

**Government of Samoa  
Ministry of Natural Resources and Environment**

**Samoa's National Implementation Plan for  
Persistent Organic Pollutants**

**December 2004**

## Foreword

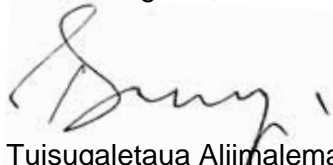
The Government of Samoa wishes to thank the Stockholm Convention Secretariat at the United Nations Environment Programme in Geneva for its vision in recognizing the global threat of Persistent Organic Pollutants (POPs) to the environment as well as human health. Samoa also thanks especially the Global Environment Facility (GEF) for funding Samoa's Enabling Activity for POPs to meet obligations of the Convention and especially the development of this National Implementation Plan (NIP) for POPs.

Samoa's NIP targets the reduction, elimination and monitoring of persistent organic pollutants and persistent toxic substances. Key to the success of the NIP is the effective coordination of a national effort to ensure our islands and people are safe from the harmful effects of such chemicals. It is only when the knowledge on such things dangerous is shared and disseminated that we may be able to effectively counter their adverse impacts.

Although POPs pesticides have been phased out in Samoa, and that PCB-contaminated transformers are being eliminated, there is a very real concern that our people are unaware of the constant release of dioxins and furans into our atmosphere and how these releases affects the health and environment of our people. The use of pesticides in the past also left behind a legacy of contaminated sites that need rehabilitation. It is hoped that through this NIP, Samoa will minimize and remove from our islands the dangers of persistent organic pollutants and persistent toxic substances.

I would like to acknowledge several institutions and stakeholders who partook in formulating Samoa's NIP. These include: the UNDP office based in Samoa and the Ministry of Finance for their timely facilitation of the project, members of the POPs National Task Team as well as their respective agencies and organizations for guiding all activities of the project, and the Pacific Environment Consultants Limited and Montgomery Watson and Harza (NZ) Limited for their contractual obligations in developing the NIP. A special thank-you also to all those who participated in several national workshops on POPs and the NIP, whose comments and feedback further progressed the development of the NIP. These include: the Non-Governmental Organisations, the Government agencies and corporations, women-group representatives, the village mayors, the farmers and the youth leaders.

Malo lava galue, malo lava le onosai.



Tuisugaletaua Aliimalemanu Sofara Aveau  
Minister of Natural Resources and Environment

## Executive Summary

Samoa's National Implementation Plan (NIP) for Persistent Organic Pollutants (POPs) incorporates the findings of several studies implemented to assess the presence of POPs chemicals and levels of contamination, areas of significant contamination, the country's institutional capacity to formulate and implement a plan for POPs reduction and elimination, and to finalize an inventory of POPs in the country.

Samoa's POP's inventory reveals the presence in the country of 8 of the 12 POPs targeted by the Stockholm Convention and a ninth suspected from the presence in pesticides in which it is a known impurity. These are aldrin, chlordane, dieldrin, Dichloro-Diphenyl-Trichloroethane (DDT), and heptachlor as pesticides, Poly-Chlorinated Biphenyls (PCBs) as an industrial chemical and dioxins and furans as unintentional introductions. Hexachlorobenzene (HCB) is present as an impurity in chlorothalonil, pentachlorophenol (PCP), atrazine, picloram, and others.

Calculations of unintended releases of dioxins and furans using the Convention Toolkit methodology show an annual release of about 1.4 gramme of Toxic Equivalents per annum. This total is low relative to other more populated countries e.g. New Zealand, but higher on a per capita basis. However, because of this continuing albeit unintentional release, it also makes dioxins and furans the most prevalent of POPs chemicals in Samoa's environment.

Five sites have high levels of POPs contamination and are identified as priority sites requiring remediation. These are the Agricultural Store Corporation's (ASC)'s Vaitele compound, Island Pest Control (IPC) facility in Vaivase, the Samoa Forest Corporation (SFC), Asau decommissioned timber treatment facility, the Electric Power Corporation's (EPC) compound in Vaitele (Figures 1-4), and William Arp estate at Moamoa-tai/ Alafua. Others include marine sediments at the Apia wharf and mangrove margin of the oil tank storage at Sogi (Figures 5-6), and EPC, Tanugamanono.

Because all identified POPs have since been non-consented for further importation and because there is no local manufacturing of intentional production of POPs chemicals, the strategies and action plans of Samoa's NIP focuses on safeguarding against illegal importation, the cleaning up of contaminated sites, the disposal of existing stockpiles, reduction of unintentional releases, continuing monitoring of other suspected sites and media, public awareness and education and the building of local capacity to effectively implement actions in these key areas.

Safeguarding against illegal importation calls for the strengthening of legal frameworks which, to date, adequately regulates against the importation of POPs pesticides, but not other potentially hazardous chemicals imported for general industrial use. A review of all chemicals-related legislation is recommended to determine how best to address several issues including possible overlapping of legislation, ambiguous definitions, and the loophole with respect to chemicals imported for general industrial use and others.

Actions for cleaning up contaminated sites prescribe the prior selection and preparation of proper disposal sites, the shipment of existing stockpiles of POPs and other intractable pesticides under the current Australian Assistance in International Development (AusAID)/ Secretariat of Pacific Regional Environment Programme (SPREP) programme for Pacific Island Countries including Samoa, and the implementation of site-specific plans. Actions for the continuing monitoring and assessment of several other suspected sites is indicative of the on-going work needed to fully rid the country of all areas that have high and dangerous levels of contamination. Unintentional releases of dioxins and furans require actions to regulate and minimize emissions from motor vehicles, power plants, and open burning.

Having the relevant technology and technical capacity are crucial elements of the NIP, especially since these have been identified as lacking in Samoa. All actions under the major objectives of the Convention entail an element of public awareness and involvement. This is a significant feature of the NIP. The health and environmental impacts of POPs need to be well understood at all levels of the community, many of whom handled POPs pesticides directly when these chemicals were considered safe and necessary for banana plantations and other purposes. Some of the contaminated areas are within villages' jurisdictions and often accessed freely by community members without knowledge of the health risks involved.

The NIP is summarized and presented in a matrix format that shows proposed actions, success indicators, implementing agencies/organizations and the corresponding objectives of the Stockholm Convention that each action contributes to. An indicative budget over the first five years of NIP implementation is provided, identifying estimated costs, potential sources of funds and reflecting priorities for actions in the schedule of activities.



