/what-we-do/ [Accessed 7/6/2015]

For immediate POPs analysis, it would be best for the Solomon Islands to utilise the POPs analysis services available in neighbouring countries and institutions such as the University of the South Pacific in Fiji, and the University of Papua New Guinea in Port Moresby in PNG. This approach is being actively pursued, particularly between Solomon Islands and PNG, through the current regional POPs programs. It would take several years to develop the technical POPs analysis capacity in the Solomon Islands, and a cost benefit analysis needs to be completed on the best way to undertake testing for POPs in the country.

3.3.12 Identification of impacted populations or environments

Once released into the environment, POPs disperse geographically, remain intact in the environment for long periods, and accumulate in living organisms including food sources. Because of these properties, the general population of the Solomon Islands are potentially at risk from the impacts of POPs. Specific populations facing higher exposure risks include:

- Former and current waste management field staff (e.g. Honiara landfill staff)
- Former workers who handled DDT before it was phased-out
- Persons who reside, work or are otherwise in close proximity to waste landfills and dumps
- Breast feeding mothers and their babies
- Smokers and those exposed to second-hand smoke
- Persons living close to busy roadways.

Based on the historical accounts of DDT use, impacted populations and sites from this specific chemical are likely to be located in the North Guadalcanal areas towards Honiara and the old malaria sheds in the provinces (section 3.3.6). These sites require further investigation.

There have been unconfirmed reports of former DDT workers employed during the 1970s and 1980s exhibiting medical symptoms of DDT exposure.

Unregulated waste disposal such as rubbish burning exposes the public to pollutants and toxic emissions and their subsequent health impacts warrants action. This intervention should aim to minimise the exposure of Solomon Islanders to uPOPs sourced from open burning, waste incineration, power generation, cigarette smoking and transportation exhaust emissions.

Solomon Islands have an epidemic with NCDs occupying 70% of hospitalized patients. While diet and physical activity have been promoted as the main causes of NCDs, food analysis should extend to looking at possible additional impacts of pesticides and chemicals on food quality and health given the relative lack of regulation of pesticide and chemical usage in the country.

3.3.13 Relevant system for assessment and listing of new chemicals

The role, operation, and challenges of the PRAC and the PP Board in evaluating and regulating the import of pesticides, and drugs and poison respectively, has already been discussed in section 2.2.3 of the NIP.

The Customs and Excise Division recently introduced the Automated System for Customs Data (ASYCUDA) for registering the import and export of goods. This web-based, universal system, is intended to streamline and simplify import and export processes (manifests, customs declarations, etc).

ASYCUDA will contribute to improving the current tariff system for documenting products and items coming into the country. The current system is very general with reference to chemicals and there is need for greater improvement in the codification of chemical products coming into the country to assist future inventory and assessment efforts.

4. Strategy and Action Plan

4.1 Policy Statement

The Solomon Islands Government recognises that:

- economic development will likely lead to an increase in the importation of chemicals and articles potentially containing POPs
- improperly managed, chemicals will potentially have immediate and prolonged adverse impacts to the national environment and health of Solomon Islanders
- chemical management is an increasingly important sustainable development issue and an overarching responsibility that must be understood, accepted and integrated into Solomon Islands' national strategies and policies
- as a member of the global community, it has a responsibility to implement measures to reduce POPs and manage other chemicals of toxic nature that are used, manufactured or transited within its borders, and where appropriate, relies on the assistance of the wider global community and program partners to help address this challenge
- there are linkages between sound chemicals management and a healthy economy; as such, the NIP must build upon existing regulatory structures and identify how they can be realistically streamlined and improved to support Solomon Islands' development needs and aspiration.

Faced with these realities, the Solomon Islands Government believes that a core focus of the NIP must be to improve the management of all chemicals in the country, and in particular POPs chemicals, in order to protect human health and the environment. To this end, the Government endorses this NIP to reaffirm its commitment to addressing the national management of POPs in accordance with its obligations under the Stockholm Convention.

Timely implementation of the actions and priorities in the NIP in partnership with stakeholders will contribute to progress under the National Development Strategy (NDS) 2016-2035, which calls for:

> *"sustained and inclusive economic growth, poverty reduction, quality health and education for all, environmental sustainable development and stable government; and*
>
> "*improving the healthcare system of the country and upholding measures against environmental degradation*."

4.2 Implementation framework

The NIP implementation strategy is outlined in Figure 4. It includes:

- upgrading the existing NIP National Coordinating Committee to a National Chemical Management Committee to guide NIP
- establishment of a National Chemical Unit within Environment and Conservation Division, MECDM as the National Focal Point for chemicals management.

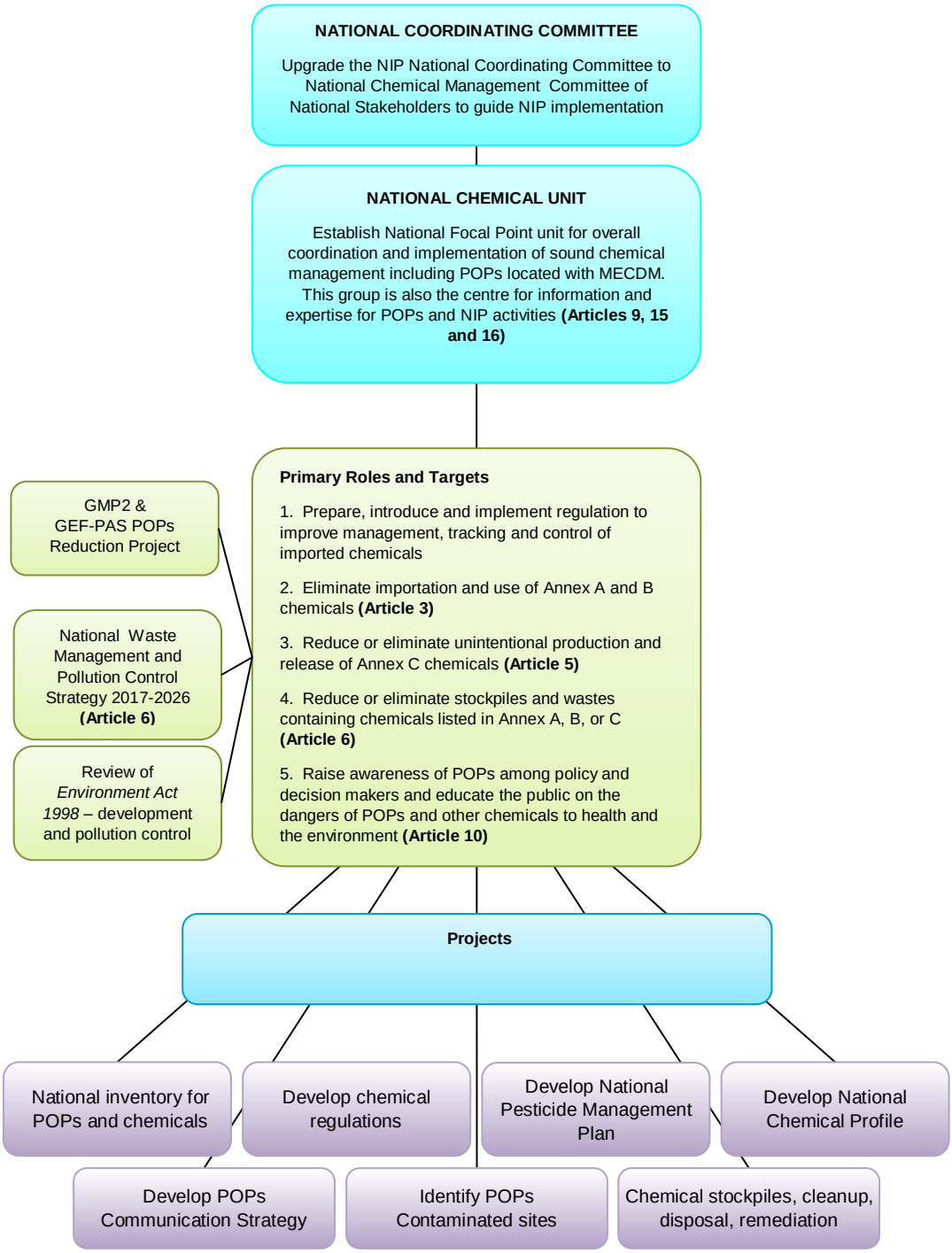

Figure 4: NIP implementation framework

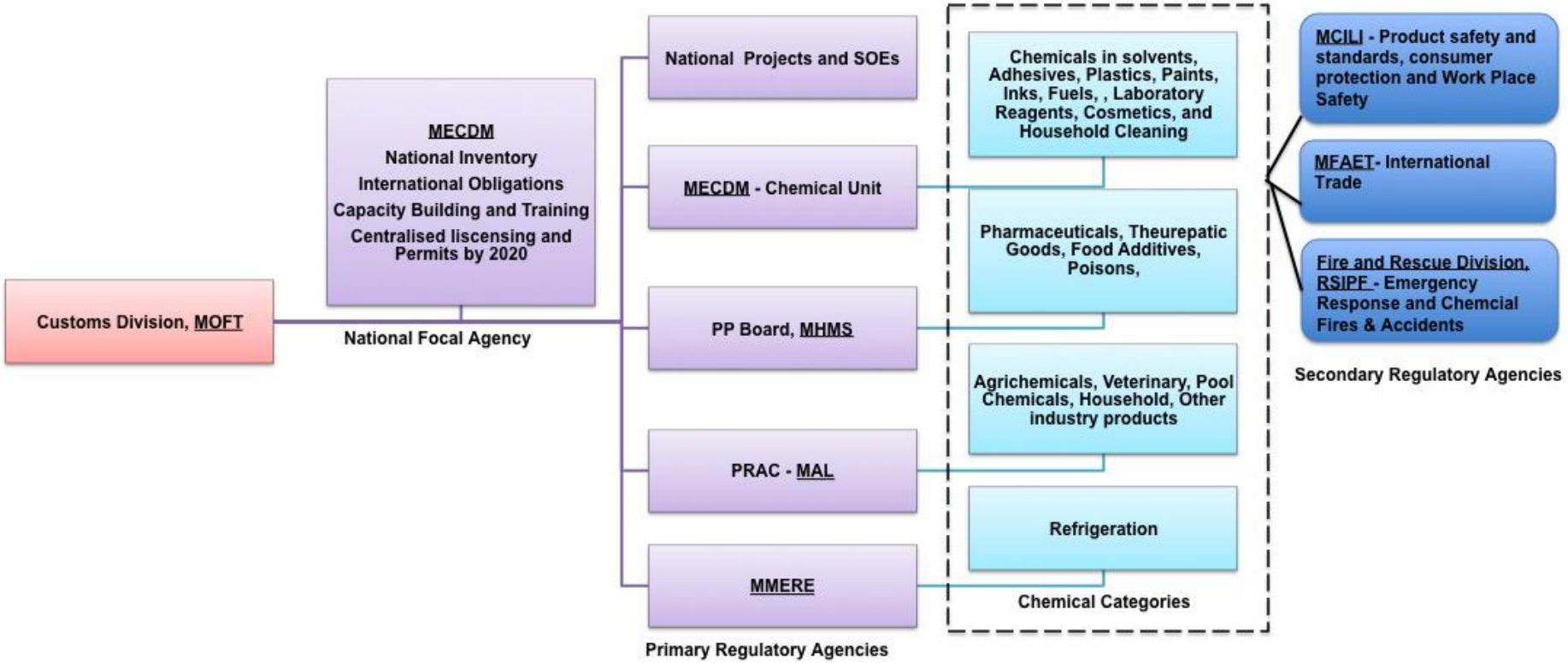

Figure 5: Overview of proposed national chemical management framework

4.3 Action Plans

Eleven Action Plans (AP1 to AP11) totalling approximate USD15.8 million have been identified in this NIP, to enable the Solomon Islands Government to meet its obligations as a Party to the Stockholm Convention (Table 12).

Implementation of certain actions under this NIP is expected to provide detailed data on POPs in Solomon Islands, which in turn will be used to inform other actions. As such, this NIP is a living document, and the costed Action Plans will be updated during implementation as necessary. Prior to implementing an activity, the projected activity cost will be adjusted, to account for the prevailing costs of goods and services.

As part of the annual work planning and budgeting process, the MECDM-ECD will select relevant action plan items to be implemented in the financial year, and endeavour to incorporate these items into its annual work programme and budget. Where external funding assistance is necessary due to lack of national funding, the MECDM-ECD will prepare funding proposals with assistance from regional organisations including SPREP and SPC, to be submitted to the donor community.

Table 12: Summary of action plans to implement the NIP

Action plan	NIP component	Cost (USD)
AP1	Institutional and regulatory strengthening measures	1,670,080
AP2	Management of modern agro-Chemicals	380,800
AP3	Identification and disposal of PCBs and equipment containing PCBs	68,000
AP4	Limit national use of DDT to malaria control	400,000
AP5	Identification and appropriate management of contaminated sites (Annex A, B and C Chemicals)	2,141,200
AP6	Identification and appropriate management of PFOS and PFOS-F	400,000
AP7	Identification and appropriate management of fire retardant (deca-BDE, HBCDD, hexaBDE and heptaBDE, tetraBDE and pentaBDE) containing wastes including e-wastes	1,100,000
AP8	Releases from unintentional production of PCDD/F, HCB, PCBs	930,000
AP9	Public awareness, information and training	642,000
AP10	Monitoring, research and development	811,600
AP11	Implementation and Reporting	9,520
Total Government contribution to action plan costs		**8,553,200**

4.3.1 AP1: Institutional and regulatory strengthening measures

Convention requirements

Articles 3, 4 and 5 of the Stockholm Convention require each Party to prohibit and/or take legal and administrative measures, one or more regulatory and assessment schemes necessary to eliminate Annex A chemicals.

National context

Regulatory frameworks are crucial for the control of chemicals in Solomon Islands and administrative systems are required to be established to administer the import, export, formulation, distribution, sale, use and disposal of chemicals.

Agrichemicals (pesticides), poisons and pharmaceuticals are covered to some degree under the *Safety at Work Act 1982*, and *Pharmacy and Poisons Act 1961* and would apply for most Annex A and B listed POPs. The *Environment Act 1998* has control over the production or manufacturing of industrial chemicals and pesticides (fertiliser), which can be triggered with developments suspected of involving POPs. The institutional and regulatory framework for managing POPs and chemicals in the Solomon Islands is fragmented. There is currently no specific legislation for POPs, and legislation needs to be expanded to cover the entire chemical life cycle from import to disposal.

Implementation partners

A National Chemical Unit established within MECDM-ECD will serve as the National Focal Point and work in partnership with primary stakeholders, MHMS and MAL. The National Chemical Unit would report to a national stakeholders body—the National Chemical Management Executive Committee (NCMEC)—to guide all NIP and related national chemical management activities.

Action plan

Goal	Objectives	Activities
1. To implement regulatory and administrative measures to manage chemicals and eliminate Annex A chemicals in Solomon Islands	1.1. Improve oversight and operational aspects of chemical management	1.1.1. Establish a National Chemical Unit within MECDM to serve as National Focal Point
		1.1.2. Establish a National Chemical Management Executive Committee of National Stakeholders
		1.1.3. Prepare a National Chemical Profile
		1.1.4. Provide training to regulatory agencies and officers on relevant legislation and powers for enforcement and monitoring
		1.1.5. Establish a centralised system for licensing and permits for chemical imports
	1.2. Establish a comprehensive legal and administrative system to manage all chemical related issues in the Solomon Islands	1.2.1. Create new legislation and regulations to control the importation of chemicals
		1.2.2. Create new legislation and regulations to improve management (transport, storage, application and disposal) of imported chemicals
		1.2.3. Implement Solomon Islands Customs Tariff codification for all imported chemicals (including POPs)
		1.2.4. Ban the production, use and import of Stockholm listed chemicals

Goal	Objectives	Activities	
Objective	**Projected Cost (USD)**	**Projected Cost (SBD)**	**Timeframe**
1.1	1,425,280	10,480,000	2018-2022
1.2	244,800	1,800,000	2018-2021
Total	**1,670,080**	**12,280,000**	

4.3.2 AP2: Management of modern agro-chemicals

Convention requirements

Article 6 requires Parties to take measures to reduce or eliminate releases from stockpiles and wastes of, or containing chemicals listed in Annex A including products and articles upon becoming wastes, including their proper handling, collection, transport and storage.

National context

Unwanted chemicals present an ongoing, potential threat to the natural environment and to the health of the Solomon Islands people. These threats need to be effectively managed in an integrated way to prevent adverse health and environmental impacts.

Importation of agro-chemicals is regulated under the *Safety at Work Act 1982*, administered by MAL. The scope of this regulation is limited to the workplace; and the penalties applied are minimal and often ineffective in deterring illegal imports. Once purchased, the handling, use, and safety of these chemicals are left to the end-user who are often village farmers with limited understanding of the adverse consequences of mismanagement. There are also issues with enforcement of existing regulations, and regulation of pesticide outlets.

An important recommendation is to develop national opinion on the concept of centralising chemical permits and licensing for imports, a secondary tier system for control of pesticide imports which would also provide efficiency for businesses (this is allocated under AP1).

Implementation partners

MECDM and MAL will work in close collaboration with Customs, MCILI, NGOs and the private sector.

Action plan

Goal	Objectives	Activities
2. To ensure an effective and robust control mechanism is in place for national management of agrochemicals	2.1. To establish an organized and effective national regulatory system for pest and pesticide management	2.1.1. MAL to establish a separate unit for national pest and pesticide management
		2.1.2. MAL to develop regulations (under *Safety at Work Act 1982,* ss. 28 and 9; and *Consumer Protections Act 1995,* Part III ss. 12 and 13 and Part IV) for pesticide sales and distribution and fines to expand and strengthen monitoring and enforcement of retailers and the public
		2.1.3. MAL to establish licensing and certification schemes and reduce number of outlets selling pesticides
		2.1.4. MCILI to ratify the ILO Convention concerning Safety in the use of Chemicals at Work

Goal	Objectives	Activities
		2.1.5. MECDM/MAL to develop a national protocol for unwanted agro-chemical collection, storage and disposal procedures and protocols including development of a harmonised Penalty Unit System developed under the *Penalties and Miscellaneous Amendments Act 2009* to improve control of disposal of unwanted chemicals

Objective	Projected Cost (USD)	Projected Cost (SBD)	Timeframe
2.1	380,800	2,800,000	2018-2021

4.3.3 AP3: Identify and dispose of PCBs and equipment containing PCBs

Convention requirements

- Annex A part 2 (a) states that all PCBs in equipment (transformers, capacitors or other receptacles containing liquid stocks) are to be eliminated by 2025
- Annex A part 2 (b) asks parties to take measures to reduce exposures and risks of PCB use including the use of non-leaking equipment, and prevent use in areas of food processing, and near schools and hospitals
- Parties are required to report after every 5 years to COP on the progress of eliminating PCBs

National context

PCBs were once widely deployed internationally as dielectric and coolant fluids in electrical apparatus, carbonless copy paper and in heat transfer fluids. PCBs are probable human carcinogens and can cause endocrine disruption.

PCBs were suspected of being used in SI prior to the 1990s though this has not been verified under the POPs in PICs project. Many of the old transformers used in the country were stripped and sold to scrap metal dealers, which were shipped overseas. SI does not use power transformers containing PCBs dielectric fluids. However, a comprehensive review is required to fully cover all potential sources of PCBs. The Solomon Islands has been known to import waste oil, for example a 500-tonne shipment in 2015 from PNG that is still in country and is a potential source of PCBs.

Implementation partners

MECDM to work closely with SI Customs, MMERE and lead companies such as Solomon Power, GPPOL, NFD, GCIL to develop PCB guidelines and operations manuals and training opportunities.

Action plan

Goal	Objectives	Activities
3. The total elimination of all PCBs and PCB containing equipment from Solomon Islands	3.1. Information is available to guide the national management of PCBs and PCB containing equipment	3.1.1. Complete a national inventory of PCBs and PCB containing equipment
		3.1.2. Develop national PCB guidelines and management guidelines
		3.1.3. Facilitate national inventory training covering the use, identification, management and disposal of PCBs and PCB containing equipment for Government Agencies

Goal	Objectives	Activities	
Objective	**Projected Cost (USD)**	**Projected Cost (SBD)**	**Timeframe**
3.1	68,000	500,000	2018-2020

4.3.4 AP4: Limit use of DDT to malaria control

Convention requirements

With respect to DDT, Article 3 requires Parties to ban or take legal or administrative measures to restrict its production and use to an acceptable purpose, which is limited to disease vector control under WHO recommendations and guidelines and when alternatives are not available. The Stockholm Convention Secretariat must be notified of such use.

Under Annex B-Part II (4), Parties who use DDT must report every 3 years to the Secretariat and WHO, information on the amount used, the conditions of such use and its relevance to the Party's disease management strategy.

National context

DDT has been used successfully in past control of malarial mosquitos during the 1980s and 1990s. However, human breast milk sampling and ambient air surveys under GMP1 have found that the Solomon Islands has some of the highest environmental concentrations of DDT in the world.

In the Solomon Islands, contemporary DDT alternatives have focused mainly on the use of pyrethroids, cypermethrin and deltamethrin for impregnation of long lasting insecticidal nets and on lambda-cyhalothrin for indoor residual spraying. However, malaria cases continue nationally, prompting calls by local experts for the return of DDT to complement treatments for nets and indoor spraying. It is thought that the ineffectiveness of pyrethroids is due to resistance caused by the oversupply of other insecticides (deltamethrin, cypermethrin, lamda-cyhallothrin, bifenthrin, permethrin) through over the counter sales. There are also indirect concerns over the impact of pesticides on other cimex species such as bed bugs which are a problem in the country. DDT though toxic, is stable and has prolonged effectiveness compared with common pyrethroids.

Implementation strategy

MECDM as focal point in strong collaboration with VBDCP, MHMS and MAL, NGOs and WHO.

Action plan

Goal	Objectives	Activities
4. Rigorous data is available on which to base future informed decisions on DDT vector control options	4.1. Undertake studies and derive a national position on effective vector controls for malaria	4.1.1. Undertake a review of the scientific and medical literature connected with the efficacy of different malarial control strategies
		4.1.2. Provide scholarship funding for local candidates to undertake a historical analysis of the impacts of DDT application in the Solomon Islands
		4.1.3. Establish a national position on the future of DDT use for malaria vector control
		4.1.4. Notify the Stockholm Convention Secretariat of the national position, if appropriate

Goal	Objectives	Activities
	4.2. Develop and implement a well-coordinated and integrated programme for malaria control based on BAT and BEP	4.2.1. In selected rural settings, commence statistically valid, pilot environmental management programs for mosquito control based on the review findings and expert opinion
		4.2.2. Implement routine chemical management training for malaria control workers

Objective	Projected Cost (USD)	Projected Cost (SBD)	Timeframe
4.1	150,000	1,103,000	2018-2020
4.2	250,000	1,838,000	2018-2022
Total	**400,000**	**2,941,000**	

4.3.5 AP5: Identification and appropriate management of contaminated sites

Convention requirements

Article 6 of the Stockholm Convention requires Parties to:

- identify contaminated sites containing chemicals listed in Annex A, B (including DDT) and C and their proper management
- ensure contaminated sites are remediated in an environmentally sound manner.
- identify products and articles that may contain chemicals listed in Annex A and B so that their wastes (or end of life materials) are managed properly (and do not contribute to future environmental contamination).

National context

The Solomon Islands has a long history of use of POPs in general and DDT in particular. Given the extent of contamination of local environments by DDT that has been detected under the GMP1, urgent action is needed to minimise further releases of DDT and other POPs to local environments. The long half-lives and the relative mobility of POPs chemicals in the environment make management of POPs contaminated sites in the Solomon Islands an imperative.

Implementation partners

The MECDM will work closely with MHMS, MAL, NPHL and town municipalities and provincial centres to ensure harmonisation of efforts across sectors with waste and chemical management programs.

Action plan

Goal	Objectives	Activities
5. Sound management of chemicals to minimise and ultimately eliminate risks to human health and the environment	5.1. Strengthen institutional capacity for POPs detection and management	5.1.1. Train Government Officers to identify and manage contaminated sites and chemical stockpiles
		5.1.2. Procure one GC-MS/MS/ pesticide residual analyser preferably AGILENT/ SCHIMADZU/THERMO SCIENTIFIC branding to equip the NPHL with pesticide analysis and POPs detection capabilities

Goal	Objectives	Activities
associated with legacy and contemporary POPs	5.2. Identify and prioritise contaminated sites and prepare management plans	5.2.1. Develop a standardised contaminated site management plan to manage the risks associated with agriculture, residential, commercial and industrial developments on contaminated sites
		5.2.2. Develop a national 'contaminated site registry' to centralise information on sites potentially contaminated with POPs and other chemicals
		5.2.3. Complete nation-wide surveys of chemically contaminated sites and prioritise remediation works
		5.2.4. Undertake national sampling of former DDT storage sites and contaminated areas and prioritise remedial measures nationally
	5.3. Safely dispose of hazardous wastes, obsolete chemicals and POPs	5.3.1. SIG (MHMS) to explore opportunities with suppliers and manufacturers of mosquito nets on disposal/recycling programs for safe retrieval and disposal of used long lasting insecticidal nets through international organisations like WHO by 2020
		5.3.2. Implement public awareness programmes on the identification of, and hazards associated with contaminated sites, and the safe disposal of chemicals
	5.4. Remediate DDT contaminated sites and affected areas	5.4.1. Undertake contaminated site remediation on a prioritised basis
	5.5. Minimise or avoid future site contamination	5.5.1. Actively enforce a ban on the unregulated dumping of chemical products

Objective	Projected Cost (USD)	Projected Cost (SBD)	Timeframe
5.1	272,000	2,000,000	2018-2021
5.2	435,200	3,200,000	2018-2019
5.3	884,000	1,500,000	2018-2022
5.4	500,000	3,676,500	2018-2022
5.5	50,000	367,650	Ongoing
Total	**2,141,200**	**10,744,150**	

4.3.6 AP6: Identification and appropriate management of PFOS and PFOS-F

Convention requirements

Article 3 and Annex B Part III of the Stockholm Convention requires Parties to eliminate the production and use of PFOS, its salts and PFOS-F, unless Parties have notified the Secretariat of their intention to produce and/or use them for acceptable purposes. Parties using these chemicals are required to reduce and ultimately eliminate production and/or use when suitable alternatives are available.

National context

PFOS, its salts, and PFOS-F are industrial chemicals with water- and oil-repellent properties and flame-retardant properties, which were used widely in the past as additives to electrical and electronic parts, firefighting foam, photo imaging, hydraulic fluids, and textiles.

The Solomon Islands does not manufacture PFOS or its related substances, consequently, any sources are likely to derive from components of imported materials including: firefighting foam used in fire extinguishers, electrical and electronic parts of some colour printers and photocopiers, textiles and upholstery and plastic goods. Limited surveys have confirmed that local fire services do not use PFOS and that the Royal Solomon Islands Fire Service uses PFOS-free Fomtec Aqueous Film Forming Foam. However, fire extinguishers without proper labels are being imported and used. The presence of PFOS is thus suspected and requires further investigation.

Implementation partners

The MECDM will work closely with MHMS, Aviation Fire Services and waste management services to coordinate the investigation and any required management of foams and consumer goods potentially containing PFOS.

Action plan

Goal	Objectives	Activities
6. Management of PFOS stockpiles and PFOS contaminated sites and progressive replacement of PFOS firefighting foams with PFOS-free alternatives	6.1. Identification of potentially PFOS-contaminated sites and any adjacent waterways	6.1.1. Assess and remediate any potentially PFOS contaminated training areas at national airports
		6.1.2. Establish dedicated long-term storage areas at landfill sites for potentially PFOS contaminated consumer goods
	6.2. Identification and replacement of PFOS containing firefighting foams	6.2.1. Undertake the national review and replacement of aviation fire services with PFOS free firefighting foams if necessary
	6.3. Management of consumer goods and end-of-life products potentially containing PFOS	6.3.1. Provide waste management workers with guidance and training on long-term management and recycling of PFOS containing wastes
		6.3.2. Develop and disseminate guidelines concerning articles which must not be reused or recycled

Objective	Projected Cost (USD)	Projected Cost (SBD)	Timeframe
6.1	100,000	735,300	2018
6.2	100,000	735,300	2018
6.3	200,000	1,470,600	2018-2021
Total	**400,000**	**2,941,2000**	

4.3.7 AP7: Identification and appropriate management of fire retardant (deca-BDE, HBCDD, hexaBDE and heptaBDE, tetraBDE and pentaBDE) containing wastes including e-wastes

Convention requirements

Articles 3, 5 and 6 of the Stockholm Convention requires Parties to eliminate the importation of, and releases from wastes containing the newly listed fire retardants in a range of consumer goods, packaging materials, construction materials and office equipment including computers and other electrical and electronic equipment.

National context

Chemicals such as Decabromodiphenyl ether (decaBDE), Hexabromocyclododecane (HBCDD), Hexabromodiphenyl ether (hexaBDE), Heptabromodiphenyl ether (heptaBDE), Tetrabromodiphenyl ether (tetraBDE) and Pentabromodiphenyl ether (pentaBDE) were used as additives that acted as fire retardants in a range of consumer and industrial goods and other materials that may have been imported into the Solomon Islands in the past. The Solomon Islands does not manufacture any of the goods or their potential chemical fire retardant additives. When present, the chemicals may be released into the environment when the goods that they are contained in are disposed of, typically to landfills.

Implementation partners

The MECDM will work closely with waste management services to coordinate improvement in waste management services to ensure that wastes are collected, stored and managed appropriately until they can be exported for recycling.

Action plan

Goal	Objectives	Activities
7. Management of materials potentially containing fire retardants to minimise environmental losses	7.1. Generic identification of previously imported products potentially containing banned fire retardants	7.1.1. Prioritise the national management of products and materials potentially contaminated with banned fire retardants through a national review of imported goods and materials
	7.2. Establishment of collection and storage mechanisms	7.2.1. Establish dedicated collection services and dedicated long-term storage areas at landfill sites for potentially contaminated consumer and construction goods
	7.3. Long-term management of goods and end-of-life products potentially containing fire retardants	7.3.1. Provide waste management workers with guidance and training on long-term management and recycling of wastes containing fire retardants
		7.3.2. Undertake regular collection and sorting of potential risk products and goods identified in national prioritisation exercise
		7.3.3. Develop and disseminate guidelines concerning articles which must not be reused or recycled

Objective	Projected Cost (USD)	Projected Cost (SBD)	Timeframe
7.1	100,000	735,300	2018
7.2	500,000	3,676,500	2018-2020
7.3	500,000	3,676,500	2018-2022

Goal	Objectives	Activities
Total	**1,100,000**	**8,088,300**

4.3.8 AP8: Releases from unintentional production of PCDD/PCDF, HCB and PCBs

Convention requirements

Article 5 of the Convention requires Parties to take measures to reduce total releases from anthropogenic sources of each chemical listed in Annex C, with the goal of continuous minimisation and, where feasible, ultimate elimination. These actions should include:

- Development and maintenance of source inventories and release estimates
- Evaluation of the efficacy of laws and policies to manage uPOPs releases
- Development of uPOPs reduction and elimination strategies and steps to promote education, training and awareness of those strategies
- Reviews at least every 5 years of uPOPs management progress
- Annex C requires Parties to consider BAT/BEP techniques in the consideration of measures to be taken to reduce uPOPs releases.

National context

Unintentional POPs are largely produced through poor waste management practices including low temperature waste incineration.

The major potential PCDD/F sources in the Solomon Islands include open burning, healthcare waste incineration, domestic rubbish burning, power generation, slush and burn from agriculture and burning wood for cooking, from the transportation sector and from cigarette smoking. Data required for making best possible estimates of annual uPOPs (PCDFs and PCDDs) releases are yet to be completed. This action plan therefore seeks to provide Solomon Islands with practical, implementable actions to achieve likely reductions and ultimately elimination of uPOPs in compliance with their obligations under the Stockholm Convention, and will ultimately reduce the negative health and environmental impacts of uPOPs.

Implementation partners

MECDM as the national focal point, shall work in partnership with HCC, companies and provincial governments.