**Chlordane and Heptachlor contaminated soils at:  
1. Agriculture Store Corporation, Vaitele.  
Source: GoS, MNRE (2003)**



**2. Island Pest Control, Vaivase**



**3. Copper-Chrome-Arsenic (CCA) contaminated  
Samoa Forest Corporation, Asau, Savaii Island.  
Source: GoS, MNRE (2004)**



**4. Transformers including PCB-contaminated at  
Electric Power Corporation, Vaitele.  
GoS, MNRE (2003)**



**Persistent Toxic Substances (PTS) Contaminated Marine Sediments:**

5. Tri-Butyl Tin (TBT) contaminated, Main Matautu Wharf

6. Poly-nuclear Aromatic Hydrocarbons (PAHs), contaminated mangrove margine, Sogi

**List of Acronyms Used**

Acronym	English	Samoan
AG	Attorney General	Loia Sili
APCS	Air Pollution Control Systems	Tenikolosi e faamama ai asu ae le' i sao atu i le ea.
ASC	Agriculture Store Corporation	Faleoloa o Faatoaga
CCA	Copper-Chrome-Arsenic	Vailaau sa soka ai laupapa

DDT	Dichloro-diphenyl-trichlorethane	Pauta sa fana ai tumoa fa'i ma tinei ai namu
DEC	Division of Environment and Conservation (of MNRE)	Vaega o le Siosiomaga ma Faasao
EPC	Electric Power Corporation	Faalapotopotoga o le Malosi Eletise
GDP	Gross Domestic Product	Aofaiga o Tupe-maua o se Atunuu
GEF	Global Environment Facility	Faalapotopotoga mo le Siosiomaga o le Lalolagi
HCB	Hexa-Chloro-Benzene	Vailaau e pisia ai isi vailaau e tinei ai manu faalafua
IPC	Island Pest Control	Kamupani e tineia manufaafua.
MCIL	Ministry of Commerce, Industry and Labor	Matagaluega o Pisinisi, Alamanuia ma Leipa
MESC	Ministry of Education, Sports and Culture	Matagaluega o Aoga, Taaloga ma Aganuu
MfR	Ministry for Revenue	Matagaluega o Tupe Maua
MNRE	Ministry of Natural Resources and Environment	Matagaluega o Punaoa Faanatura ma le Siosiomaga
MoA	Ministry of Agriculture	Matagaluega o Faatoaga
MoF	Ministry of Finance	Matagaluega o Tupe
MoH	Ministry of Health	Matagaluega o Soifua Maloloina
MPPFS	Ministry of Police, Prisons and Fire Service	Matagaluega o Leoleo, Falepuipui ma Tinei Mu
MWCSD	Ministry of Women, Community and Social Development	Matagaluega o Tina ma Tamaitai, Atinae o Nuu ma Afioaga, ma Agafesootai
MWTI	Ministry of Works, Transport and Infrastructure	Matagaluega o Galuega, Felauaiga ma Atinae
NGO(s)	Non-Government Organisation(s)	Faalapotopotoga e le i lalo o le vaaiga o le Malo
NIP	National Implementation Plan	Fuafuaga o Samoa mo le Vaaiga o POPs
NUS	National University of Samoa	Iunivesite Aoao o Samoa
NTT	National Task Team	Komiti e faagaioia Polokalame mo POPs
OLSSI	O Le Siosiomaga Society Inc.	Faalapotopotoga o Le Siosiomaga
PAHs	Polynuclear Aromatic Hydrocarbons	Vailaau oona e maua mai faatafunaina o suauu
PCBs	Polychlorinated Biphenyls	Vailaau oona sa faaaoga i pusa fana uila eletise
PCDD/ PCDF	Poly-Chlorinated Dibenzo-p-Dioxins/ Poly-Chlorinated Dibenzo-Furans	Vailaau e maua i le faatafunaina le atoatoa o soo se mea ae maise mea e gaosia ma le kolorini
PCP	Penta-Chloro-Phenol	Vailaau oona e ogaoga aafiaga sa soka ai laupapa
PECL	Pacific Environment Consultants Ltd	Kamupani o Alii Suesue le Siosiomaga o le Pasefika
PIC	Prior Informed Consent	Maliega i le Faanoi muamua
POP(s)	Persistent Organic Pollutant(s)	Vailaau-oonaa e Ogaoga Aafiaga
PTS	Persistent Toxic Substances	Vailaau Oona e Tumau (i tagata ma le siosiomaga)
PUMA	Planning and Urban Management Agency	Pulega mo Taulaga ma Atinae
SAT	Samoan Tala	Tala Samoa
SFC	Samoa Forest Corporation	Faalapotopotoga mo Vaomatua o Samoa
SPREP	Secretariat of the (former South) Pacific Regional Environment Programme	Pulega o Polokalame mo le Siosiomaga o le Pasefika (i Saute)
SWA	Samoa Water Authority	Faalapotopotoga mo le Vai o Samoa
TBT	Tri-Butyl-Tin	Vailaau e vali ai vaa
TCB	Transport Control Board	Komiti o Taavale Afi
TEQ	Toxic Equivalents	Faatusatusa o le Oona
TPH	Total Petroleum Hydrocarbons	Aofaiga o Haitoro-karaponi mai Suauu
WHO	World Health Organisation	Faalapotopotoga mo le Soifua o le Lalolagi

## Table of Contents

	Page
Foreword	ii
Executive Summary	iii
List of Acronyms	vi
1. Introduction	2
2. Methodology	4
3. Country Baseline	6
3.1 Country Profile	6
3.1.1 Physical and Demographic context	
3.1.2 Political and Geographic structure	
3.1.3 Economy	
3.1.4 Environment	
3.2 Institutional Policy and Regulatory Framework	8
3.2.1 Environmental and Sustainable Development Policies and General legislative framework	
3.2.2 Roles and Responsibilities	
3.2.3 Relevant International Commitments and Obligations	
3.2.4 Existing Legislation and Regulations Addressing POPs	
3.2.5 Education and Public Awareness Needs and Gaps	
3.3 POPs Assessment:	13
3.3.1 Introduction	
3.3.2 Background	
3.3.3 Production, Import and Use	
3.3.4 Levels and Trends	
3.3.5 Stockpiles	
3.3.6 Contaminated Sites	
4. Strategies and Action Plan Elements of the National Implementation Plan	20
4.1 Policy Statement	20
4.2 Implementation Strategy	20
4.3 Strategies and Action Plans	21
4.4 National Implementation Framework	32
4.5 Indicative Financial Plan	46
5. Priority Projects	63
6. Bibliography	64
Annex 1. List of People Consulted	69



## **1. Introduction**

Samoa ratified the Stockholm Convention on Persistent Organic Pollutants on 4 February 2002. The Convention entered into force on the 17<sup>th</sup> of May 2004.

As a party to the Convention, one of Samoa's first obligations is the compilation of an initial inventory and the formulation of a National Implementation Plan (NIP) for the proper management and eventual elimination of POPs. With GEF funding, the Planning and Urban Management Agency (PUMA) of the Ministry of Natural Resources and the Environment (MNRE) initiated the POPs project in January 2002 with several activities including the compilation of an initial inventory of POPs and PTS. The consulting firm of Montgomery Watson Harza (MWH) undertook this work under contract (Figures 1 and 2 refer). The Pacific Environment Consultants Ltd (PECL) was also contracted in July 2003 to finalize the MWH inventory, assess the extent of POPs contamination and the country's institutional capacity, and to compile a National Implementation Plan (NIP).

The National Implementation Plan is based largely on the findings of three studies; namely, the POPs and PTS Assessment Report, the POPs Inventory Report, and the Institutional Capacity Assessment Report. Relevant comments and inputs received from public consultations, reviewers amongst members of the National Task Team and other experts have been incorporated into the three source reports, as well as the NIP. All of the justifications and backgrounds to actions proposed in the NIP are provided in these reports. The NIP will therefore be more easily explained and understood when read in conjunction with the aforementioned documents.

The NIP was formulated using a broadly consultative process ably led and coordinated by the Planning and Urban Management Agency (PUMA) of the Ministry of Natural Resources and Environment (MNRE), with the support of the National Task Team for POPs, and involving a large number of government agencies, corporations, NGOs and private sector representatives. The initial NIP draft went through several iterations to incorporate comments and inputs from members of the National Task Team and others (Figures 7-10). Presentations of the draft NIP were also made at two public meetings held in conjunction with the National Chemical Awareness Day activities organized by PUMA. The same public meetings also presented a valuable opportunity to promote and raise public awareness both of POPs and of the NIP.

The National Task Team's finalization of the draft NIP report included further consultation workshops with representatives of: Government agencies and Corporations (Figure 10); Non-Governmental Organisations; Village Mayors, Women groups, Youth leaders, Farmers Association; and the Samoa Chamber of Commerce and Industry (Annex 1). Following finalization and translation into the Samoan language, the NIP was submitted to Cabinet for endorsement with a view for consequent transmission to the Stockholm Convention Secretariat.



7. Participants at NIP Criteria Workshop  
Source: GoS, MNRE, 2004.

8. POPs National Task Team Meeting.  
Source: GoS, MNRE, 2004.



9. Third National Chemicals Awareness Day  
Savaii Island, 2004.  
Source: GoS, MNRE, 2004.

10. Consultation Workshop with Govt.  
Agencies and Corporations, 2004.  
Source: GoS, MNRE, 2004.

## 2. Methodology

Samoa's National Implementation Plan (NIP) for POPs was initiated and developed in partnership with the Government of Samoa and the Global Environment Facility (GEF). With funds made available from GEF through the United Nations Development Programme (UNDP), Samoa's Enabling Activity for POPs began, with the Ministry of Natural Resources and Environment (MNRE) as the National Execution Agency.

To implement the provisions of the Stockholm Convention, the Planning and Urban Management Agency (PUMA) of the MNRE was selected as the National Lead Agency. Following this, a special POPs unit and National Task Team (NTT) were also established. The Unit consisted of persons employed specifically for their chemicals and environmental background and expertise, and were tasked with the responsibility of creating and strengthening an enabling environment for the management of POPs. This included: awareness raising, capacity building, and the development of a NIP for POPs. The NTT was selected from a wide range of institutions and organizations that have different views and interests in Samoan society.

The PUMA, as the National Lead Agency, together with the National Task Team (NTT), contracted the firm of Pacific Environment Consultants Ltd. (PECL) to develop and produce the draft NIP. Preparations for the compilation of the draft NIP included:

1. Agreement with PECL on the terms of reference for the development of the NIP,
2. Endorsement of PECLs proposed work plan for developing the NIP,
3. PECL undertaking an independent expert review of the Initial Inventory of POPs and PTS in Samoa that was compiled by MWH,
4. Endorsement by the NTT of the recommendations from the independent review report and the proposed work plan for completing the POPs inventory and the Institutional Capacity Assessment,
5. Assessment of existing available information and the conducting of field sampling and interviews on gaps identified in the Initial Inventory,
6. PECL consulting members of the NTT on an individual basis,
7. PECL consulting experts outside of the NTT,
8. National Workshops for the estimation of Dioxin and Furans,
9. National Workshop on the Draft NIP,
10. Presentations on the draft NIP during the National Chemical Awareness Day, both for Upolu and Savaii.
11. Review of the Assessment reports and draft NIP by the NTT,
12. Review of the Assessment reports and draft NIP by experts outside of the NTT,
13. Completion and submission of Assessment reports and draft NIP to PUMA and the NTT,
14. Acceptance of the draft NIP by the NTT,
15. Further six national consultation workshops and a separate meeting to reach consensus on the draft NIP,
16. Finalisation/ Acceptance of the final NIP by the NTT and MNRE
17. The translation of the final NIP into the Samoan language,
18. Submission of the final translated report to Cabinet for their endorsement and approval, and,
19. Transmission of the final NIP to the Stockholm Convention Secretariat.

Throughout the consultancy, the Project Coordinator and Project Manager of the POPs Unit monitored PECLs activities on matters relating to the implementation of their consultancy. This progress was then presented to the NTT during its monthly meetings where the NTT was given opportunity to present feedback, further instructions and information on several issues and matters needed to complete the draft. The draft NIP was completed and considered in April 2004.

In finalising the draft NIP report, a further seven consultation workshops were held from August through October 2004 to reach consensus on the submitted draft report. Four consultation workshops and a separate meeting were held on the main island of Upolu while two others were held on the larger but less populated island of Savaii. The POPs Unit, together with sub-committee members of the NTT, facilitated focus group discussions with the participants to ascertain comments for incorporation into the final NIP report. Following this, the NIP was finalized and accepted by the NTT and the MNRE in December 2004.



Figure 11. Women and Youth representatives during focus group discussions of NIP Strategies and Action Plans for presentation to Plenary, Tooa Salamasina Hall, Upolu Island, 21 October 2004