Action plan

Goal	Objectives	Activities
8. The progressive reduction of dioxins and furans (PCDDs/PCDFs) and other uPOPs emissions using BAT/BEP	8.1. Establish nationally-agreed frameworks implemented by trained and empowered officials for long-term prevention and management of uPOPs	8.1.1. Convene national multi-stakeholder group to promote uPOPs initiatives
		8.1.2. Implement the NWMPCS
		8.1.3. Complete a national uPOPs inventory and update this every 5 years
		8.1.4. Complete national survey through population census to identify uPOPs generating activities
	8.2. Reduce human exposure to	8.2.1. Develop, enforce national code of practice on PPE for workers in waste management

Goal	Objectives	Activities
	uPOPs through improved public awareness and worker safety and training	8.2.2. Develop, enforce national code of practice and training schedule on safe work procedures for waste incinerator and landfill workers
		8.2.3. Deliver public education campaigns on uPOPs and requirements under the law
	8.3. Reduce uPOPs emissions from open burning (including burning on landfills)	8.3.1. Implement a nationwide ban on open burning
		8.3.2. Prescribe open burning rules for low-density remote communities if needed
		8.3.3. Areas susceptible to repeated open burning identified, monitored, and targeted for enforcement
		8.3.4. Designate areas in landfills/dumps for reclamation of recyclable materials
		8.3.5. Restrict public access to landfill tipping face where possible
		8.3.6. Implement container deposit schemes to incentivise recycling
		8.3.7. Introduce extended producer responsibility for used oil and e-waste
		8.3.8. Phase out and ban single-use plastic bag
	8.4. Reduce uPOPs emissions from waste incineration	8.4.1. Prepare, disseminate data reporting template for waste incineration activities
		8.4.2. Require regular reports from healthcare and quarantine waste incinerator operators
		8.4.3. Enforce colour-coded healthcare waste segregation in hospitals, healthcare centres
		8.4.4. Develop and implement healthcare waste management plans for facilities
		8.4.5. Assess and upgrade, improve or replace healthcare and quarantine waste incinerators
	8.5. Reduce uPOPs emissions from power generation activities	8.5.1. Plan for and install grid-tied solar generation systems
		8.5.2. Plan for and install stand-alone rural solar generation systems
	8.6. Reduce uPOPs emissions from disposal and landfilling	8.6.1. Establish temporary and long-term storage facilities for hazardous wastes and chemicals locally and nationally
		8.6.2. Issue regular public guidance on safe storage and disposal of hazardous waste & chemicals
		8.6.3. Operate regular collection service for hazardous wastes & chemicals when storage facilities are operational

Goal	Objectives	Activities
		8.6.4. Establish compost facilities for green waste and market wastes
		8.6.5. Scale up, promote backyard/community composting programs incl. education
		8.6.6. Prepare and enforce landfill operation manuals and environmental management plans for waste disposal sites
		8.6.7. Close or improve temporary and unregulated dumpsites
	8.7. Reduce uPOPs emissions from tobacco smoking	8.7.1. Progressively introduce higher tobacco taxes
		8.7.2. Introduce anti-smoking awareness into schools
		8.7.3. Implement public anti-smoking advertising campaigns
		8.7.4. Establish smoke-free environments (e.g. universities, government facilities, restaurants, public areas)
		8.7.5. Implement other tobacco initiatives in compliance with national obligations under the WHO Framework Convention on Tobacco Control and the Tobacco Control Act 2010
	8.8. Reduce uPOPs emissions from the transport sector	8.8.1. Introduce mandatory vehicle servicing
		8.8.2. Ban the importation of vehicles without pollution control technology
		8.8.3. Ban the importation of vehicles manufactured before 2004
		8.8.4. Introduce import tariff on vehicles to pay for end-of-life recycling costs
		8.8.5. Develop, and implement a recycling program for end-of-life vehicles

Objective	Projected Cost (USD)	Projected Cost (SBD)	Timeframe
8.1	[a] 200,000	1,470,600	2018-2022
8.2	10,000	73,530	2018-2019
8.3	50,000	367,650	2018-2020
8.4	[b] 200,000	1,470,600	2018-2022
8.5	[c] 200,000	1,470,600	2018-2027
8.6	[d] 200,000	1,470,600	2018-2022
8.7	20,000	147,000	2018-2022
8.8	50,000	367,650	2018-2022
Total	**930,000**	**6,838,230**	

[a]: Excludes costs associated with implementation of the NWMPCS
[b]: Excludes costs associated with purchase and commissioning of high temperature healthcare waste incinerators
[c]: Excludes costs associated with procurement and commissioning of solar equipment
[d]: Excludes costs associated with landfill closure or upgrade works

4.3.9 AP9: Public awareness, information and training

Convention requirements

Articles 9 and 10 of the Stockholm Convention require Parties to:

- Designate a national focal point and to facilitate information exchange and development of POPs material for public knowledge, and policy decisions particularly on the health and environmental impacts of POPs.
- Train workers, scientists, educators and technical and managerial personnel on POPs and chemical management
- Develop mechanisms such as pollutant release and transfer registers for the collection and dissemination of information on estimates of the annual quantities of chemicals listed in Annex A, B and C that are released or disposed.

National context

Under the NIP Project, MECDM-ECD being the National Stockholm Convention Focal point, has carried out chemical safety and awareness training since September 2015 to government stakeholders. In 2016, this training was expanded to include the private sector, customs, NGOs and schools. This has increased the interest among national stakeholders in promoting POPs information and chemical management. The feedback from these trainings suggest stakeholders require information on their roles, and addressing gaps in legislation for chemical transport, storage, and disposal.

Stakeholders were also aware of the need for thorough chemical inventories. Inventories are pivotal for providing good baseline information required for information exchange with other Convention Parties and reporting requirements under the Convention.

Implementation partners

MECDM as the National Focal Point, will work in close partnership with MAL, MHMS, national municipals and the public.

Action plan

Goal	Objectives	Activities
9. Stakeholders attain a level of awareness and technical capacity that supports implementation of the NIP and improved national chemical management	9.1. Build public awareness on POPs chemicals and their impacts	9.1.1. Develop and implement a 3-year Public Awareness Communication Strategy for POPs to underpin the NIP and to inform the general public, communities and schools
	9.2. Promote ongoing capacity building of stakeholders on POPs and chemical management	9.2.1. Seek inclusion of 'environmental chemistry' or similar on the national training priority list administered by the National Training Unit of the Ministry of Education and Human Resources Development. This will help to secure scholarship opportunities and promote long-term capacity building in chemical management
		9.2.2. Develop and implement a 5-year training strategy for POPs and national chemical management to address different components of the Stockholm Convention, NIP implementation and chemical lifecycles
		9.2.3. Develop and maintain a 'training register' to keep track of persons trained, who can support NIP implementation and serve as resource persons in future trainings

Goal	Objectives	Activities
	9.3. Centralise and make public, information on national POPs and chemical management	9.3.1. Establish a simple, centralised database the National Focal Point for information on national POPs and chemicals management
		9.3.2. Require businesses that import and sell chemicals to report quarterly to the National Focal Point on the amount and type of chemicals imported and distributed. This could be a condition of the business licence

Objective	Projected Cost (USD)	Projected Cost (SBD)	Timeframe
9.1	204,000	1,500,000	2018-2020
9.2	408,000	3,000,000	2018-2022
9.3	30,000	220,000	2018
Total	**642,000**	**4,720,000**	

4.3.10 AP10: Monitoring, research and development

Convention requirements

Article 11 of the Stockholm Convention requires Parties to, according to their capabilities, undertake appropriate research, development, monitoring and cooperation pertaining to POPs, and where relevant, their alternatives, including on their:

- sources and releases into the environment
- presence and levels in humans and the environment
- environment transport, fate and transformation
- effects on human health
- socio-economic and cultural impacts
- release reduction and elimination
- harmonised methodologies for inventories, and analytical techniques for measuring releases.

National context

Monitoring activities are important steps in assessing the scope of the national POPs issue and evaluating the effectiveness of actions taken to reduce and manage POPs and are therefore requirements of Parties to Convention Obligations.

Any research in SI is governed by the *Research Act 1982* administered by the MERHD, which controls and administers the conduct of research in SI and connected matters, including scientific research for those coming from outside and within. The technical infrastructure in SI is very limited. Laboratory and analytical facilities are confined to medical purposes and basic food and water analysis. There is a national university, SINU which opened in 2014 offering mainly humanities and arts courses with other tertiary institutions, which are regional centres of the USP and UPNG. There are no private laboratories capable of POPs analysis and therefore a majority of samples for analysis are sent overseas (usually to Australia). The only national POPs monitoring program is the GEF funded GMP, now in Phase 2.

Implementation partners

MECDM-ECD as the National Focal Point will actively collaborate with UNEP, and facilitate and participate in the GMP2.

Action plan

Goal	Objectives	Activities
10. Encourage investment and research in building national capacity for POPs monitoring and assessment to determine effectiveness of SI undertakings under the Stockholm Convention	10.1. Strengthen and build institutional and local capacity for research and monitoring of POPs	10.1.1. SIG to complete a cost benefit analysis of the utility of a nationally based POPs testing including investigation of the purchase of equipment for the in-house analysis of organochlorides through the MECDM chemical unit
		10.1.2. Five-year MOU established with relevant Partners to provide technical assistance and expertise to build national chemical management capacity (including guidance for chemical data collection, analysis and data interpretation by national officers and stakeholders to support NIP implementation)
	10.2. Support international programs for POPs monitoring at the national level	10.2.1. SI to participate fully under GEF-GMP2 initiatives including passive and sample based monitoring of air, human breast milk, selected food groups and environmental matrices
	10.3. Monitor local health and environmental impacts of POPs and chemicals	10.3.1. Implement priority monitoring of ambient air, (sea) food items and human breast milk concentrations of DDT, chlordane, dieldrin, endrin, lindane, endosulphan and toxaphene and PCBs, PCDDs and PCDFs
		10.3.2. Undertake routine monitoring of landfill sites and contaminated sites
		10.3.3. Undertake routine aquatic passive sampling of modern agro-chemical concentrations

Objective	Projected Cost (USD)	Projected Cost (SBD)	Timeframe
10.1	734,400	5,400,000	2018-2022
10.2	27,200	200,000	2018-2019
10.3	50,000	370,000	2018-2019
Total	**811,600**	**5,970,000**	

4.3.11 AP11: Implementation and reporting

Convention requirements

Article 15 of the Stockholm Convention requires Parties to report to the COP the measures taken to implement the provisions of the Convention and on the effectiveness of such measures in meeting the objectives of the Convention. Convention guidelines require Parties to report every 4 years.

National context

National reports are the main references used to evaluate the effectiveness of national actions undertaken through the Convention. On transmission of its first NIP, Solomon Islands is required to periodically submit national reports to the Convention Secretariat.

Implementation partners

MECDM is the lead agency and will coordinate inputs from other stakeholders as necessary.

Action Plan

Goal	Objectives	Activities
11. Solomon Islands reporting obligations under the Convention are up-to-date and reflective of national undertakings to reduce and eliminate POPs	11.1. The Stockholm Convention's national reporting requirements are met	11.1.1. Establish a national reporting system for NIP implementation activities
		11.1.2. Submit national reports to the COP
	11.2. Timely implementation of the NIP	11.2.1. Integrate national operational NIP activities into departmental/ ministerial annual work plans and budgets

Objective	Projected Cost (USD)	Projected Cost (SBD)	Timeframe
11.1	2,720	20,000	2018
11.2	6,800	50,000	2018
Total	**9,520**	**70,000**	

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Appendix 1: Action Plan summary

GOAL	1. To implement national regulatory and administrative measures to manage chemicals and eliminate Annex A chemicals		
Implementation partners	National chemical unit in partnership with MHMS, MAL, and reporting to the NCMEC		

Objective	**1.1. Improve oversight and operational aspects of chemical management**		
Actions	1.1.1. Establish a National Chemical Unit within MECDM to serve as National Focal Point		
	1.1.2. Establish a National Chemical Management Executive Committee		
	1.1.3. Prepare a National Chemical Profile		
	1.1.4. Provide training to regulatory agencies and officers on relevant legislation and powers for enforcement and monitoring		
	1.1.5. Establish a centralised system for licensing and permits for chemical imports		
Cost & timeframe	USD 1,425,280	SBD 10,480,000	5 years (2018-2022)

Objective	**1.2. Establish a comprehensive legal and administrative system to manage all chemical related issues in the Solomon Islands**		
Actions	1.2.1. Create new legislation and regulations to control the importation of chemicals		
	1.2.2. Create new legislation and regulations to improve management (transport, storage, application and disposal) of imported chemicals		
	1.2.3. Implement Solomon Islands Customs Tariff codification for all imported chemicals (including POPs)		
	1.2.4. Ban the production, use and import of Stockholm listed chemicals		
	1.2.5. Create new legislation and regulations to control the importation of chemicals		
Cost & timeframe	USD 244,800	SBD 1,800,000	4 years (2018-2021)

GOAL	2. To implement regulatory and administrative measures to manage chemicals and eliminate Annex A in Solomon Islands		
Implementation partners	MECDM and MAL will work in close collaboration with Customs, MCILI, NGOs and the private sector		

Objective	**2.1. To establish an organized and effective national regulatory system for pest and pesticide management**		
Actions	2.1.1. MAL to establish a separate unit for national pest and pesticide management		
	2.1.2. MAL to develop regulations (under Safety at Work Act 1982, ss. 28 and 9; and Consumer Protections Act 1995, Part III ss. 12 and 13 and Part IV) for pesticide sales, distribution and fines to expand and strengthen monitoring and enforcement of retailers and the public		
	2.1.3. MAL to establish licensing and certification schemes and reduce number of outlets selling pesticides		
	2.1.4. MCILI to ratify the ILO Convention concerning Safety in the use of Chemicals at Work		
	2.1.5. MECDM/MAL to develop a national protocol for unwanted agro-chemical collection, storage and disposal procedures, and protocols including development of a harmonised Penalty Unit System developed under the *Penalties and Miscellaneous Amendments Act 2009* to improve control of disposal of unwanted chemicals		
Cost & timeframe	USD 380,800	SBD 2,800,000	3 years (2018-2020)

GOAL	3. The total elimination of all PCBs and PCB containing equipment from Solomon Island		
Implementation partners	MECDM to work closely with SI Customs, MMERE and lead companies such as Solomon Power, GPPOL, NFD, GCIL		

Objective	**3.1. Information is available to guide the national management of PCBs and PCB containing equipment**		
Actions	3.1.1. Complete a national inventory of PCBs and PCB containing equipment		
	3.1.2. Develop national PCB guidelines and management guidelines		
	3.1.3. Facilitate national inventory training covering the use, identification, management and disposal of PCBs and PCB containing equipment for Government Agencies		
Cost & timeframe	USD 68,000	SBD 500,000	2 years (2018-2019)

GOAL	**4. Rigorous data is available on which to base future informed decisions on DDT vector control options**
Implementation partners	MECDM as focal point in strong collaboration with VBDCP, MHMS and MAL, NGOs and WHO

Objective	**4.1. Undertake studies and derive a national position on effective vector controls for malaria**		
Actions	4.1.1. Undertake a review of the scientific and medical literature connected with the efficacy of different malarial control strategies		
	4.1.2. Provide scholarship funding for local candidates to undertake a historical analysis of the impacts of DDT application in the Solomon Islands		
	4.1.3. Establish a national position on the future of DDT use for malaria vector control		
	4.1.4. Notify the Stockholm Convention Secretariat of the national position, if appropriate		
Cost & timeframe	USD 150,000	SBD 1,103,000	3 years (2018-2020)

Objective	**4.2. Develop and implement a well-coordinated and integrated programme for malaria control based on BAT and BEP**		
Actions	4.2.1. In selected rural settings, commence statistically valid, pilot environmental management programs for mosquito control based on the review findings and expert opinion		
	4.2.2. Implement routine chemical management training for malaria control workers		
Cost & timeframe	USD 250,000	SBD 1,838,000	5 years (2018-2022)

GOAL	**5. Sound management of chemicals to minimise and ultimately eliminate risks to human health and the environment associated with legacy and contemporary POPs**
Implementation partners	MECDM will work closely with MHMS, MAL, NPHL and town municipalities and provincial centres to ensure harmonisation of efforts across sectors with waste and chemical management programs

Objective	**5.1. Strengthen institutional capacity for POPs detection and management**		
Actions	5.1.1. Train Government Officers to identify and manage contaminated sites and chemical stockpiles		
	5.1.2. Procure one GC-MS/MS/ pesticide residual analyser preferably AGILENT/ SCHIMADZU/THERMO SCIENTIFIC branding to equip the NPHL with pesticide analysis and POPs detection capabilities		
Cost & timeframe	USD 272,000	SBD 2,000,000	4 years (2018-2021)
Objective	**5.2. Identify and prioritise contaminated sites and prepare management plans**		
Actions	5.2.1. Develop a standardised contaminated site management plan to manage the risks associated with agriculture, residential, commercial and industrial developments on contaminated sites		
	5.2.2. Develop a national 'contaminated site registry' to centralise information on sites potentially contaminated with POPs and other chemicals		
	5.2.3. Complete nation-wide surveys of chemically contaminated sites and prioritise remediation works		

	5.2.4. Undertake national sampling of former DDT storage sites and contaminated areas and prioritise remedial measures nationally		
Cost & timeframe	USD 435,200	SBD 3,200,000	2 years (2018-2019)