### 3. Country Baseline

#### 3.1 Country Profile

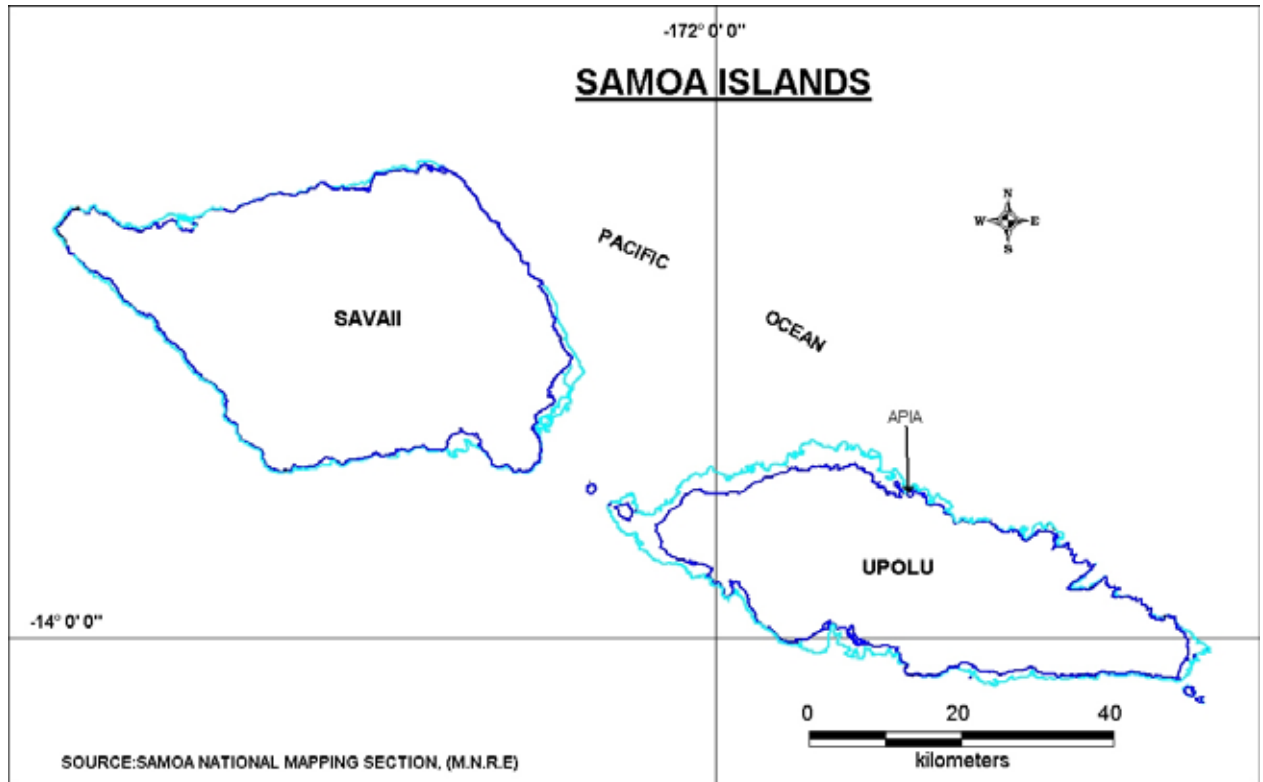


Figure 12:

##### 3.1.1 Physical and Demographic Context

Samoa consists of two main islands namely Upolu and Savaii, and seven smaller islands all of which lie between about 13° and 14° South latitude and 171° and 173° West longitude. The total land area is 2,934 km<sup>2</sup> and a sea area within Samoa's Exclusive Economic Zone is about 128,000 km<sup>2</sup>. The most populous and developed island is Upolu, where the national capital Apia is located. About 80 per cent of the land is under customary tenure.

The 2001 Census enumerated slightly more than 167,000 persons, about 98 per cent of whom are Samoans including assimilated Europeans (referred to separately as part-European to the 1950s), Chinese and other Pacific islanders. The same census recorded 40,000 people living in and around the urban area of Apia. There has also been considerable migration from Savaii to the North West of Upolu. The resulting higher population concentration in the NW Upolu and Apia Urban Area is a cause for concern regarding the carrying capacity of the environment and natural resources to support it. There is inevitable pressure and impacts on water resources, land use planning and management, atmosphere and climate change, waste management, agriculture and forestry, fisheries and marine resources.

The 1991 Census recorded the workforce employed in industries other than agriculture, forestry and fishing in the greater Apia area at 51 to 60 per cent (%), 21 to 30 % in most of the rest of northern Upolu, and on Savaii in districts encompassing Salelologa and Asau.



### **3.1.2 Political and Geographic Structure of the Country**

Samoa has a representative democratic parliamentary system of government. The Constitution provides for a Head of State, a Prime Minister, a Cabinet of Ministers who comprises the Executive Council, and a 49-member Legislative Assembly. Members of the Legislative Assembly are elected by universal suffrage from 41 electoral constituencies and for a term of five years. The last election took place in March 2001. The Village Fono Act 1990 recognizes village by-laws which gives traditional village councils authority over the management of village affairs in collaboration with the National Government.

Approximately 50% of Savaii and 40% of Upolu are of steep slopes derived from volcanic activity. Both islands have central mountain ridges formed from a chain of volcanic peaks and craters. In Upolu, the mountain range runs along the length of the island with some peaks rising to more than 1000 metres (m) above sea level, surrounded by flat and rolling coastal plains. Savaii contains a central core of volcanic peaks reaching 1858m at the highest point and encompassed by a series of lava-based plateaus, hills and coastal plains.

All the islands of Samoa were formed by volcanic activity. Most soils were derived from basaltic volcanic flows differing largely in age and type of deposit. The young volcanic structure of the island means the soils is at places very porous for leaching into the groundwater system.

### **3.1.3 Economy**

The economy is relatively small with aggregate Gross Domestic Product (GDP) in current prices of SAT 720 million (approx. US\$200 million) in 1999 implying a per capita income of US\$1,390. Economic performance is constrained by distance to markets, a small local market, and a limited labor base that cannot compete with Asian countries in labour-intensive production and a high vulnerability to natural disasters particularly cyclones.

The agricultural sector accounts for 10-15% of GDP and is characterized by a substantial subsistence base which continues to provide a source of livelihood for over 80% of the population and a high level of domestic food security. More recently, the fisheries sector has replaced agriculture as the dominant export earner.

The second half of the 1990s was characterized by relative prosperity based on strong performances in the tourism and fisheries industries. GDP growth in 1998 was 3.4% rising to 5.6% in 1999 and 4.0 % in 2000 driven mainly by the fishing sector, construction, commerce, transport and communication. At the same time inflation declined to 0.3% in 1999 the lowest level in five years. Inflation is expected to remain low as tariff cuts resulting in competitive trading conditions work through to consumer prices.

The relatively successful introduction of extensive economic and financial reforms in the second half of the 1990s has made the last decade a historical turning point in the development of Samoa. These reforms have included, building effective partnerships between the government and the private sector, overhauling of the revenue structure for the government based on the introduction of the value added goods and services tax, a reduction and simplification of import tariffs and income taxes, institutional strengthening of government departments and corporations, corporatisation and privatisation of selected public sector activities, financial sector

liberalisation and overall pursuance of good governance principles in the public sector.

### **3.1.4 Environment**

Samoa's biological environment reflects a rich natural heritage of high species diversity and endemism. It is estimated that Samoa supports 775 native vascular plant species of which approximately 30% of the angiosperms are endemic. There are about 280 genera of native angiosperms (more than any other archipelago in Polynesia). In addition, there are about 250 introduced plant species and 47 threatened plants.

Samoa's fauna consists of 21 butterfly species, 11 species of reptiles, 43 resident bird species eight of which are endemic, two flying fox species, and a bat (Taule'alo, 1993). This biodiversity constitutes an essential aspect of the Samoan culture, with many cultural proverbs and oratory traditions derived from or reflecting relationships with the forests, reefs, marine life and land animals.

The smallness and geographical isolation of Samoa's islands from continental landmasses resulted in the high level of species endemism. At the same time, the same factors provide the seeds for its ecological fragility and vulnerability. For instance, many species have limited defenses against aggressive invasive species, and while endemism is high at the species level, it is less diversified at higher taxa levels. Genetic variability is thus limited.

The ecological vulnerability inherent in its smallness, isolation, and limited genetic variability is exacerbated by the ever present threat of extreme events such as cyclones, flooding, climate variability, and the impacts of human activities. In this context, the environmental and human threat that POPs chemicals present aggravates an already challenging situation.

## **3.2 Institutional, policy and regulatory framework**

### **3.2.1 Environmental policy, sustainable development policy, and general legislative framework.**

Samoa's Development Strategy for 2002-2004 promotes a vision of "...improved quality of life for every Samoan premised on sustained economic growth, improved education, enhanced health standards and strengthened cultural and traditional values."

Enhancing health standards and sustaining economic growth are dependent, amongst other factors, on a healthy biophysical environment and natural resource base. This rationale underpins environmental protection and sustainable development strategy.

The elimination of POPs, which Samoa committed itself to when it ratified the Stockholm Convention on POPs, constitutes one of several elements of Samoa's overall strategy for the protection of its environment and the pursuit of sustainable development.