Objective	**5.3. Safely dispose of hazardous wastes, obsolete chemicals and POPs**		
Actions	5.3.1. SIG (MHMS) to explore opportunities with suppliers and manufacturers of mosquito nets on disposal/recycling programs for safe retrieval and disposal of used long lasting insecticidal nets through international organs like WHO by 2020		
	5.3.2. Implement public awareness programmes on the identification of, and hazards associated with contaminated sites, and the safe disposal of chemicals		
Cost & timeframe	USD 884,000	SBD 1,500,000	5 years (2018-2022)

Objective	**5.4. Remediate DDT contaminated sites and affected areas**		
Actions	5.4.1. Undertake contaminated site remediation on a prioritised basis		
Cost & timeframe	USD 500,000	SBD 3,676,500	5 years (2018-2022)

Objective	**5.5. Minimise or avoid future site contamination**		
Actions	5.5.1. Actively enforce a ban on the unregulated dumping of chemical products		
Cost & timeframe	USD 50,000	SBD 367,650	Ongoing

GOAL	**6. Management of PFOS stockpiles and PFOS contaminated sites and progressive replacement of PFOS firefighting foams with PFOS-free alternatives**		
Implementation partners	MECDM will work closely with MHMS, Aviation Fire Services and waste management service providers		

Objective	**6.1. Identification of potentially PFOS-contaminated sites and any adjacent waterways**		
Actions	6.1.1. Assess and remediate any potentially PFOS contaminated training areas at national airports		
	6.1.2. Establish dedicated long-term storage areas at landfill sites for potentially PFOS contaminated consumer goods		
Cost & timeframe	USD 100,000	SBD 735,300	1 year (2018)

Objective	**6.2. Identification and replacement of PFOS containing firefighting foams**		
Actions	6.2.1. Undertake the national review and replacement of aviation fire services with PFOS free firefighting foams if necessary		
Cost & timeframe	USD 100,000	SBD 735,300	1 year (2018)

Objective	**6.3. Management of consumer goods & end-of-life products potentially containing PFOS**		
Actions	6.3.1. Provide waste management workers with guidance and training on long-term management and recycling of PFOS containing wastes		
	6.3.2. Develop and disseminate guidelines concerning articles which must not be reused or recycled		
Cost & timeframe	USD 200,000	SBD 1,470,600	4 years (2018-2021)
GOAL	**7. Management of PFOS stockpiles and PFOS contaminated sites and progressive replacement of PFOS firefighting foams with PFOS-free alternatives**		
Implementation partners	MECDM in partnership with waste management services providers		

Objective	**7.1. Generic identification of previously imported products potentially containing banned fire retardants**		

Actions	7.1.1. Prioritise the national management of products and materials potentially contaminated with banned fire retardants through a national review of imported goods and materials		
Cost & timeframe	USD 100,000	SBD 735,300	1 year 92018)

Objective	**7.2. Establishment of collection and storage mechanisms**		
Actions	7.2.1. Establish dedicated collection services and dedicated long-term storage areas at landfill sites for potentially contaminated consumer and construction goods		
Cost & timeframe	USD 500,000	SBD 3,676,500	3 years (2018-2020)

Objective	**7.3. Long-term management of goods and end-of-life products potentially containing fire retardants**		
Actions	7.3.1. Provide waste management workers with guidance and training on long-term management and recycling of wastes containing fire retardants		
	7.3.2. Undertake regular collection and sorting of potential risk products and goods identified in national prioritisation exercise		
	7.3.3. Develop and disseminate guidelines concerning articles which must not be reused or recycled		
Cost & timeframe	USD 500,000	SBD 3,676,500	5 years (2018-2022)

GOAL	**8. The progressive reduction of dioxins and furans (PCDDs/PCDFs) and other uPOPs emissions using BAT/BEP**		
Implementation partners	MECDM as the national focal point, shall work in partnership with HCC, companies and provincial governments		

Objective	**8.1. Establish nationally-agreed frameworks implemented by trained and empowered officials for long-term prevention and management of uPOPs**		
Actions	8.1.1. Convene national multi-stakeholder group to promote uPOPs initiatives		
	8.1.2. Implement the NWMPCS		
	8.1.3. Complete a national uPOPs inventory and update this every 5 years		
	8.1.4. Complete national survey through population census to identify uPOPs generating activities		
Cost & timeframe	USD 200,000	SBD 1,470,600	5 years (2018-2022)
	Note: excludes costs associated with implementation of the NWMPCS		

Objective	**8.2. Reduce human exposure to uPOPs through improved public awareness and worker safety and training**		
Actions	8.2.1. Develop, enforce national code of practice on PPE for workers in waste management		
	8.2.2. Develop, enforce national code of practice and training schedule on safe work procedures for waste incinerator and landfill workers		
	8.2.3. Deliver public education campaigns on uPOPs and requirements under the law		
Cost & timeframe	USD 10,000	SBD 73,530	2 years (2018-2019)

Objective	8.3. Reduce uPOPs emissions from open burning (including burning on landfills)		
Actions	8.3.1. Implement a nationwide ban on open burning		
	8.3.2. Prescribe open burning rules for low-density remote communities if needed		
	8.3.3. Identify, monitor & target areas prone to repeated open burning for enforcement		
	8.3.4. Designate areas in landfills/dumps for reclamation of recyclable materials		
	8.3.5. Restrict public access to landfill tipping face where possible		
	8.3.6. Implement container deposit schemes to incentivise recycling		
	8.3.7. Introduce extended producer responsibility for used oil and e-waste		
	8.3.8. Phase out and ban single-use plastic bag		
Cost & timeframe	USD 50,000	SBD 367,650	3 years (2018-2020)

Objective	8.4. Reduce uPOPs emissions from waste incineration		
Actions	8.4.1. Prepare, disseminate data reporting template for waste incineration activities		
	8.4.2. Require regular reports from healthcare and quarantine waste incinerator operators		
	8.4.3. Enforce colour-coded healthcare waste segregation in hospitals, healthcare centres		
	8.4.4. Develop and implement healthcare waste management plans for facilities		
	8.4.5. Assess and upgrade, improve or replace healthcare and quarantine waste incinerators		
Cost & timeframe	USD 200,000	SBD 1,470,600	5 years (2018-2022)
	Excludes costs associated with purchase & commissioning of high temperature healthcare waste incinerators		

Objective	8.5. Reduce uPOPs emissions from power generation activities		
Actions	8.5.1. Plan for and install grid-tied solar generation systems		
	8.5.2. Plan for and install stand-alone rural solar generation systems		
Cost & timeframe	USD 200,000	SBD 1,470,600	10 years (2018-2027)
	Excludes costs associated with procurement & commissioning of solar equipment		

Objective	8.6. Reduce uPOPs emissions from disposal and landfilling		
Actions	8.6.1. Establish temporary and long-term storage facilities for hazardous wastes and chemicals locally and nationally		
	8.6.2. Issue regular public guidance on safe storage and disposal of hazardous waste & chemicals		
	8.6.3. Provide regular collection service for hazardous wastes & chemicals when storage facilities are operational		
	8.6.4. Establish compost facilities for green waste and market wastes		
	8.6.5. Scale up, promote backyard/community composting programs incl. education		
	8.6.6. Prepare and enforce landfill operation manuals and environmental management plans for waste disposal sites		
	8.6.7. Close or improve temporary and unregulated dumpsites		
Cost & timeframe	USD 200,000	SBD 1,470,600	5 years (2018-2022)
	Excludes costs associated with landfill closure and upgrade works		

Objective	8.7. Reduce uPOPs emissions from tobacco smoking		
Actions	8.7.1. Progressively introduce higher tobacco taxes		
	8.7.2. Introduce anti-smoking awareness into schools		
	8.7.3. Implement public anti-smoking advertising campaigns		
	8.7.4. Establish smoke-free environments (e.g. universities, government facilities, restaurants, public areas)		
	8.7.5. Implement other tobacco initiatives in compliance with national obligations under the WHO Framework Convention on Tobacco Control		
Cost & timeframe	USD 20,000	SBD 147,000	5 years (2018-2022)

Objective	8.8. Reduce uPOPs emissions from the transport sector		
Actions	8.8.1. Introduce mandatory vehicle servicing		
	8.8.2. Ban the importation of vehicles without pollution control technology		
	8.8.3. Ban the importation of vehicles manufactured before 2004		
	8.8.4. Introduce import tariff on vehicles to pay for end-of-life recycling costs		
	8.8.5. Develop, and implement a recycling program for end-of-life vehicles		
Cost & timeframe	USD 50,000	SBD 367,650	5 years (2018-2022)

GOAL	**9. Stakeholders attain a level of awareness and technical capacity that supports implementation of the NIP and improved national chemical management**
Implementation partners	MECDM as the National Focal Point, will work in close partnership with MAL, MHMS, national municipals and public

Objective	9.1. Build public awareness on POPs chemicals and their impacts		
Actions	9.1.1. Seek inclusion of 'environmental chemistry' or similar on the national training priority list administered by the National Training Unit of the Ministry of Education and Human Resources Development. This will help to secure scholarship opportunities and promote long-term capacity building in chemical management		
	9.1.2. Develop and implement a 5-year training strategy for POPs and national chemical management to address different components of the Stockholm Convention, NIP implementation and chemical lifecycles		
	9.1.3. Develop and maintain a 'training register' to keep track of persons trained, who can support NIP implementation and serve as resource persons in future trainings		
Cost & timeframe	USD 204,000	SBD 1,500,000	3 years (2018-2020)

Objective	9.2. Promote ongoing capacity building of stakeholders on POPs and chemical management		
Actions	9.2.1. Seek inclusion of 'environmental chemistry' or similar on the national training priority list administered by the National Training Unit of the Ministry of Education and Human Resources Development. This will help to secure scholarship opportunities and promote long-term capacity building in chemical management		
	9.2.2. Develop and implement a 5-year training strategy for POPs and national chemical management to address different components of the Stockholm Convention, NIP implementation and chemical lifecycles		
	9.2.3. Develop and maintain a 'training register' to keep track of persons trained, who can support NIP implementation and serve as resource persons in future trainings		
Cost & timeframe	USD 408,000	SBD 3,000,000	5 years (2018-2022)

Objective	9.3. Centralise and make public, information on national POPs and chemical management		
Actions	9.3.1. Establish a simple, centralised database the National Focal Point for information on national POPs and chemicals management		
	9.3.2. Require businesses that import and sell chemicals to report quarterly to the National Focal Point on the amount and type of chemicals imported and distributed. This could be a condition of the business licence		
Cost & timeframe	USD 30,000	SBD 220,000	1 year (2018)

GOAL	10. Encourage investment and research in building national capacity for POPs monitoring and assessment to determine effectiveness of SI undertakings under the Stockholm Convention		
Implementation partners	MECDM-ECD as the National Focal Point will actively collaborate with UNEP, and facilitate and participate in the GMP2		

Objective	**10.1. Strengthen and build institutional and local capacity for research and monitoring of POPs**		
Actions	10.1.1. SIG to complete a cost benefit analysis of the utility of a nationally based POPs testing including investigation of the purchase of equipment for the in-house analysis of organochlorides through the MECDM chemical unit		
	10.1.2. Five year MOU established with relevant Partners to provide technical assistance and expertise to build national chemical management capacity (including guidance for chemical data collection, analysis and data interpretation by national officers and stakeholders to support NIP implementation)		
Cost & timeframe	USD 734,400	SBD 5,400,000	5 years (2018-2022)

Objective	**10.2. Support international programs for POPs monitoring at the national level**		
Actions	10.2.1. SI to participate fully under GEF-GMP2 initiatives including passive and sample based monitoring of air, human breast milk, selected food groups and environmental matrices		
Cost & timeframe	USD 27,200	SBD 200,000	2 years (2018-2019)

Objective	**10.3. Monitor local health and environmental impacts of POPs and chemicals**		
Actions	10.3.1. Implement priority monitoring of ambient air, (sea) food items and human breast milk concentrations of DDT, chlordane, dieldrin, endrin, lindane, endosulphan and toxaphene and PCBs, PCDDs and PCDFs		
	10.3.2. Undertake routine monitoring of landfill sites and contaminated sites		
	10.3.3. Undertake routine aquatic passive sampling of modern agro-chemical concentrations		
Cost & timeframe	USD 50,000	SBD 370,000	2 years (2018-2019)

GOAL	11. Encourage investment and research in building national capacity for POPs monitoring and assessment to determine effectiveness of SI undertakings under the Stockholm Convention		
Implementation partners	MECDM is the lead agency and will coordinate inputs from other stakeholders as necessary		

Objective	**11.1. The Stockholm Convention's national reporting requirements are met**		
Actions	11.1.1. Establish a national reporting system for NIP implementation activities		
	11.1.2. Submit national reports to the COP		
Cost & timeframe	USD 2,720	SBD 20,000	1 year (2018)

Objective	**11.2. Timely implementation of the NIP**		
Actions	11.2.1. Integrate national operational NIP activities into departments' or ministries' annual work plans and budgets		
Cost & timeframe	6,800	50,000	Annually/ongoing

Appendix 2: NCC stakeholders and schedule of meetings

The NCC comprised of the following stakeholders and respective officers:

1. Rosemary Apa .....ECD/MECDM –Project Supervisor
2. Francis Kapini .....ECD/MECDM – Project Coordinator
3. Wendy Beti.....ECD/MECDM
4. Jimmy Hilly.....EHD/MHMS
5. John Sao'hu .....Infectious Control Unit/MHMS
6. Hilda Wratten .....Research/MAL
7. Susan Makabo .....Solomon Water
8. David Ho'ota .....NPHL/MHMS
9. Jeremiah Kisi.....Geochemical Lab/MMERE
10. Fiona Faarondo.....CED/MoFT
11. Ivory Akao.....MFMR

[ECD-Environment Conservation Division, EHD-Environmental health Division, MHMS- Ministry of Health and Medical Services, MAL – Ministry of Agriculture, NPHL- National Public Health Laboratory, MoFT – Ministry of Finance and Treasury, MFMR- Ministry of Fisheries and Marine Resources]

The following meetings have been convened under the NIP project, or where the project office has participated:

1. 1st NCC meeting..... 8 April 2015
2. POPs Legislation Review Meetings.....13-15 May 2015
3. 2nd NCC meeting.....16 June 2015
4. POPs inventory and Chemical Training .....31 Aug– 4 Sept 2015
5. 3rd NCC meeting .....29 September 2015
6. NWMPCS Review Workshop .....2-5 May 2015
7. POPs awareness, Mataniko.....21January 2016
8. ADB EA 1998 Review meeting.....15 February 2016
9. POPs and NSWMS Team Meeting.....March 2016
10. GMP 2 Inception and NIP Update/Review Training, Suva .....4-9 April 2016
11. GMP 2 National inception and NIP Update Workshop.....11-13 May 2016
12. Chemical Training – Chemical Management and SC .....13-17 June 2016
13. NIP Validation Workshop.....25 -26 Aug 2016
14. Training on Chemical Handling and Disposal.....11-16 Sept 2016

Appendix 3: Details of legislation relevant to POPs management

The relevant legislation that will be important to developing a POPs management framework and sound chemical management system for Solomon Islands are the:

- *Customs and Excise Act 2003*
- *Environment Act 1998* and Environment Regulations 2008
- Environmental Health Act 1980 and Environmental Health (Public Health Act) Regulations
- *Pure Foods Act 1996*
- *Pharmacy and Poisons Act 1941*
- *Safety at Work Act 1982*
- *Provincial Government Act 1987*
- *Labour Act 1960*
- *Consumer Protections Act 1995*

Customs and Excise Act 2003 *(CE 2003)*

The CE 2003 covers the imposition, collection and management of excise duties, licensing and control of warehouses or premises used for manufacturing certain goods, and importantly the control and prohibition of imports and exports[49]. POPs chemicals as prohibited and restricted substances can be managed under the Second Schedule[50] of the CE 2003, through the Minister who can amend the Act from time to time. In principal the CE 2003 effectively ensures:

1. The detection of prohibited or restricted items or smuggled goods including goods on trans-shipment as declared by the CE 2003 or any other Act.
2. That the legislative requirements of other government departments (e.g. import permits) are fulfilled; and
3. That the goods imported comply with the legislative requirements (i.e. to verify their description, value, quantity and invoice information).

This is supported with the Act offering Customs Officers the same powers offered to Police Officers in the execution of their duties. The CE 2003 also allows Customs Officers to act on behalf of other government ministries in the event that other government ministry representations or officers are not present, or the location is remote or isolated. This is important for policing chemicals in the outer provinces and sea borders of the country. Currently there are two international ports in the country, Noro in the Western Province and Honiara, the capital, on Guadalcanal including the Henderson International Airport.