Samoa's legislative framework for regulating the importation and management of POPs and other persistent toxic substances (PTS) hinges mainly on the Pesticides Regulation 1990 and to a lesser degree, the Poisons Act 1968. This framework

covers most but not all imported chemicals. A range of chemicals imported for a broad range of industrial uses is not regulated. There are also areas in the existing framework that needs strengthening. These issues are targeted in Samoa's NIP.

The Lands, Surveys and Environment Act 1989 is the overarching environmental protection legislation that addresses issues related to hazardous waste management and disposal. The PUM Act 2004 further strengthens environmental protection with stricter environmental planning requirements for all major development activities, and the creation of the Planning and Urban Management Agency (PUMA).

Before ratifying the Rotterdam Convention on Prior Informed Consent (PIC Convention) in 2002 Samoa had issued non-consents for eight POPs pesticides previously imported under its Pesticides Regulation 1990. To date, the Pesticides Regulation constitutes the main legal instrument for regulating the importation of POPs and PTS. The PUM Act 2004 defines the framework for planning the use, development, management and protection of land in Samoa. Under this Act, PUMA is empowered to prepare 'sustainable management plans' and prepare 'development standards' in respect of new developments targeted at specific requirements including in relation to the emission of pollution and means for its prevention, control and mitigation. It also provides for Environmental Impact Assessments to be undertaken by developers if the Agency deems it necessary. This legal authority therefore bodes well for regulating the presence of POPs and PTS in Samoa.

Two other draft legislations are being considered for passage into law, the Ministry of Natural Resources and Environment Bill and the draft Environmental Impact Assessment Regulations. Once enacted, these will significantly strengthen the legal framework for environmental management. There are however several other legal issues that need to be addressed to bring all hazardous chemicals under effective management. A legal review is proposed that will consider these issues and all available options for the appropriate actions to be taken.

### **3.2.2 Roles and Responsibilities**

The Ministry of Natural Resources and Environment (MNRE) is responsible for the protection of Samoa's environment and has overall coordination responsibility for the implementation of Samoa's National Implementation Plan (NIP). Within the Ministry, the Planning and Urban Management Agency (PUMA) will be the lead agency.

Activities of the NIP will be implemented by a variety of government agencies and corporations. Others will by necessity be outsourced to private contractors while others still will require the involvement of local NGOs, community groups and educational institutions. The involvement of many agencies and organizations in government and the private sector calls for a multi-sector approach and a mechanism for interagency coordination.

An existing National Task Team for POPs, currently supporting the GEF-funded Samoa NIP POPs project, is proposed to assist PUMA with the coordination of inputs from all the stakeholder groups involved. The NTT will be chaired by the Assistant CEO of PUMA, and will meet regularly to monitor progress in implementation, coordinate inputs from different agencies and organizations, and advice on interagency issues as necessary. Key agencies and organizations of the NTT includes, the Ministry of Health, Ministry of Agriculture, Ministry of Commerce, Industry and Labor, Ministry of Foreign Affairs and Trade, Ministry of Works, Transport and Infrastructure, Ministry of Women, Community and Social



Development, Ministry for Revenue, Agriculture Store Corporation, Electric Power Corporation, Samoa Ports Authority, National University of Samoa, University of the South Pacific Alafua Campus, and Samoa Umbrella of Non-Governmental Organisations.

### 3.2.3. Relevant International Commitments and Obligations

Samoa is party to the following international conventions related to chemical management, and is obligated to comply with its responsibilities under each convention:

1. *Stockholm Convention on Persistent Organic Pollutants, 2001 (Stockholm Convention)*. Signed: 23 May 2001, Ratified: 4 February 2002
2. *Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal, 1989*. Acceded: 22 March 2002
3. *Convention to Ban the importation into Forum Island Countries of Hazardous and Radioactive Wastes and to control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region (Waigani Convention), 1995*. Ratified: 23 May 2001
4. *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 1998 (Rotterdam Convention)*. Acceded: 30 May 2002
5. *United Nations Framework Convention on Climate Change, 1992 (UNFCCC)* Signed: 12 June 1992, Ratified: 29 December 1994; and Kyoto Protocol ratified 15 November 2000 (in force 16 February 2005)
6. *Vienna Convention for the Protection of the Ozone Layer, 1985*. Acceded: 21 December 1992
7. *Montreal Protocol on Substances that Deplete the Ozone Layer, 1987* Acceded: 21 December 1992; and Amendments<sup>1</sup>
8. *International Convention for the Prevention of Air Pollution from Ships, 1973; as modified by the protocol of 1978 relating thereto (Marpol), 1973 /1978*. Acceded: 4 February 2002

### 3.2.4. Existing Legislation and Regulations Addressing POPs

The Pesticides Regulation 1990 is the main law for regulating the importation of POPs pesticides. Non-consents required under the Rotterdam Convention on PIC have been issued to importing parties under this Convention. The Poisons Act 1968 regulates the importation of poisons and toxic substances as defined under this Act.

Several other legislations deal with different aspects of hazardous substances management once they pass through border control. The Lands, Surveys and

---

<sup>1</sup> London Amendment (1990); Copenhagen Amendment (1992); Montreal Amendment (1997); and Beijing Amendment (1999)

*Note:* Governments are not legally bound until they ratify the Protocol as well as the Amendments. Samoa 'accepted' all four Amendments on 4 October 2001; the London, Copenhagen and Montreal Amendments came into force for Samoa on 2 January 2002; the Beijing Amendment is not yet in force.

Environment Act 1989 and the PUMA Act 2004 deal with disposal and environmental monitoring. These and other relevant legislation and their respective areas of responsibilities are indicated in Table 1.

**Table 1: Existing Legislation and main purposes.**

Legislation	Importation	Storage	Transport, Distribution & Marketing	Use and Handling	Disposal	Environmental Monitoring
Lands Surveys and Environment Act 1989					✓	✓
Poisons Act 1968	✓	✓	✓	✓	✓	
Pesticides Regulation 1990	✓	✓	✓	✓	✓	
Food and Drugs Act 1967	✓	✓	✓	✓		
Occupational Safety and Health Act 2002		✓	✓	✓	✓	✓
PUM Act 2004					✓	✓

Specifically for POPs and PTS, Table 2 depicts relevant national legislations and their relevant provisions. These existing legislations can help regulate POPs and PTS in Samoa.

**Table 2: National Legislations and their relevant provisions for POPs and PTS**

POPs/PTS	Relevant National Legislation	Relevant provisions
POPs pesticides (aldrin, dieldrin, chlordane, DDT, endrin, heptachlor, mirex, hexachlorobenzene, toxaphene).	Pesticides Regulation 1990	Non-consent for importation.
Dioxins and furans	Lands, Surveys and Environment Act 1989	Regulate introduction of hazardous substances; maintain air quality.
Dioxins and furans	Forest Act 1967	Prohibit the causing of forest fires on any land.
Polychlorinated biphenols (PCBs) /PTS	Lands, Surveys and Environment Act 1989	Regulate introduction of hazardous substances.