Customs and Excise and Tariff

The general provisions, tariff and exemptions book is the SI Customs Guide for goods classification and statistical purposes. It is tied to the Harmonized System Nomenclature (HS) under the World Customs Organization. The HS tariff system is reproducible to six digits with the seventh and eight digits representing specific national codes. Section VI (28-38) of the SI Tariff book registers chemicals of all kinds including several POPs compounds represented in Table A3.1.

[49] *Customs and Excise Act 2003* [Cap 121]

[50] Second Schedule of CE Act 2003 refers to goods that are prohibited or restricted for import. The Third Schedule applies to goods prohibited or restricted for exports

Table A3.1: POPs Chemicals under HS code (SI Tariff system)

Tariff Item	Description
2903.8100 3808.5000	Hexachlorohexane (HCH) and Lindane Mixtures, preparations containing substance
2903.8200 3808.5000	Aldrin, Chlordane and heptachlor Mixtures, preparations containing substance
2903.9200 3808.5000	Hexachlorobenzene and DDT Mixtures, preparations containing substance
2910.4000 3808.5000	Dieldrin Mixtures, preparations containing substance
2918.9100 3808.5000	2,4,5-T, its salts and esters Mixtures, preparations containing substance
3824.8200	Mixtures containing polychlorinated biphenyls (PCBs)
3808.5000	Toxaphene

(Source: HS Tariff 2012- Solomon Islands)

A number of labelling and classification systems for POPs identification with relevance at the Customs level are available, and could be adopted.

Environment Act 1998 and Environment Regulations 2008 *(EA 1998, ER 2008)*

National safeguards with regards to the environment are vested in the *Environment Act 1998 (EA 1998)* and its corresponding regulation, *Environmental Regulations 2008*. The EA 1998 is a development and pollution control act and importantly is the preeminent Act in the country. It regulates development in a way that it maintains the integrity and quality of the natural environment, people's health and ensures sustainability through four main provisions:

- Provides for and establishes integrated systems for development control, environmental impact assessments (EIA) and pollution control[51]
- Prevents, controls and monitors pollution[52]
- Reduces risk to human health and prevent degradation of the environment by all practical means[53]
- Complies with and gives effect to regional and international conventions and obligations relating to the environment[54]

The obligation to uphold international environmental conventions and the protection of citizen's health and the environment gives the MECDM direct responsibility for the Stockholm Convention. The ER 2008 supports the EA 1998 over development controls such as the issuing of development consents, discharge licenses, stop and pollution abatement notices and fees and penalties.

The most important part of the Act with relevance to POPs is that it sets out the conditions for 'prescribed developments' [55] which includes chemical manufacturing (pesticide production, pharmaceutical production, fertilizer manufacturing), mining, landfills, waste management, paper and textile (chemical dying), housing estates, food industries amongst others. In effect, environmental assessment and approval requirements in the development consent process as required by the Act may be triggered where POPs chemicals or POPs articles are suspected, which covers industrial discharges and air emissions

[51] EA 1998 Section 3 (a)
[52] EA 1998 Section 3 (b)
[53] EA 1998 Section 3 (c)
[54] EA 1998 Section 3 (d)
[55] A 'Prescribed Development' is development prescribed under Part III, and Second Schedule of the EA 1998

relevant to Annex C chemicals of the Stockholm Convention.

However, in terms of fees and penalties, a review of the Act shows that current fees for development applications under ER 2008 are fixed and disallow flexibility to reflect risk, size and complexity or time and experience that would be required to make adequate assessments, and it is recommended that fees be adjusted and charged on a sliding scale to reflect the above-mentioned. In addition, EA 1998 Sections 53 and 47(2) holds Corporations and senior managers/directors liable for contraventions and likewise also liable for costs incurred for prevention, abatements, clean ups and disposal of pollution which can add on stipulated fines as additional penalty for breaches to the Act. Current fines range from SBD5,000-SBD10,000 for pollution offences, ignoring stop notices, and vehicle emissions.

The review of the EA 1998 which began in 2015, has a specific section for POPs chemicals and the management of hazardous and dangerous substances which regulations can be developed and effected under the Minister's power. It will also have oversight of all chemicals in the country, which caters for the merging of existing gaps and unregulated chemical classes, in particular industrial chemicals. The EA amendment bill is expected to be presented in parliament in 2018.

Environment Health Act 1996 and Environmental Health (Public Health Act) Regulations 1980 *(EH 1996, EHR 1980)*

The *Environment Health Act 1996 (EH 1980)* and *Environmental Health (Public Health Act) Regulations 1980* regulates environmental and public health. The Act deals with the discharge of noxious wastes and matter on premises, the prohibition of nuisances and acts that may be dangerous to life or injurious to health[56]. The regulation applies to premises, streets and watercourses. The EHD, who administers this Act, is responsible for water quality, food quality and works alongside departments such as the NHPL that does the testing to ensure quality. The EHD are the responsible agency under the Act for environmental health monitoring, which has been useful for the GMP projects, 1 and 2.

The EH 1996, Section 14 and 17 has similar authority such as the EA 1998 for imposing penalties on companies and individuals who breach the Act and also cause pollution respectively. The Act is supported by immediate entry powers to health inspectors who can enter any factory, warehouse and workplace with the exception of premises that act as a factory, warehouse or workplace, and in that case, they are required to provide 24 hours prior notice.

Pure Foods Act 1996 *(PF 1996)*

The PF 1996 under the EHD-MHMS makes provision for securing the safety and wholesomeness of food for sale and human consumption. It protects against food adulteration, improper packaging and labelling, and also covers imports and exports, inspection and analysis. Regulation can be developed under the Act requiring *"standards for food, food additives and packaging including labelling, composition, strength, purity, character and microbiological, chemical and physical quality*" Evaluation of certain food additives and contaminants can be determined under this Act relating to POPs chemicals and their presence in food. Food under the Act is defined as "*foods of any nature and includes water, ice, beverages, alcoholic drinks, chewing gum, food additives, food preservatives and substances used as ingredients in the preparation of food or drink or of such products",*[57] but does not include, live animals, animal feed and substances used in drugs. Suspicious food products can also be analysed and tested under this Act.

The Act is officially administered through a Pure Foods Advisory Board.

Pharmacy and Poisons Act 1941 *(PP 1941)*

The MHMS regulates chemicals and drugs in the health sector under the *Pharmacy and Poisons Act 1941 (PP 1941).* The legislation is quite outdated but is probably the most comprehensive chemical legislation in the country to date. There are two main components to this Act; the regulation of drugs and poisons

[56] Environmental Health (Public Health Act) Regulations 24
[57] *Pure Foods Act 1996*, Part 1.

including importation and sales and the regulation of pharmacists and dispensing outlets. Most acids, main alkalis, alkaloids, mercuric substances, and metal arsenates are under the schedule of this Act. PP 1941 regulates the imports of drugs and poisons through a Pharmacy and Poisons Board (PP Board) that assesses applications for importation. Roles include:

- Licensing/Registration of Pharmacist, pharmacy officers, premises (distribution and dispensing outlets) and import permits.
- Inspection of importers, wholesalers and dispensers of medicines premises, including storage and work space
- Reporting on narcotic and psychotropic drugs
- Development of storage and distribution guidelines for scheduled drugs and poisons

The PP Board also has ongoing challenges with non-compliance, adequate resources for monitoring and enforcement, proper work guidelines, instrumentation, and manpower. There are overlapping interests with certain poison chemicals that are often imported without consent, which continue to support the call for a national chemical body to be enacted and comprise all immediate stakeholders regulating chemicals in the country.

Safety at Work Act 1982 *(SW 1982)*

The *Safety at Work Act 1982* provides for the health, safety and welfare of persons at work. Under Section 28 (5), regulations may prohibit the importation, sale or supply of any pesticide unless the pesticide is registered as acceptable or comes with conditions attached.[58] This Act can be immediately effective for POPs chemicals in the Annex A category and in some instances Annex B if it is regarded as a pesticide.

Though the SW 1982 is under the MCILI, the MAL has used Section 28 of the Act to regulate pesticide imports into the country through a Pesticides Registry Advisory Committee (PRAC). The PRAC is made up of public health and environmental officers, police, customs and from labour. The Registrar and Chair of the PRAC is currently the Permanent Secretary of MAL with the secretariat comprising of officers from the Research office of MAL. Under the Act the PRAC:

- Convenes at least once a year, or as required by applications from intended importers and businesses
- Advises the registrar on the profile of each pesticide applied to be imported
- Gives approval or refusals to pesticide importers
- Deals with non-compliance issues and fines

The Act is confined to work premises only and would require extended powers or new regulations for MAL Officers to regulate the trade, distribution, and use of pesticides to safeguard the wider public. Alternatively, the EA 1998 can be subject to new regulations under Section 55 for wider enforcement responsibilities for pesticide management to the wider public, in the event the EA 1998 assumes overall oversight of chemicals under Section 3 as one of the Act's objectives, which is a core recommendation of the NIP.

Section 9 of the SW 1982 also addresses manufacture and suppliers' duties towards their workers, with reference to chemicals or substances that pose risk to human health. Substances must be/have:

- Safe and without health risks when used
- Tested and examined properly for its safety prior to use
- Adequate information on it connected to the relevant tests to ensure its safety when used.

Again, this section applies only to activities connected to running a business and within the control of the employer.[59]

[58] Safety at Work Act 1982 section 28 5(a)(b)
[59] Safety at Work Act 1982 section 10 (1)

Provincial Government Act 1987 *(PGA 1987)*

The Provincial ordinances of the country are regulated under the national *Provincial Government Act 1987 (PGA 1987*). This Act facilitates the devolution of powers from the national government to the provincial governments. In effect the PGA 1987 allows provincial government to make their own laws provided they are in line with polices of the national government and they relate to matters within the legislative competency of the provincial assembly[60]. Schedule three of the PGA 1987 talks about Culture and Environment as matters to be provided for under the provincial ordinances, but has confined the scope to coastal and lagoons, including the maintenance of bridges, wharfs and roads[61]. The management of POPs in the provinces through individual provincial governments can occur through the PGA Act 1987 if the national framework permits and priorities for good chemical management are supported at the national level, which would give impetus for provincial governments to follow.

Consumer Protections Act 1995

The *Consumer Protection Act 1995* covers consumer protection and fair-trade practices. Relevant to product articles imported or manufactured, the Act allows for regulations concerned with product safety and quality standards for specified products[62] to be developed and legalised. It advocates 'approved standards' for specified products. The Act refers to chemical products and substances and that 'approved standards' requirements should include; product composition, manufacturing process, labelling, warnings, and storage and handling instructions. These requirements are catered for under the Act and are important components of the chemical lifecycle regarding sales and safety of consumers but are not utilized when describing the current situation.

Many imported products, particularly from Asia, do not have information, and any safety labels are not in English, placing consumers potentially at risk. A project survey suggests that one of the reasons for this practice by importers is that many are reluctant to cover additional costs on their products to transcribe this information into English. This is common for products imported from China and being supplied through local Chinese retailers.

[60] PGA 1987 Section 31 (1a)
[61] PGA 1987 Schedule 3.3
[62] CPA 1995 Part III 12(1)

Appendix 4: Historical account of pesticide usage in the Solomon Islands

DDT in Annex B and POPs pesticides particular Part 1 Chemicals Annex A are best discussed together to give a historical context of the issue in Solomon Islands.

DDT was first documented in the islands brought in my American forces to combat malaria during World War II. DDT became widespread for managing pests under the BSIP though continuing to be used for malaria vector control. Through the massive health campaigns on radio in the 1980s, posters and the much stylish and admired spray men who fought tirelessly around the villages and populated centres of each province, DDT would easily become the most known POP by all levels both adults and children in the Solomon Islands. Other POPs pesticides or organochlorine chemicals appeared in the 1960s, notably the introduction of mechanized rice farms under the BSIP's rice self-sufficiency policy initiatives in Okea and Ilu North Guadalcanal, saw the use of lindane, chlordane, Dieldrin, DDT, isobenzan, the DDT analogue difocol, Norweed containing furan and dioxin precursors 2,4-D and 2,4,5 –T, naphthalene's and BHC.

DDT and the American Malaria Organization (1942-1944)

The story of the insecticidal DDT and the work of the Swiss chemist Paul Hemann Muller in 1939 is well-documented. On the battlefronts of Europe and the Pacific, American soldiers were fighting another enemy in the malaria carrying mosquito. Commentaries put casualties from insect borne illnesses like malaria and typhus to be more than those directly from the war itself and the story was no different for American troops fighting the Japanese in the coastal and jungle interiors of the Solomon Islands. Bulk DDT came with the Americans in July 1944 under the auspices of the South Pacific Malaria and Insects Control Organization (SPMICO) set up by the US forces and their allies. The devastating malaria epidemic between 1942-1943 on US soldiers fighting on Guadalcanal called for prompt action that resulted in the formation of the American Malaria Organization in 1943 that later became the SPMICO. Prior to 1944, the American forces used lavicidal oil and diesel to contain the dangerous *Anopheles farauti* mosquito's breeding sites common in shell holes, vehicle ruts, tranches and man-made catchment areas created since the arrival of allied forces on Guadalcanal in August of 1942. As many as five in every thousand soldiers were falling sick to malaria every day by November 1942. Immediate de-malarisation and rehabilitation programs for Americans were costly financially and on the battlefront as whole infantries had to be shipped to Fiji for quinacrine therapy from Guadalcanal after 3-4 month stints. The SPMICO boasted 4000 men strong, of malaria technicians, skilled and unskilled laborers including over 500 local Solomon Islanders. The SPMICO carried out aerial larviciding over affected areas using 5% oil DDT. In Guadalcanal alone, something like 1800 x 55 gals (374,760L) of larvicidal oil was used in 2 months[63]. Paris Green (Copper (II) acetate triarsenite) was often employed as a temporary insecticide measure along streams. Residual spraying of DDT was done on the ground covering soldier bases and village huts equally supported by the use of impregnated nets using 5% DDT in kerosene. Malaria was rife in both the US and Japanese camps, and the Americans went to great measures to ensure their soldiers were protected. Some even saw the prompt response by the American forces to establish a highly effective malaria control organization like the American Malaria Organisation, to be the reason that ultimately led to an American victory in the Pacific theatre.

[63] Harper 1947

Table A4.1: Common Agriculture chemicals including POPs used in the British Solomon's (1960-1970s)

Chemical	POP	Constituent	Use
Posporuf-50	✓	50% DDT	Control of large insects 1 tbsp. (50% DDT) in 1 gal water + manoxyl, 1 oz.
Didimac	✓	DDT	Control plant hoppers in rice farms
10DRDK	✓	10% w/v DDT in 50:50 dieseline and tractor vehicle oil + 1% indiene couarin resin mix heated gently until uniform solution produced + 1% waxoline red	Used in coconut plantations against Pheidol and Indomyrmex ant species
10DDT	✓	10% DDT in odorless kerosene	
DDT Paste	✓	Microcrystalline paste containing 50% DDT	
DDT Emulsions	✓	0.5% DDT in 0.025% succinate	Used in coconut plantations against amblypelta ant, an antagonistic ant species
Dieldrin EC	✓	Dieldri	Used on rice farm to control caterpillars, grubs, beetles, flies, bugs, grasshoppers and locusts. Mix - 1 tbsp (15% Dieldrin) to 1 gal water _ sticker spread. Used in coconut plantations to control leaf beetle and ants
Lanosan	✓	8.75% DDT	Tomato spray to control insects, fungi and gives trace element of soils. Mix 2 oz. per gall water + manoxyl
Niran	✓	Chlordane	Control of plant hoppers on rice farm
Octaklor	✓	Chlordane	Dieldrin supplement used on the bases of coconut palms for ant control
BHC	✓	HCB	Control caterpillars, grasshoppers. Mix - 1 tbsp. per gal water + Manoxyl 1 oz.
Diazinon	✗	Ester	Control for citrus leaf miner. Mix 1 tbsp. per gal water + Manoxyl 1 Oz
Telodrin	✓	Izobenzan	Chlorinated hydrocarbon added to fertilizers for treating wide range of big and small insects including foliage insects
Malathion	✗	Carbafos	
Maladot	✓	Malathion and DDT	Used as a replacement for malathion for broader spectrum of insect control since it contains DDT
Rogor	✗	Diomethoate	
Kelthane	✓	Difocol (DDT analogue)	Miticide
Tedien	✓	tetradifon	Chlorinated dihphenyl sulphone for killing redspider and mites, eggs and nymphs
Lindol	✓	94% refined paraffin oil and 2% gamma-lindane	Insecticide for mite, bugs, scale insects. Mix 2-3oz lindol to 1 gal water
White oil - Albarol	✗	72% white Oil	Insecticide to control scale insects, bugs, thrives on citrus. Used with Rogor 20W.