### 3.2.5 Education and Public Awareness needs and gaps

#### 3.2.5.1 Education

The Curriculum Statement for Science, Years 9-12, in Samoa Secondary Schools was recently revised and published in February 2004. Noteworthy is the addition of a strand on "The World and Beyond" which addresses environmental themes. In addition, the revised Year 12 and Year 13 Biology curricula contain an "Environment" strand addressing issues such as adaptation, conservation and ecosystems. The Organic Chemistry strand of the Year 13 curriculum for Chemistry addresses the issue of environmental problems caused by polythene and PVC products. Tertiary-level chemistry courses, in particular the 3rd year course "Advanced Environmental Chemistry" offered at the National University of Samoa (NUS), provide technical expertise directly related to POPs and PTS.

The Faculty of Science at the NUS currently offers a Diploma in Environmental Science and a Bachelor of Science degree with the possibility to major or minor in Environmental Science. Another available option for formal education at NUS in environment-related topics is enrolment in individual courses on a non-award basis. This can include courses offered by other faculties in environment-related areas such as Physical Geography, and Health and the Environment. The Faculty of Science does not currently offer short term skills-based training such as offered by some other faculties. However, the capacity is there to organise and run short skills-based training around the skills area of existing staff, given demand and a narrow time frame of June - July and November - January. The possibility of collaboration with MNRE-PUMA and SPREP in such short term training has merits and advantages for all three parties and should be explored.

Overall, the potential of NUS to contribute to Samoa's capacity in hazardous chemical management is significant. The existing Bachelor of Science degree program with a major in Environmental Science (introduced in 2004) provides a solid foundation in environmental chemistry and biology/ecology that is essential to hazardous waste management. This will offer MNRE, other government agencies and the private sector, a ready source of well trained graduates to serve their increasing needs in this crucial area.

With regard to environmental monitoring, NUS has functioning laboratories but would need additional funding for equipment and chemicals to be able to contribute to any initiatives in this area. An on-going chemical field monitoring program using science students and staff is an area of possible involvement that NUS should consider and where collaboration with PUMA can be of mutual advantage.

The University of the South Pacific School of Agriculture (USP-SOA) has a Department of Soil Science and Agricultural Engineering that offers formal courses in Fundamentals of Soil Science, Soil Fertility, Plant Nutrition and Soils, and Water and Structures Engineering as part of the Diploma, Bachelor, Masters and PhD degrees in Agriculture. Close collaboration between USP-SOA and the Institute of Research and Training in Agriculture (IRETA) facilitates the transfer and dissemination of knowledge and information to users including technical field people, scientists, policy makers, students and farmers.

Other departments at USP-SOA offer courses that deal with issues related to the management of agricultural chemicals such as fertilisers and pesticides. These courses include Plant Protection, and Pest and Disease Management.

### **3.2.5.2 Public Awareness**

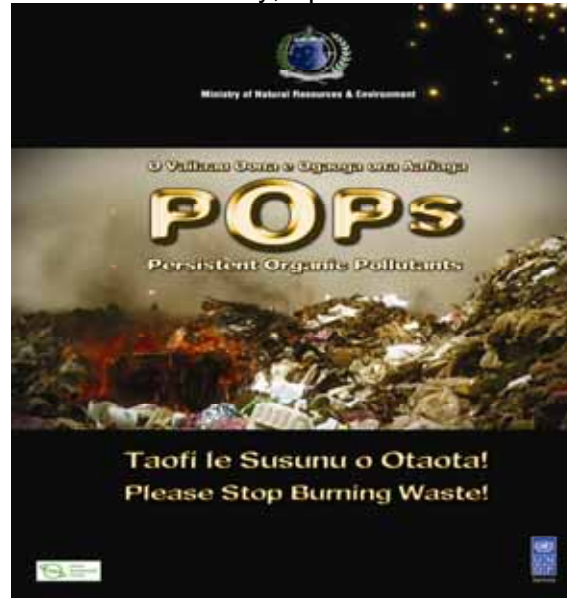
The importance of public awareness and understanding of the threat to public health and the environment posed by POPs and PTS, or hazardous chemicals generally, is pivotal to all efforts aimed at regulating the importation, use and ultimately the elimination of POPs and PTS in Samoa.

In 2003, a survey questionnaire targeting secondary school students found that 21 % of students interviewed had learnt of POPs and PTS for the first time through the project's awareness raising activities; such as two National Chemicals Awareness Days, several radio talkback shows, posters and a POPs documentary.

After several awareness raising activities conducted from 2002 to 2004, the majority of representatives who participated in activities such as workshops, seminars, and consultations, would like to see more programmes on POPs and PTS

brought out to the villages. The people support the objectives of the Stockholm Convention and feel that it is only with the cooperation of each village council that the releases of dioxins and furans can be regulated and monitored in their own respective communities. They also wish to see more of the POPs documentary on Samoa's national television as well as hear more about such issues on the radio.

Figure 13: Poster developed to promote the theme of 'Stop burning Waste' for the third National Chemicals Awareness Day, April 2004



### 3.3 POPs Assessment

#### 3.3.1 Introduction

Persistent organic pollutants are a set of chemicals that are toxic, persist in the environment for long periods of time, and characterized by low water solubility and high lipid solubility thus bio-accumulate in fatty tissues as they move up the food chain. Because they are semi-volatile, they circulate globally via the atmosphere, oceans, and other pathways, such that those released in one part of the world can travel to regions far from their source of origin.

Globally, the persistence of these chemicals in the atmosphere and bioaccumulation in fatty tissues has caused detrimental impacts on human health and the environment (UNEP Chemicals, 2003a). For Samoa however, this statement has not yet been proven true, due to the lack of resources and research to determine the above.

#### 3.3.2 Background

Of the 12 POPs chemicals identified in the Convention, eight are present in Samoa with the ninth suspected from the presence of its impurities. These include aldrin, chlordane, dieldrin, DDT, and heptachlor as pesticides, PCBs as an industrial chemical and dioxins and furans as unintentional introductions. There is also the presence of DDT as an impurity (<0.1%) in Dicofol<sup>2</sup>. Hexachlorobenzene (HCB) is

<sup>2</sup> Despite the presence of DDT as an impurity in Dicofol, current Dicofol usage data indicate that DDT releases to the environment from this source are likely to be small.

also present as an impurity in chemicals such as chlorothalonil (e.g. Bravo 50), pentachlorophenol (PCP), atrazine, picloram, and others.

Table 3 Nine of the twelve POPs chemicals found in Samoa		
<sup>1</sup> Pesticide	<sup>2</sup> Industrial Chemical	<sup>3</sup> Byproduct
1. aldrin <sup>1</sup>		
2. chlordane <sup>1</sup>		
3. DDT <sup>1</sup>		
4. dieldrin <sup>1</sup>		
5. heptachlor <sup>1</sup>		
6. Hexachlorobenzene (HCB) <sup>1,2,3</sup>		
7. polychlorinated biphenyls (PCBs) <sup>2,3</sup>		
8. polychlorinated dibenzo-p-dioxins (Dioxins) <sup>3</sup>		
9. polychlorinated dibenzo-furans (Furans) <sup>3</sup>		

### 3.3.3 Production, Import and Use

#### 3.3.3.1 Sources

Samoa does not manufacture any of the intentionally released substances such as pesticides and industrial chemicals, thus the main source of entry is importation. As for unintentional releases, the main sources are through uncontrolled combustion, such as open fire for cooking and for the burning of rubbish, controlled combustion processes such as incineration, and incomplete combustion exhaust from motor vehicle exhausts.