Chemical	POP	Constituent	Use
Ethion in oil	✕	2% ethion and 82.2% mineral oil	Miticide
2,4-D or Norweed	✓	2,4-dichlorophenoxy acetic acid	Used for damages on young coconut palms, control of devil fly and blue rat tail.
2,4,5-T or Norweed or triestyl	✓	2,4,5-trichlorophenoxy acetic acid (TCA) and Trichlorophenoxy acetic acid (TCA)	Weedicide to kill broadleaf weeds, shrubs and trees
Tordon 50-D	✓	2,4-dichlorophenoxy acetic acid picloram mixture	Selective weedicide for control of broadleaf weeds
Dalapon	✕	2,2-dichloropropionic acid	Control for grasses including perennial grass
Agroxone-4		2-methyl-4-chlorophenoxyacetic acid (MPCA)	Herbicide control for broadleaf weeds in rice and pasture
Pesco 15-18	✓	Mixture of 2-methyl-4-chlorophenoxyacetic acid (MPCA) and trichlorophenoxy acetic acid (TCA)	Herbicide used as a grass killer on rice farm
Linuron 50	✓	2% naphthalene, 50 % linuron	Selective systemic herbicide used in the control of grasses and broadleaf weeds.
Treflan	✕	Carbamate	Fungicide
Maneb	✕	Manganese carbamate	Fungicide
Kopi	✓	1,2,3,4-tetrahydronapthalene (tetralin)	Fungicide
Zineb	✕	Zinc carbamate	Fungicide
Karathane (Dinocap)	✕	Dinitrophenyl derivative	Miticide-fungicide
Deconil	✓	Chlorothalonil (2,4,5,6-tetrachloroisophthalonitrile) with potential BHC contamination	Broad-spectrum fungicide
Dexon	✕	p-(dimethylamino) benzenediazo sodium sulfonate	Sulfonated phenyl diazo compound organic fungicide used for treating soil pathogens
Mercurial Dry Seed Dressing	✓	Benzene hexachloride (BHC)	Organochloride fungicidal and insecticidal seed protectant containing small percentage of mercury but very volatile and toxic. The fumes destroy fungal development and spores typical use is 200g per 100kg seeds per ha.
Fumasene	✕	dibromochloropropane	Soil fumigant

DDT, POPs pesticides and the BSIP Rice Program (1945-1975)

World War II triggered other developments for Solomon Islands, like rice farming. Landmark developments such as the Matepona and Okea, Ilu rice farms on the North Guadalcanal plains sprung up from what the American forces began or encouraged to continue. Rice was staple diet for the Americans stationed on Guadalcanal. The Americans established the first rice paddies on the island to help support their troops. By 1945, the war was over and the BSIP had taken up the interest and rice farming was adopted in government plans with the idea of supporting domestic consumption and the excess rice would be sold to neighbouring British territories in the Pacific. The BSIP negotiated and secured land in North Guadalcanal, in Okea and Matepona to establish rice farms. There were early setbacks with the program and it was temporary abandoned in the 1950s mainly due to pest infestation, labor issues, equipment and supplies and bad weather. After 1961, the interest in rice resumed following encouraging reports that further experimentation on rice growing should be done but with a strong scientific emphasis noting that the river systems of northern Guadalcanal coupled with arable land if harnessed "*could transform the plains into providing food stuffs for men and stock"*. A private company, the Guadalcanal Plantation Limited (GPL) took up the challenge in 1965 starting with dry rice and in 1969 shifted to irrigation (wet rice). Mismanagement and agronomic issues again dulled GPL's operation soon after and the Okea and Matepona rice establishments were sold to BSA a Hawaiian based American company in 1975 who were better positioned financially and with the technical expertise to carry on with the rice program in the Solomon Islands. Within two years of the takeover more than a 1000ha of land was committed to rice planting in Okea and Matepona and more than 3000tons of rice were sold. BSA operations heavily revolved around experimenting different chemical treatments and studies of weeds and their effect on different rice varieties. Endemic weeds, volunteer rice, insects and pests were a great problem and BSA focused resources to address them. Pesticides, herbicides, weedicides were necessary and what was trialled and approved on experimental plots was passed on to the actual plots. Other crops such as maize, soya and lima beans, sorghum, sugarcane and tobacco were also trialled. BSIP Rice Reports from 1964-1967 showed that organochloride based pesticides were used and among the declared POPs under the Stockholm Convention were DDT (Trade name: didimac, and 5300 gal was used annually), Chlordane (Trade name: Niran, and 2193 gal was used annually)[64], benzene hexachloride (lindane), dieldrin (applied @ 0.6L per hectare).

Cabaryl (Sevin), organophosphates malathion, methamidophos (monitor), thimet toxic substances like agrosan GN (phenylmecuric actetate applied @ 200g per 100kg seed) was used for seed dressing and also norweed containing 2,4-dichlorophenoxy acetic acid used for soaking seeds was also used. 2,4-D is said to be linked to dioxins derived during its manufacturing and are present as impurities in the compound.

DDT and POPs pesticides in coconut plantations and cattle

Coconut plantations were widespread throughout the Solomon Islands, from east to west. The remnant plantations are still very much the feature of many of the islands today. The coconut sector was and continues to be a viable sector for many Solomon Islanders. The BSIP promoted coconut plantations because of its economic potential thus its establishment and maintenance particular in the 1950s upwards to the 1970s was particular important. The *Amblypelta* ant was causing premature felling of nuts. Biological control using other ants such as the *Oecopillas* and *Anoplolepis* against *Amblypelta* did not work as they were affected by antagonistic ants such as the *Pheidol* and *Iridomyrmex*. In 1955 the decision was made to use insecticide directly on the *Amblypelta.* DDT emulsions (0.5% DDT in 0.025% succinate) was found to be the most effective. 15% dieldrin EC was also used on the antagonistic ants *Pheidol* and *Iridomyrmex* added to the bases of the coconut trees. 15% Dieldrin EC was later substituted with 0.2% chlordane and prepared from Octa-Klor, an 80% emulsible chlordane concentrate. Apart from ant treatment, dieldrin was also used to control leaf beetles, which was found to be the most effective. And because plantations were all over the Solomon's, the treatment was also widespread. Other DDT formulations were also used like DDT paste which came in the form of microcrystalline paste containing 50% DDT. There was also 10% DRDK which was 10% DDT in 50:50 dieseline and T.V.O used in mist spray form. There was also 10% DDT in odourless kerosene another mist spray application.

[64] HD Jordan, Solomon Islands rice in the 1970s

Cattle were also introduced to the plantations. Though cattle had been around since the early 1900s, it was found that cows were good for controlling undergrowth and at the same time supply meat to the domestic market. Most cattle at that time were imported from Australia. The largest cattle concentration was in the Russel Islands owned by Levers Pacific Plantation Limited (LPPL). Cattle were distributed in all the main islands. POPs chemicals Dieldrin and DDT were used on cattle to control buffalo flies and interestingly an early analysis was done to look at the presence of chlorinated hydrocarbon residues on peri-renal samples of cows. The results shown in the following table revealed that as much as 25ppm ΣDDT was present in some samples and 18ppm ΣDDT in others, both were taken from Malaita Province, Karipa Tawanaora and Kawanaora, Kariea respectively. Dieldrin levels of 8ppm, 7ppm, and 6ppm were shown for samples on Guadalcanal province, Matepona where the rice farm was located, and also Banika in Russel Islands. The results including traces of lindane reflected the practices at the time but importantly POPs was everywhere and having the testing done around the 1960s, showed that DDT was used earlier with the results showing degraded forms of DDT being DDE and DDD.

Table A4.2: Levels of chlorinated hydrocarbon residues on peri-renal samples of cows

Location	Age (yrs)	Spray	Lindano (ppm)	Dieldrin (ppm)	DDE (ppm)	DDD (ppm)	DDT (ppm)	DDT Total (ppm)
Guadalcanal								
Tassifarongo 1	6	(1)	0.3	1.4	Nil	Nil	Nil	Nil
Tassifarongo 2	2	(1)	0.3	1.0	0.1	trace	0.3	0.3
Tassifarongo 3	2	(1)	0.3	0.7	trace	0.3	0.3	0.3
Tassifarongo 4	4	(1)	0.1	0.8	0.1	Nil	Nil	0.1
Riuani Ltd Nugu	2	(1)	0.2	0.9	0.1	Nil	0.3	0.4
LPPPL Tenaru 1	Aged	(1)	trace	0.3	1.2	0.1	1.1	2.4
LPPPL Tenaru 2	Aged	(1)	Nil	0.8	0.4	Nil	Nil	0.4
LPPPL Lunga 1	4	(1)	0.1	0.7	0.1	Nil	0.2	0.3
LPPPL Lunga 2	3	(1)	Nil	2.8	0.5	Nil	0.5	1.0
LPPPL Henderson 1		(1)	Nil	6.1	0.2	trace	0.4	0.6
LPPPL Henderson 2	5	(1)	Nil	0.8	0.2	trace	0.4	0.6
LPPPL Henderson 3	5	(1)	Nil	0.6	0.1	Nil	0.3	0.4
BSA 1	7	(1)	Nil	4.1	0.2	Nil	0.5	0.7
BSA 2	3	(1)	0.1	6.3	0.2	Nil	Nil	0.2
BSA 3	3	(1)	trace	8.2	0.1	Nil	0.9	1.0
BSA 4	3	(1)	trace	8.4	0.2	Nil	0.6	0.8
Besa-Misinikau 1	6	(2)	Nil	1.4	0.3	0.1	0.2	0.6
Besa-Misinikau 2	2	(2)	Trace	1.8	0.2	trace	0.2	0.4
Parkinson- Rere 1	Aged	(3)	0.1	2.6	0.2	trace	0.2	0.4
Parkinson- Rere 2	Aged	(3)	0.1	7.4	0.4	0.1	0.6	1.1
Russel Islands								
LPPPL Talina 1	1	(3)	Nil	0.2	Nil	Nil	Nil	Nil
LPPPL Talina 2	2	(3)	Nil	0.2	0.1	Nil	Nil	0.1
LPPPL Talina 3	5	(3)	Nil	0.7	0.1	Nil	0.8	0.9
LPPPL Talina 4	1	(3)	Nil	0.2	0.2	Nil	Nil	0.2
LPPPL Banika 1	3	(1)	trace	4.8	trace	Nil	Nil	trace
LPPPL Banika 2	3	(1)	trace	7.3	0.1	Nil	Nil	0.1
LPPPL Banika 3	4	(1)	trace	8.4	0.1	Nil	Nil	0.1
Rendova								
Harry Kaipa-Ugele	2	(2)	Nil	0.1	0.3	Trace	0.4	0.7
Malaita								
Dofai-Manakwai	8	(2)	0.1	2.9	0.1	0.7	0.1	0.9
Karipa Tawanaora	3	(2)	Nil	0.7	9.2	2.3	13.6	25.1
Korasimae Rate 1	2	(2)	trace	0.3	0.3	0.1	0.3	0.7
Korasimae Rate 2	2	(2)	Nil	0.2	0.2	Nil	0.4	0.6
Kawanaora Kariea	4	(2)	trace	1.0	6.8	1.8	9.5	18.1
James Talelsu Maoa	5	(2)	Nil	1.2	2.1	0.2	1.8	4.1
R.C.M-Buma	3	(1)	Nil	13.8	0.4	0.1	0.3	0.8
Stepheno-Bio	3	(2)	Nil	0.2	0.1	Nil	Nil	0.1
Niuau-Alafe	2	(2)	Nil	0.7	0.2	Nil	0.3	0.5

Explanations:
DDE% DDE are breakdown products of DDT
Spray is spraying for buffalo flies (1) regularly (2) irregularly (3) never

Appendix 5: Pesticides available in the Solomon Islands as of 2015

Table A5.1: List of pesticides screened and approved for registration by Pesticide Registration Advisory Committee (PRAC)*

Ref	Registration number	Trade Name	Chemical Name	Registrant	Registration Effective From	Registration Effective To
1	R1/0713/2F	Ramik Bait Bits Rodenticide	2-Diphenylacetyl-1, 3-Indandione	Island Enterprise	19/08/2014	19/08/2019
2	R2/0713/2F	All Weather PCT Finst Formular Blocks	Brodifocoum	Island Enterprise	19/08/2014	19/08/2019
3	H1/0713/2F	Glyphosphate Broad hectare herbicide	H2 Glyphospate	Island Enterprise	19/08/2014	19/08/2019
4	H2/0713/2F	Round Up	H1 Isopropylamine salt	Island Enterprise	19/08/2014	19/08/2019
5	F1/0713/2F	Osmose Boracol 200H fungicide	Ethylene glycol; Disodium Otaborate tetrahydrate	Island Enterprise	19/08/2014	19/08/2019
6	F2/0713/2F	Fungus Fighter Copper fungicide	Copper Hydroxide	Island Enterprise	19/08/2014	19/08/2019
7	F3/0713/2F	Fungus Gun Systemic Disease Spray	Myclobutanil	Island Enterprise	19/08/2014	19/08/2019
8	I2/0713/2F	Insect and Mite killer	Potassium Linoleate	Island Enterprise	19/08/2014	19/08/2019
9	I3/0713/2F	Invict Clear Cockroach Gel Bait	Abamectin	Island Enterprise	19/08/2014	19/08/2019
10	I4/0713/2F	Maldison500 Insecticide	Malathion & Liquid Hydrocarbon	Island Enterprise	19/08/2014	19/08/2019
11	I5/0713/2F	Mavrik chewing & sucking insect killer	Taufluvalinate	Island Enterprise	19/08/2014	19/08/2019
12	I6/0713/2F	Pyrethrum	Pyrethrins Piperonyl Butoxide	Island Enterprise	19/08/2014	19/08/2019
13	I7/0713/2F	Methyl Bromide 100%	Brominated Hydrocarbon	Island Enterprise	19/08/2014	19/08/2019
14	I8/0713/2F	Pestex Fumigation Tablets	Phosphine (Aluminium Phosphide)	Island Enterprise	19/08/2014	19/08/2019
15	I9/0713/2F	Pest Oil	Petroleum Oil Insect Control Spray	Island Enterprise	19/08/2014	19/08/2019
16	I10/0713/2F	White Oil Insecticde	Distillates (Petroleum)	Island Enterprise	19/08/2014	19/08/2019
17	I11/0713/2F	PY ZAP Insecticide	Pyrethrins Piperonyl Butoxide	Island Enterprise	19/08/2014	19/08/2019
18	I12/0713/2F	Rudchem PY Fog	Pyrethrins Piperonly Butoxide	Island Enterprise	19/08/2014	19/08/2019
19	I13/0713/2F	Success Naturalyte Insect Control	Spinosad	Island Enterprise	19/08/2014	19/08/2019

Ref	Registration number	Trade Name	Chemical Name	Registrant	Registration Effective From	Registration Effective To
20	I14/0713/2F	Sumilarv Insect and Growth Regulator	Pyriproxyfen Propylene	Island Enterprise	19/08/2014	19/08/2019
21	I15/0713/2F	Target Dust	Permethrin	Island Enterprise	19/08/2014	19/08/2019
22	I16/0713/2F	Bifenthrin Termicide and Insecticide	Bifenthrin	Island Enterprise	19/08/2014	19/08/2019
23	I17/0713/2F	Nemesis Termite Bait	Alpha-cellulose	Island Enterprise	19/08/2014	19/08/2019
24	I18/0713/2F	Termstar Termicide and Insecticide	Bifenthrin	Island Enterprise	19/08/2014	19/08/2019
25	M1/0713/2F	Blitzem Snail and Slug Pellets	Metaldehyde	Island Enterprise	19/08/2014	19/08/2019
26	I46/0416/2F	Blitz Insecticide	Deltamethrin	Island Enterprise	5/02/2016	5/02/2021
27	I47/0416/2F	Bedlam	Simithrin	Island Enterprise	5/02/2016	5/02/2021
28	R3/0713/3F	Talon	Brodifacoum	Farmset	9/05/2014	9/05/2019
29	H3/0713/3F	Metsulfuron-methyl (Ally) 20DF		Farmset	9/05/2014	9/05/2019
30	H4/0713/3F	Paraquat (Gramoxone)		Farmset	9/05/2014	9/05/2019
31	H5/0713/3F	Farmine	2-4-D Dimethyamic salt	Farmset	9/05/2014	9/05/2019
32	H6/0713/3F	Flurane	Fluroxypr	Farmset	9/05/2014	9/05/2019
33	H7/0713/3F	Grasskill	Glyphosate	Farmset	9/05/2014	9/05/2019
34	H8/0713/3F	Glyphosate	Glufosinate Ammonium	Farmset	9/05/2014	9/05/2019
35	F4/0713/3F	Copper Nordox 50 WP (Copper NORDOX)	Cuprous Oxide	Farmset	9/05/2014	9/05/2019
36	F5/0713/3F	Barrack	Chlorothalonil	Farmset	9/05/2014	9/05/2019
37	F6/0713/3F	Farmoz Axiom	Mancozeb/Metalaxyl	Farmset	9/05/2014	9/05/2019
38	I20/0713/3F	Fumi toxin	Phosphine (PH3)	Farmset	9/05/2014	9/05/2019
39	I21/0713/3F	Otin	Acephate	Farmset	9/05/2014	9/05/2019
40	I22/0713/3F	Karate	Lambda cyhalothrin	Farmset	9/05/2014	9/05/2019
41	I23/0713/3F	Farmicon	Lambda cyhalothrin	Farmset	9/05/2014	9/05/2019
42	W1/0713/3F	Vet sense Kilverm Pig and Poultry Wormer	Levamisale (Hydrochloride)	Farmset	9/05/2014	9/05/2019
43	S1/713/3F	Chemwet	Alcohol alkoxylate	Farmset	9/05/2014	9/05/2019
44	S2/713/3F	LI 700		Farmset	9/05/2014	9/05/2019
45	S3/713/3F	Activator surfactant		Farmset	9/05/2014	9/05/2019
46	F8/1115/3F	Farmacarb	Indoxacarb	Farmset	25/01/2016	25/01/2021
47	I33/1115/3F	Termidor	Fipronil	Farmset	25/01/2016	25/01/2021
48	I34/1115/3F	Pirimiphos Methyl (Atellic)	Pyrimiphos Methyl	Farmset	25/01/2016	25/01/2021
49	I35/1115/3F	Bifenthrin	Bifenthrin	Farmset	25/01/2016	25/01/2021
50	I36/1115/3F	Chlorpyrifos 480EC	Chlorpyrifos	Farmset	25/01/2016	25/01/2021
51	I37/1115/3F	Konpida	Imidachloprid	Farmset	25/01/2016	25/01/2021
52	I38/1115/3F	Cypermethrin	Cypermethrin	Farmset	25/01/2016	25/01/2021
53	R4/0813/4F	Pestoff Rodenticide	Brodifacoum	GPPOL	9/05/2014	9/05/2019

Ref	Registration number	Trade Name	Chemical Name	Registrant	Registration Effective From	Registration Effective To
54	H8/0813/4F	Basta @ R non-selective herbicide	Glycine/Phosphinic acid	GPPOL	9/05/2014	9/05/2019
55	S4/0813/4F	LI 700		GPPOL	9/05/2014	9/05/2019
56	I32/0614/2P	32,000 IU/mg Bt WP	BT kirstaki (Bacillus Thuringiensis)	AVRDC	28/08/2014	
57	I1/0713/1P	Zero Fly		MHMS	9/10/2013	9/10/2013
58	R5/0813/5F	Ramik Bait Bits Rodenticide	2-Diphenylacetyl-1, 3-Indandione	SI Pest Mgt Ltd	4/11/2014	4/11/2019
59	I25/0813/5F	Target Dust	Permethrin	SI Pest Mgt Ltd	4/11/2014	4/11/2019
60	I26/0813/5F	Quick Phos Fumigation Tablets and Pellets	Aluminum Phosphide & Ammonium Carbamate	SI Pest Mgt Ltd	4/11/2014	4/11/2019
61	I27/0813/5F	Rudchempy Fog Insecticide	White Mineral Oil	SI Pest Mgt Ltd	4/11/2014	4/11/2019
62	I28/0813/5F	Maldison 500 insecticide	Malathion	SI Pest Mgt Ltd	4/11/2014	4/11/2019
63	I29/0813/5F	Invict Clear Cockroach Gel Bait	Abamectin	SI Pest Mgt Ltd	4/11/2014	4/11/2019
64	I30/0813/5F	Nemesis Termite Bait (Termiticide)	Chlofluazuron	SI Pest Mgt Ltd	4/11/2014	4/11/2019
65	I31/0813/5F	Termstar Termiticide and insecticide	Bifenthrin	SI Pest Mgt Ltd	4/11/2014	4/11/2019
66	F7/0813/5F	Osmose Boracol 200RH Fungicide	Ethylene glycol; Disodium Otaborate tetrahydrate	SI Pest Mgt Ltd	4/11/2014	4/11/2019

* Information current as of 2015

Appendix 6: POPs chemicals

The following POPs are listed under the Stockholm Convention and are covered under the Solomon Islands National Implementation Plan.

Table A6.1: Stockholm Convention POPs

Chemical	Date listed	Pesticide	Industrial chemical	By product
Annex A chemicals (elimination)				
Aldrin	May 2004	●		
Chlordane	May 2004	●		
Chlordecone	May 2009	●		
Decabromodiphenyl ether (commercial mixture, c-decaBDE	May 2017		●	
Dieldrin	May 2004	●		
Endrin	May 2004	●		
Heptachlor	May 2004	●		
Hexabromobiphenyl (HBB)	May 2009		●	
Hexabromocyclododecane (HBCD)	May 2013		●	
Hexabromodiphenyl ether & heptabromodiphenyl ether	May 2009		●	
Hexachlorobenzene (HCB)	May 2004	●	●	●
Hexachlorobutadiene (HCBD)	May 2015		●	●
Alpha-hexachlorocyclohexane (α-HCH)	May 2009	●		
Beta-hexachlorocyclohexane (β-HCH)	May 2009	●		
Lindane (Ɣ-HCH)	May 2009	●		
Mirex	May 2004	●		
Pentachlorobenzene (PeCB)	May 2009	●	●	●
Pentachlorophenol and its salts and esters (PCP)	May 2015	●		
Polychlorinated biphenyls (PCBs)	May 2004		●	●
Polychlorinated naphthalenes	May 2015		●	●
Short-chain chlorinated paraffins (SCCPs)	May 2017		●	
Technical endosulfan and its related isomers	May 2011	●		
Tetrabromodiphenyl ether (tetraBDE) and pentabromodiphenyl ether (pentaBDE)	May 2009		●	
Toxaphene	May 2004	●		
Annex B chemicals (restriction)				
DDT	May 2004	●		
Perfluorooctane sulfonic acids and salts (PFOS) and Perfluorooctane sulfonyl fluoride (PFOS-F)	May 2009	●	●	
Annex C chemicals (unintentional production)				
Hexachlorobenzene (HCB)	May 2004			●
Hexachlorobutadiene (HCBD)	May 2017			●
Pentachlorobenzene (PeCB)	May 2009			●
Polychlorinated biphenyls (PCBs)	May 2004			●
Polychlorinated dibenzo-p-dioxins (PCDD)	May 2004			●
Polychlorinated di-benzofurans (PCDF)	May 2004			●
Polychlorinated naphthalenes	May 2015			●

1. Aldrin

Listed under Annex A

A pesticide applied to soils to kill termites, grasshoppers, corn rootworm, and other insect pests, aldrin can also kill birds, fish, and humans. In one incident, aldrin-treated rice is believed to have killed hundreds of shorebirds, waterfowl, and passerines along the Texas Gulf Coast when these birds either ate animals that had eaten the rice or ate the rice themselves. In humans, the fatal dose for an adult male is estimated to be about five grams. Humans are mostly exposed to aldrin through dairy products and animal meats.

2. Chlordane

Listed under Annex A

Used extensively to control termites and as a broad-spectrum insecticide on a range of agricultural crops, chlordane remains in the soil for a long time and has a reported half-life of one year. The lethal effects of chlordane on fish and birds vary according to the species, but tests have shown that it can kill mallard ducks, bobwhite quail, and pink shrimp. Chlordane may affect the human immune system and is classified as a possible human carcinogen. It is believed that human exposure occurs mainly through the air.

3. Chlordecone

Listed under Annex A

Chlordecone is a synthetic chlorinated organic compound, which was mainly used as an agricultural pesticide, miticide and fungicide. It had been used extensively in the tropics for the control of banana root bore. Currently, no use or production of the chemical is reported.

4. Decabromodiphenyl ether (commercial mixture, c-decaBDE)

Listed under Annex A

DecaBDE 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 housings of computers and TVs, wires and cables, pipes and carpets. Commercially available decaBDE consumption peaked in the early 2000's, but c-decaBDE is still extensively used worldwide. The decaBDE is highly persistent, has a high potential for bioaccumulation and food-web biomagnification, as well as for long-range transport. Adverse effects are reported for soil organisms, birds, fish, frog, rat, mice and humans.

5. Dieldrin

Listed under Annex A

Used principally to control termites and textile pests, Dieldrin has also been used to control insect-borne diseases and insects living in agricultural soils. Its half-life in soil is approximately five years. The pesticide aldrin rapidly converts to Dieldrin, so concentrations of Dieldrin in the environment are higher than dieldrin use alone would indicate. 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. Food represents the primary source of exposure to the general population.

6. Endrin

Listed under Annex A

This insecticide is sprayed on the leaves of crops such as cotton and grains. It is also used to control rodents such as mice and voles. Animals can metabolize endrin, so it does not accumulate in their fatty tissue to the extent that structurally similar chemicals do. It has a long half-life, however, persisting in the soil for up to 12 years. In addition, endrin is highly toxic to fish. The primary route of exposure for the general human population is through food, although current dietary intake estimates are below the limits deemed safe by world health authorities.

7. Heptachlor

Listed under Annex A

Primarily used to kill soil insects and termites, heptachlor has also been used more widely to kill cotton insects, grasshoppers, other crop pests, and malaria-carrying mosquitoes. It is believed to be responsible for the decline of several wild bird populations, including Canadian Geese and American Kestrels in the Columbia River basin in the US. Laboratory tests have also shown high doses of heptachlor to be fatal to mink, rats, and rabbits, with lower doses causing adverse behavioral changes and reduced reproductive success. Heptachlor is classified as a possible human carcinogen. Food is the major source of exposure for humans, and residues have been detected in the blood of cattle from the US and from Australia.

8. Hexabromobiphenyl (HBB)

Listed under Annex A

Hexabromobiphenyl is no longer produced or used in most countries. Hexabromobiphenyl is an industrial chemical that was used as a flame retardant, mainly in the 1970s as a component of: acrylonitrile-butadienestyrene (ABS) thermoplastics for constructing business machine housings and in industrial (e.g. motor housing), and electrical (e. g. radio and TV parts) products; as a fire retardant in coatings and lacquers, and in polyurethane foam for auto upholstery.

9. Hexabromocyclododecane (HBCD)

Listed under Annex A

HBCD is currently used in four principal product types: expandable polystyrene (EPS), extruded polystyrene (XPS), high impact polystyrene (HIPS) and in polymer dispersions for coating textiles. By far the dominant use is in expandable polystyrene, which is often referred to as Styrofoam. This is used for insulation in buildings and refrigerated trucks and containers, as a fill and shape material in concrete construction, in packaging, and as the filling material for bean bags. The HBCD is usually present at levels of about 0.5 to 2%. The chemical is not used for food-based applications, such as seafood boxes and clamshell food containers (as used with some takeaway food). Use in textile applications and electric and electronic appliances is smaller. HBCD is used a flame retardant additive, providing fire protection during the service life of vehicles, buildings or articles, as well as protection while stored. At the end of their service life, products containing HBCD are likely to be disposed of in landfills, incinerated, recycled, or remain as waste in the environment. Insulation boards form the majority of HBCD containing waste. Packaging waste was found to be the main contributor to potential releases to soil due to uncontrolled landfill or compost, recycling of empty paper packaging, substances going to unknown destinations and the unprotected storage of packaging.

10. Hexabromodiphenyl ether and Heptabromodiphenyl ether

Listed under Annex A

Hexabromodiphenyl ether and heptabromodiphenyl ether are the main components of commercial octabromodiphenyl ether. They are used as flame retardant additives typically in housings of office equipment and business machines. Other uses include nylon and low-density polyethylene, polycarbonate, phenol-formaldehyde resins and unsaturated polyesters and in adhesives and coatings.

11. Hexachlorobenzene (HCB)

Listed under Annex A and Annex C

First introduced in 1945 to treat seeds, HCB kills fungi that affect food crops. It was widely used to control wheat bunt. It is also a by-product of the manufacture of certain industrial chemicals and exists as an impurity in several pesticide formulations. In high doses, HCB is lethal to some animals and, at lower levels, adversely affects their reproductive success. HCB has been found in food of all types.

12. Hexachlorobutadiene (HCBD)

Listed under Annex A and Annex C

HCBD was used as intermediate in the chemical industry or as a product. It was applied as a solvent (for rubber and other polymers); as a "scrubber" to recover chlorine containing gas or to remove volatile organic components from gas; as hydraulic, heat transfer or transformer fluid; or in gyroscopes. HCBD was also used in the production of aluminium and graphite rods.

13. & 14. Alpha and Beta Hexachlorocyclohexane (HCH)

Listed under Annex A

These two 'chemicals' are listed separately under the Convention, but in practice they are normally only encountered together as the commercial mixture of HCH isomers. The Convention listing for Hexachlorocyclohexane covers the alpha and beta isomers, and the Listing for Lindane covers the gamma isomer. Alpha-HCH and beta-HCH were not intentionally produced or commercialised, but were produced as the main constituent of technical HCH (in the 1940s) which was used as an organochlorine insecticide. Technical HCH consists of 70 % alpha-HCH, 7 % beta-HCH and 13 % gamma-HCH (Lindane). There has been a gradual replacement of technical HCH by Lindane.

15. Lindane (gamma-HCH)

Listed under Annex A with a specific exemption for use as a human health pharmaceutical for control of head lice and scabies as second line treatment

Lindane is the common name for the gamma isomer of hexachlorocyclohexane (HCH). Lindane has been used as a broad-spectrum insecticide for seed and soil treatment, foliar applications, tree and wood treatment and against ecto-parasites in both veterinary and human applications. Human health pharmaceutical use for control of head lice and scabies is still allowed as a specific exemption under the Convention. It is applied usually in the form of shampoos or lotions, with the Lindane typically present at a concentration of around 1%.

16. Mirex

Listed under Annex A

This insecticide is used mainly to combat fire ants, and it has also been used against other types of ants and termites. It has also been used as a fire retardant in plastics, rubber, and electrical goods. The main route of human exposure to Mirex is through food, particularly meat, fish, and wild game. 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. It is considered to be one of the most stable and persistent pesticides, with a half-life of up to 10 years.

17. Pentachlorobenzene (PeCB)

Listed under Annex A and Annex C

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

18. Pentachlorophenol (PCP) and its salts and esters

Listed under Annex A with specific exemptions for use in utility poles and cross-arms

Pentachlorophenol (PCP) is an organochlorine compound primarily used as an oil based wood preservative. PCP is currently allowed worldwide only for wood preservation uses. By 1990s, widespread use was discontinued in most countries and at present it is banned in a number of countries. PCP consumption for wood preservation appears to concentrate in Canada and the USA (restricted to industrial use only), whereas Na-PCP appears to be mainly used in India, mainly for wood preservation purposes.

19. Polychlorinated biphenyls (PCBs)

Listed under Annex A with specific exemptions and under Annex C

These compounds are used in industry as heat exchange fluids, in electric transformers and capacitors, and as additives in paint, carbonless copy paper, and plastics. Of the 209 different types of PCBs, 13 exhibit a dioxin-like toxicity. Their persistence in the environment corresponds to the degree of chlorination, and half-lives can vary from 10 days to one-and-a-half years. 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. PCBs also suppress the human immune system and are listed as probable human carcinogens.

20. (Poly) Chlorinated Naphthalenes

Listed under Annex A and C with specific exemptions for use in the production of polyfluorinated naphthalenes, including octafluoronaphthalene

PCN have been used mainly for their chemical stability, including low flammability, their (electrically) insulating properties and recalcitrance, including resistance to biodegradation and biocidal function. PCN have historically been used as wood preservatives, paints and engine oils additives, heat exchange fluids, high-boiling point specialty solvents, engine crank case additives and ingredients in motor tune-up compounds, in capacitors and for cable insulation, chemical-resistant gauge fluids, instrument seals and colour dispersions. While the use of PCN has ceased, they are also present in PCB formulations and are unintentionally produced during combustion processes and in industrial installations. PCN are also unintentionally generated during high-temperature industrial processes in the presence of chlorine. Of the known releases, combustion (primarily waste incineration) is considered the most significant current source.

21. Short-chained chlorinated paraffins

Listed under Annex A

Chlorinated paraffins are produced by chlorination of straight-chained paraffin fractions and are complex mixtures of certain organic compounds containing chloride: polychlorinated n-alkanes. The chlorination degree of CPs can vary between 30 and 70 wt %. SCCPs can be used as a plasticizer 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. The production of SCCPs has decreased globally as jurisdictions have established control measures.