#### 3.3.3.2 Intentional introductions: Pesticides and PCBs

Samoa does not manufacture any of the pesticides or PCBs identified in the Convention, while its association with some of the agricultural chemicals go back as early as the 1950's. During this time, dieldrin was used to control the leaf hopper for taro plantations, and beetle borer in banana plantations. Aldrin and chlordane were used for the control of the sweet potato weevil. (Laufasi Ola Bulletin, 1956).

Based on the inventories and assessment reports, the POPs and PTS were imported for the following uses.

- Aldrin and dieldrin which are similar compounds were used for crop protection against various soil dwelling pests as well as for termite infestation, by soaking the young banana saplings in the chemicals before planting. The approach was discontinued in the late 1970's
- DDT was commonly used as one of the mixtures in the puffer for new banana bunches and as health vector spraying for dengue fever in the 1970's. According to Ministry of Health reports, DDT was last used for dengue fever vector spraying in 1974.
- Chlordane was originally used as a pesticide on field crops such as corn and citrus fruits and was later used to control termites in houses and cable phone lines. The last known supplies were with the Agricultural Store and Island Pest Control in the early 1990's.
- Heptachlor was imported for use as a non-agricultural insecticide for ants and termite control.

- PCBs were imported as part of electrical transformers. The amount of PCB-based transformers imported over the years could not be estimated reliably due to incomplete records.
- The presence of chlorothalonil, picloram, pentachlorophenol (PCP), atrazine, lindane in the Agriculture store list of chemicals (SPREP, 2000) indicated that HCB may also be present in Samoa although analysis has not shown any traces.
- Lindane was imported for pharmaceutical uses for scabies, but with alternatives now available, this should be discontinued or phased out.

The lack of records to ascertain the quantities of POPs chemicals imported by the main importers such as the Agricultural Store is a constraint to compiling a complete inventory. The recent inventories and survey's (MNRE, 2004b) did not find any pesticide stockpiles while the only indication of past use was obtained from personal communications with people with past direct association with their use or management.

### 3.3.3.3 Unintentional Introduction: Dioxin and furans

Dioxins and furans are mainly produced from incomplete combustion processes of vehicles and incinerators, industrial processes with no Air Pollution Control Systems (APCS), and open burning (e.g. cooking). According to US, EPA (2000), dioxin can be formed through natural combustion, but the contribution of natural combustion to dioxin levels in the environment is probably insignificant. Within Samoa, the inventory of dioxins and furans indicates that major releases are from:

- Waste Incinerations: approximately 0.797 gramme (g) Toxic Equivalents/ annum (TEQ/a) is released annually from fly ash and to air
- Uncontrolled combustion: approximately 0.445g TEQ/a mainly from open and uncontrolled burning
- Power generation and Heating: approximately 0.009g TEQ/a with the majority release from domestic heating and cooking
- Transportation: approximately 0.003g TEQ/a mainly from vehicle and 2 stroke engines emissions
- Miscellaneous: approximately 0.2 TEQ/a from dry cleaning and tobacco smoking
- Waste disposal, Consumer goods, and metallurgic processes have insignificant releases on an annual basis.

**Table 4: Estimated Dioxin and furan releases in Samoa**

Cat.	Source Categories	Annual Releases (g TEQ/a)				
		Air	Water	Land	Products	Residue
1	Waste Incineration	0.797	0.000	0.000	0.000	0.000
2	Ferrous and Non-Ferrous Metal Production	0.000	0.000	0.000	0.000	0.000
3	Power Generation and Heating	0.009	0.000	0.000	0.000	0.000
4	Production of Mineral Products	0.000	0.000	0.000	0.000	0.000
5	Transportation	0.003	0.000	0.000	0.000	0.000
6	Uncontrolled Combustion Processes	0.245	0.000	0.020	0.000	0.180
7	Production of Chemicals and Consumer Goods	0.000	0.000	0.000	0.000	0.000
8	Miscellaneous	0.000	0.000	0.000	0.000	0.150
9	Disposal/Landfilling	0.000	0.000	0.000	0.000	0.000
10	Identification of Potential Hot-Spots					
<b>1-9</b>	<b>Total</b>	<b>1.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>

Samoa's estimated annual dioxin and furan releases of about 1.4 g TEQ/a is similar to that of Brunei Darussalam, whose annual dioxin and furan release is 1.401 g TEQ/a. Despite this similarity however, it should be noted Brunei's population is estimated at 350,000 while Samoa's population is 169,000. Clearly, this means that Samoa has a higher release of Dioxins and Furans on a per capita basis.

Other countries that used the UNEP Standardized Toolkit have estimates of annual releases higher than Samoa. They include Uruguay (28g TEQ/a), Jordan (142.2g TEQ/a), and New Zealand (14-51g TEQ/a for air only). Nevertheless, complacency in reducing dioxins and furans could pose some impacts in the future if appropriate Best Environmental Practices (BEP) and Best Available Technology (BAT) options are not used for waste incineration and transport in particular.

### **3.3.4 Levels and Trends**

#### **3.3.4.1 Intentional releases: Pesticides and PCB**

The levels of pesticides releases in Samoa varied throughout the years, with the last major releases of DDT, dieldrin and aldrin occurring between the 1950's to the 1970's. Heptachlor and chlordane had confined uses for termite spraying up to the early 1990's and is assessed to have limited nation-wide contamination. The presence of only five PCB contaminated transformers above acceptable levels denotes the limited spread of contamination nationwide.

Since POPs pesticides and PCBs are no longer consented for importation into Samoa, intentional releases into the environment is effectively curbed, except when they are imported illegally. Therefore current levels of contamination, which are very confined and localized for soils, are expected to decrease over the years, especially if the highly contaminated areas can be cleaned and disposed or sealed from further contact by humans or animals.

The current levels of bioaccumulation for DDT, dieldrin, and PCB in fatty tissues for animal fat, humans and marine sediments is assessed to be considerably lower than levels of concerns for human health and environment. However, although the levels are low, the persistent nature of these chemicals requires the continued testing of breast milk and pig fat samples so that POPs and PTS presence and levels are recorded for monitoring purposes. These levels will continue to decrease over the years as long as no new chemicals containing the same active ingredients are released into the environment.

For some of the marine sediments where high concentrations of TBT have been found, it is anticipated that an increasing trend will continue due to the high level of use of the Apia harbor and wharf by visiting ships, yachts and other vessels as the main seaport of entry into the country. TBT levels should be routinely monitored within the harbor so that toxicity levels can be made public, especially as several families still fish within this area.

#### **3.3.4.2 Unintentional releases: dioxin and furans**

The current releases from dioxin and furans are low compared to other countries of the world, but greater on per capita and land area bases. Based on the precautionary principle, actions need to be taken now to reduce their accumulation in the soil and water and their bioaccumulation in animals.