22. Endosulfan and its related isomers

Listed under Annex A with a specific exemption

Endosulfan is an insecticide that has been used since the 1950s to control crop pests, tsetse flies and ecto-parasites of cattle and as a wood preservative. As a broad-spectrum insecticide, endosulfan is currently used to control a wide range of pests on a variety of crops including coffee, cotton, rice, sorghum and soy.

23. Tetrabromodiphenyl ether & pentabromodiphenyl ether (commercial pentabromodiphenyl ether)

Listed under Annex A with a specific exemption for use as articles containing these chemicals for recycling

Penta-BDE is a brominated flame retardant that inhibits or suppresses combustion in organic material. It has been used mainly was as a fire retardant in polyurethane foams for automotive seats and fittings and in the foams used for domestic furniture, mattresses and carpet underlay, and to a smaller extent non-foamed PUR in casings and electric and electronic equipment including computer casings. Use of PBDEs in electrical and electronic appliances was phased out from 1 July 2006.

24. Toxaphene

Listed under Annex A

This insecticide is used on cotton, cereal grains, fruits, nuts, and vegetables. It has also been used to control ticks and mites in livestock. Toxaphene was the most widely used pesticide in the US in 1975. Up

to 50% of a toxaphene release can persist in the soil for up to 12 years. For humans, the most likely source of toxaphene exposure is food. 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.

25. DDT

Listed under Annex B with acceptable purpose for disease vector control

DDT was widely used during World War II to protect soldiers and civilians from malaria, typhus, and other diseases spread by insects. After the war, DDT continued to be used to control disease, and it was sprayed on a variety of agricultural crops, especially cotton. DDT continues to be applied against mosquitoes in several countries to control malaria. Its stability, its persistence (as much as 50% can remain in the soil 10-15 years after application), and its widespread use have meant that DDT residues can be found everywhere; residual DDT has even been detected in the Arctic. Perhaps the best known toxic effect of DDT is egg-shell thinning among birds, especially birds of prey. Its impact on bird populations led to bans in many countries during the 1970s. Although its use had been banned in many countries, it has been detected in food from all over the world. Although residues in domestic animals have declined steadily over the last two decades, food-borne DDT remains the greatest source of exposure for the general population. The short-term acute effects of DDT on humans are limited, but long-term exposures have been associated with chronic health effects. DDT has been detected in breast milk, raising serious concerns about infant health.

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

Listed under Annex B with a range of acceptable purposes

Perfluorooctane sulfonic acid (PFOS) is a highly fluorinated substance which can act as a highly effective repellent of both oil and water. These properties have provided PFOS with a wide variety of uses, for example PFOS has been used for the protection of paper, leather, fabric, upholstery and carpets, as a surfactant in the mining industry, and in floor polishes, photographic film, denture cleaners, shampoos, surface coatings (paints), and carpet cleaners. PFOS has also been used as an insecticide, specifically as bait for leaf-cutting ants, red fire ants and termites and as a component of fire-fighting foams. PFOS and PFOS-related substances can be released to the environment at their manufacture, during their use in industrial and consumer applications and from disposal of the chemicals or of products or articles containing them after their use. Acceptable purposes for the use of the chemical include: Photo-imaging, photo-resist and anti-reflective coatings for semi-conductor, etching agent for compound semi-conductor and ceramic filter, aviation hydraulic fluids, metal plating (hard metal plating) only in closed-loop systems, certain medical devices (such as ethylene tetrafluoroethylene copolymer (ETFE) layers and radio-opaque ETFE production, in-vitro diagnostic medical devices, and CCD colour filters), fire-fighting foam, insect baits for control of leaf-cutting ants.

27. Polychlorinated dibenzo-p-dioxins (PCDD)

Listed under Annex C

These chemicals are produced unintentionally due to incomplete combustion, as well during the manufacture of pesticides and other chlorinated substances. They are emitted mostly from the burning of hospital waste, municipal waste, and hazardous waste, and also from automobile emissions, peat, coal, and wood. There are 75 different dioxins, of which seven are considered to be of concern. One type of dioxin was found to be present in the soil 10 - 12 years after the first exposure. Dioxins have been associated with a number of adverse effects in humans, including immune and enzyme disorders and chloracne, and they are classified as possible human carcinogens. Laboratory animals given dioxins suffered a variety of effects, including an increase in birth defects and stillbirths. Fish exposed to these substances died shortly after the exposure ended. Food (particularly from animals) is the major source of exposure for humans.

28. Polychlorinated dibenzofurans (PCDF)

Listed under Annex C

These compounds are produced unintentionally from many of the same processes that produce dioxins, and also during the production of PCBs. They have been detected in emissions from waste incinerators and automobiles. Furans are structurally similar to dioxins and share many of their toxic effects. There

are 135 different types, and their toxicity varies. 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.

Appendix 7: Potential e-waste: Selected electronic equipment imports to the Solomon Islands 2008–2016

1. Overview

A determination of electronic equipment imports into the Solomon Islands provides some indication of the quantity of e-waste that will be produced in the country in subsequent years. Whilst to identify all potential imports that might become e-waste is a major task, if selected common items are identified, ones that can be fairly easily extracted from the import data, then these can provide some degree of benchmarking, and act as proxy values, in identifying the scale of the problem faced.

To this end, imports of laptops, desktop & server computers, televisions and video monitors, and cell phones have been extracted from the customs data for the years 2008 - 2016. In addition, lead-acid batteries are looked at, as these give two ballpark indicators for the number of vehicles in use and the number of solar systems in use, as solar home systems in the Solomon Islands are almost entirely 'stand-alone' systems that are used in rural areas and require a battery. These rural systems support the use and charging of a large number of small electronic devices such as cell phones, tablets and small entertainment devices.

The data can provide general trends over the years, and so greatly assist any development and design of an e-waste recycling system, especially where a product stewardship approach is taken where there is an incentive created to return end-of-life electronics - which have become e-waste - for recycling.

This analysis has been undertaken in order to assist the development of the Solomon Islands National Implementation Plan for the Stockholm Convention. The aim is to provide some baseline data from which to measure progress in recovering e-waste in the future.

2. Methodology

It is important that the methodology used to generate this information is clear at the outset, so that any future work can be comparable. Simple number sorting of the data using excel formula and sum tools may produce results that do not reflect the reality for reasons stated below; however, this situation may improve through time where improved identification of items by importers and their agents may make a simple sorting a viable approach in future, as the correct tariff lines are entered for the item in question on the import entry; the evidence is that this will be the case, which may make future analysis much easier.

The data below has been extracted from Solomon Islands Customs import data for the years 2008 to 2016. Years 2008 to 2014 for computers, TVs and video monitors has been extracted from individual customs entry data (i.e. by inspection of every import entry in that general 4-figure tariff line). Tariff numbers refer to the Harmonised System classifications, as used by the Solomon Islands Customs. Information for 2015 and 2016 years only is extracted from aggregated information provided for each individual tariff line, as raw import data was not available. For individual import entries, the data selection was done by inspecting a combination of tariff line, item

description, and c.i.f. value. It must be noted that items are frequently not booked into their correct tariff line, partly as this has no impact on duty payable. For example, large numbers of USB memory sticks fall into 84.71, and should be in 8471.7000 'storage units of automatic data processing machines', but are frequently recorded in other lines, such as that for laptops - 'portable devices'. Laptops are frequently not booked in the 'portable' line (84713000) where they should be; laptops are perhaps the easiest item to identify from all 84.71 data, and are frequently described as such, but even where this is not explicit the technical description frequently serves to identify a laptop, particularly as to screen size (e.g. in *'Sat C850 i5 15.6 4GB 640GB W7'* the *'15.6'* refers to a common laptop screen size).

Some items that are completely unrelated to computers were found booked under 84.71. In addition, the 'quantity' figure ascribed in some instances may be incorrect (examples being found such as a fraction of a laptop), and sometimes the value is recorded in the quantity line, which can drastically upset calculations if a simple 'sum' function is used.

The results have been provided to ECD in an excel file, which has data sorted by year, with a worksheet for each item and year. Each worksheet dataset is sorted such that the 'quantity' value is arranged in ascending order, with the largest quantity entries at the bottom of the sheet. It is, of course, in these larger quantity entries that wrong entry data may most likely distort the final total: thus, particular attention must be paid to entries with large quantities. The data has been sorted by hand, and as such inaccuracies inevitably remain. All numbers are rounded to avoid giving the impression of precision in this exercise, although the results should give a good picture of the scale of the problem of e-waste, at very least concerning these items.

3. Computer Imports

Data from the Solomon Islands Customs Service was extracted for the tariff line 84.71 which is 'Automatic data processing machines' and covers all computer imports. From this, data for conventional computer units, e.g. desktops, servers, and laptops was extracted.

The number of laptops imported in 2016 is three times that of 2008, which may be taken as a general indication that the amount of electronic equipment imported in 2016 (and e-waste generated in the future) might be of the order of thrice that imported in 2008, given that the increase in e-waste is largely in the consumer electronics area, and portable items may be of particular interest to Solomon Islanders given the dispersed nature of the country. It is notable too that the incidence of tablet and 'iPad' type devices becomes prevalent from 2013 (from looking at the raw data), and it can be expected that this trend will rapidly increase, although without looking carefully at future individual import entries it is hard to be specific on this point. Whether tablets/smart phones are being booked under computers (8471) or telephones (8517) is of interest and unclear. A significant number of laptops will also be imported in incoming passengers' luggage as personal items, bought on overseas trips, to avoid duty.

Table A7.1: Imports of computers into the Solomon Islands, 2008 - 2016

Year	Laptop	Desktop/server	All computers
2008	770	1,950	2,720
2009	640	1,680	2,320
2010	820	1,330	2,150
2011	950	1,290	2,240
2012	1,730	1,520	3,250
2013	2,260	1,670	3,930
2014	1,650	2,150	3,800
2015	2,060	3,730	5,790
2016	2,230	6,900*	9,130
Total	13,110	22,220	35,330

Notes on Table A7.1:

- *this 2016 number looks high.
- 2015 and 2016 laptop data is derived from 84713000 only
- 2015 and 2016 desktop/server data is derived from 8471 - 4100; - 4900; -5000; -8000 only

4. Television Sets and Video Monitors

Television and monitors both go into tariff line 85.28: 'Reception apparatus for television….video monitors and video projectors'. Many instances of video monitors can be found in the computer data sets recorded under 8471, and these have been sorted out and added to the table below. Many of the monitors in 8471 are explicitly recorded, but also where the term 'computer set' or similar is used it is assumed that this includes a monitor, and so counted as such.

The data is provided at Table A7.2, and indicates fluctuating imports around the 3 - 5,000 per year. Access to TV stations is understood to be fairly recent for the Solomon Islands.

Table A7.2: imports of TVs and Monitors to the Solomon Islands 2008 - 2016

Year	Computer monitor in 8471	TV & Monitor in 8528	Total
2008	200	5,050	5,250
2009	460	1,650	2,110
2010	1,080	4,900	5,980
2011	710	3,200	3,910
2012	1,200	2,600	3,800
2013	1,030	2,800	3,830
2014	1,150	4,000	5,150
2015	1,040*	2,760	3,800
2016	910*	4,600	5,510
Total	7,780	31,560	**39,340**

Note on Table A7.2:

- *these numbers are derived from 8471.6000 data only and not individual entries
- Data for 2015 and 2016 is from aggregate figures in tariff lines.

5. Telephones

Telephone data comes from totals in the respective tariff lines that might cover mobile phones in 8571, not individual import entries. The tariff classifications have changed during the period, with a distinct line for cell phones in 2016 not showing in the 2014 tariff. Raw individual import entry data was not available for any years for 8571. The number of landlines is expected to be small, being confined to very few locations, principally Honiara. The numbers for the last few years show the explosion in growth of mobile phone use. The actual numbers of mobile phones may be less than the numbers indicate, given that - for example - if we assume a population of around 600,000 people then in the three years 2014 - 2016 some 723,000 mobile phones might have been imported which is significantly more than one for every person in the country, a seemingly high figure.

Clearly, the number of mobile phones that have entered the Solomon Islands in the last ten years can be expected to be of the order of a million units. If the average weight of a phone is 200g over that period, then that translates to something like 200 tonnes of mobile phones. Given a typical phone may have a life of three years, it can be expected that there are currently well in excess of 100 tonnes of mobile phone waste somewhere in the country.

Table A7.3: Estimates of mobile phone imports to the Solomon Islands 2008 - 2016

Year	Phones
2008	11,000
2009	10,000
2010	73,000
2011	66,000
2012	52,000
2013	180,000
2014	280,000
2015	310,000
2016	125,000
Total	**1,107,000**

6. Lead- Acid Batteries

Only 2015 and 2016 data allows sorting out of lead-acid batteries, as for the other years only a total for the 4-figure HS 8507 is available. Nominally, 'other lead acid batteries' would be batteries for solar systems and small number of sealed lead-acid batteries used in items like security cameras and UPS. If a crude estimate is made by using the difference in lead-acid batteries against the total 8507 quantity for the 2015 and 2016 years, and applying it to the other years, then the total of all batteries for the earlier years may be a factor of around 1.5 times larger than the actual number of just lead-acid batteries. Applying this crude calculus to the years 2008 - 2016 would give a total - for 8 years of data - at around 140,000 lead-acid batteries, or an average of 17-18,000 per year. Table A7.4 provides some data, albeit incomplete.

These numbers give no indication of weight of the batteries, which is the key factor for recycling, but if a typical car battery is considered at 16kg, then the 2015 and 2016 combined total for car batteries (27,600 units) would represent something like 440 tonnes of used lead acid batteries potentially available for recycling around 3-4 years after import, the typical life expectancy of a lead-acid battery in tropical environment.

Table A7.4: Estimates of imports of lead-acid batteries into Solomon Islands 2008 - 2016

Year	Car battery*	Other lead-acid	Total lead acid	Total all 8507	Difference
2008	N/A	N/A	N/A	11,940	N/A
2009	N/A	N/A	N/A	N/A	N/A
2010	N/A	N/A	N/A	13360	N/A
2011	N/A	N/A	N/A	18,920	N/A
2012	N/A	N/A	N/A	14,330	N/A
2013	N/A	N/A	N/A	30,030	N/A
2014	N/A	N/A	N/A	37,000	N/A
2015	16,260	7,710	25,985	44,380	20,400
2016	11,350	3,440	16,806	55,220	40,430
Totals	27,610	11,150	42,791	213,240	

Note: ** 'Car battery' refers to batteries used for starting engines and covers batteries used in small boats and trucks etc.*

With 'car battery' numbers if the order of 13,000 per year in the last two years, and with a typical life expectancy of three years, that tends to indicate something of the order of 30,000 vehicles - and small boats - in operation that have engines that use batteries (typically 4 stroke petrol and diesel engines, as small 2-stroke outboards usually do not have a battery).

Again, over the last two years of the table, around six thousand per year 'other lead acid' batteries might be mostly associated with solar PV systems, but as the total for HS 8507 is significantly higher than what the total of the lead-acid only lines give, there are probably large numbers of small sealed lead-acid batteries that are used in small-scale 'barefoot solar' systems that are not booked under these lead-acid battery lines. If so, the number of small solar home systems could be many thousands. HS8507 does not include dry cell batteries such as torch batteries, so the extra numbers (nominally ni-cad and Li-ion cells) may well reflect a significant number of lead-acid batteries.

7. Summary and Conclusions

Total quantities of e-waste are not large on a global context, but large from a Pacific Island Country perspective. From the point of view of uPOPs that may be released from these materials, there is a high chance these items will either end up being burnt in informal waste dumps, or buried, or dumped into waterways. Much of this dumping and burning will take place in pristine rural areas where efforts at avoiding pollution would have great value for environmental protection.

Collection of the e-waste is the greatest single challenge in a country as dispersed as the Solomon Islands, where internal travel can be an arduous business that may take several days to get from one part of the country to another. Some sort of incentive program will be essential; but the advantage of the situation is that much of the target materials are portable and small, precisely because of the geography. Any recycling system is likely to be centred on the mobile phone, both as a communication device to reach out to the public, and as an item to be recovered. Phones are also closely connected to ULABs generated from solar home systems in rural areas, and ULABs have a good recyclable value, so there are synergies there to be exploited. The move to smaller, more dense devices such as tablets and touch-screen phones is good in that it makes these things easier to recover and also militates against local recyclers burning items to recover non-ferrous metals, a common problem when copper is recovered from old cables by open burning, for example.

These numbers at least provide some basic benchmarks for selected items that are easy to identify and categorise, and so make collection of new data in the future easier and consistent with this material. These figures can also provide some degree of proxy value for the entire e-waste problem to help policy makers grasp the scale of the challenge faced.