### 3.3.5 Stockpiles

To date, the only stockpiles of POPs found in Samoa are from electric transformers with PCB. A complete assessment of PCBs is not possible due to some of the transformers still being used. To date, however, only five transformers have been confirmed to have PCBs. The obsolete transformers and those taken for repairs are tested using the PCB quick test method (Clor-N-Oil 50, PCB Screening Kit (EPA Method 9079). Samples of the transformer oils that test positive are then sent overseas for analysis and confirmation. Transformers with PCB are then placed in the allocated stockpiles at the EPC Vaitele depot.

Buried stockpiles of obsolete chemicals were noted at the Nuu Research station but there is no authoritative verification of the specific chemicals involved. The types of chemicals buried were based on the recollections of some staff in the absence of any documentation (Burns et al., 2000). Additionally, analyses of sampling taken from the disposal sites show very low levels of heptachlor contamination.

### 3.3.6 Contaminated Sites:

Of the sites selected and analyzed for the POPs assessment, only five are considered as high priority for immediate remediation based on the extreme high levels of soil contamination. Three of the sites are contaminated with POPs chemicals, one is a mixture of POPs and PTS, and the fifth is contaminated with PTS only.

The high priority sites are much localized and of very small areas, with the areas having the highest concentration of contaminants usually less than 25 square meters and less than 2m in depth.

- The Agricultural Store Corporation's Vaitele compound: the area shows contamination from a mixture of chemicals including chlordane and heptachlor. Chlordane showed the most contamination which is around 10 times above recommended levels for commercial sites. The contamination has reached 1.5m depths and shows to cover around 25m square around the old docking bay to the storeroom. The major concerns at this site related to the risk of contamination of workers at the compound including night watchman whose cookhouse is less than 10m from the contaminated area, whose chickens forage over the contaminated site. Immediate actions will need to be done to stop access of the area by both humans and animals, and for remediation actions to be carried out as soon as possible.
- The Island Pest Control facility in Vaivase shows contamination of chlordane, heptachlor, and heptachlor epoxide. The levels do not exceed those of commercial areas, although total chlordane is more than 7 times above the recommended levels for residential areas. The concern is due to the close proximity of the contaminated site to family residences. Possible actions will be to seal off the contaminated site while a plan for possible disposal is implemented.
- The SFC Asau old timber treatment facility showed arsenic acid concentrations exceed the guidelines by up to 30 times. Copper and chromium III concentrations are also significantly elevated; however the levels of these determinands are either within the guidelines or are not considered a major health risk given the current land use. All samples exceed the acceptance criteria



set for agricultural land use purposes, as listed in the New Zealand timber treatment guidelines.

- William Arp's storage and handling facility in Moamoa, show elevated levels of dieldrin and DDT. Families now occupy this area and are at serious risk of contamination.
- The Electric Power Corporation, Vaitele, although not having much PCBs contamination in soil samples taken, it is considered a potential contaminated site as pre-1987 transformers continue to be brought in for decommissioning and testing.

Other sites were also found to be contaminated but below levels that would pose a concern for human health and the environment. Nevertheless, some actions need to be taken to ensure that future exposure is eliminated. These include:

- **Vaiusu Bay and Matautu Wharf:**  
The two sites showed high levels of dieldrin, and DDT as well as TBT and some other heavy metals. Due to the limited size of samples collected, the results are only preliminary until further investigation.
- **Nuu Agricultural Research Station:**  
Heptachlor was detected at a disposal site at the Nu'u Agricultural Research Station in one sample with the level of contamination below recommended guideline levels.
- **A decommissioned timber treatment plant at Asau:**  
SFC Asau's decommissioned timber treatment plant, had PCBs-contaminated oil in one old transformer.

**Table 5: POPs and PTS in Samoa**

POPs	Use	Amounts	Current status	Levels	Trends
Aldrin	Banana plantations	Moderate	Non-consent for import since 1998	<ul style="list-style-type: none"> <li>Widely used in banana plantation up to the 1970's</li> <li>No known contamination or stockpile</li> </ul>	<ul style="list-style-type: none"> <li>No new releases into the environment</li> <li>Soil erosion could result in bio-accumulation in aquatic and marine organisms</li> </ul>
Chlordane	Termite control	Low	Non-consent for import since 1993	<ul style="list-style-type: none"> <li>Contamination in only two storage sites (ASC Vaitele and IPC Vaivase)</li> </ul>	<ul style="list-style-type: none"> <li>No new releases into the environment</li> <li>Possible contamination at homes sprayed with chlordane</li> <li>Localized contamination can be eliminated with clean up</li> </ul>
DDT	Banana plantation  Vector control	Widely used in banana plantations, and in homes	<p>Non-consent for agricultural use since 1993</p> <p>Last import of DDT-formulated mosquito coils in 1994</p>	<ul style="list-style-type: none"> <li>Contamination at ASC Vaitele facility, and some old plantations</li> <li>low level detection in pig fat, marine organisms tested</li> <li>Very low levels of DDT in humans possibly from past use or imported food and other products</li> </ul>	<ul style="list-style-type: none"> <li>Possible increase in food chain bioaccumulation from existing low levels in marine organisms from Vaiusu Bay and domesticated pigs</li> <li>Decreasing levels of presences in humans due to the absence of any new releases</li> </ul>
Dieldrin	Banana plantations	Widely used in banana plantations	Non-consent for import since 1998	<ul style="list-style-type: none"> <li>widely used for banana plantations</li> <li>Confined contamination in two confirmed sites</li> <li>Presence in marine organisms</li> </ul>	<ul style="list-style-type: none"> <li>No new releases into the environment</li> <li>Decrease of bioaccumulation in food chain</li> </ul>
Heptachlor	Termite control	Low	Non-consent for import since 1994	<ul style="list-style-type: none"> <li>very low and confined use for termite control</li> <li>contamination only at ASC Vaitele compound and IPC Vaivase</li> </ul>	<ul style="list-style-type: none"> <li>no new releases into the environment</li> <li>Possible contamination at homes sprayed with chlordane</li> </ul>
PCB	Electrical transformers	Low	Importing countries do not produce PCB transformers anymore	<ul style="list-style-type: none"> <li>unknown number of imported transformers with PCB</li> <li>three contaminated sites (EPC Vaitele, Salelologa and SFC Asau)</li> </ul>	<ul style="list-style-type: none"> <li>no new imported transformers containing PCBs</li> <li>contaminated sites are sealed and planned for disposal, therefore pose limited risk to the environment and human health</li> </ul>
PCDD/PCDF	Produced from combustion processes and burning	Moderate	Produced from combustion processes and burning with low levels from other processes	<ul style="list-style-type: none"> <li>emissions are low compared to other countries</li> <li>highest releases from biomass burning and incinerators</li> </ul>	<ul style="list-style-type: none"> <li>considerable decrease in future when new (and upgraded) incinerators with good APCS are installed</li> <li>implementation of waste management strategy</li> </ul>
<b>PTS:</b>					
TPH/PAH	Oil waste	Low		<ul style="list-style-type: none"> <li>presence at the main bulk storage oil facility</li> </ul>	<ul style="list-style-type: none"> <li>will be reduced when good oil management plans are installed for waste oil disposal</li> </ul>
TBT	Anti-fouling for boats	Low	No anti-fouling done in the country	<ul style="list-style-type: none"> <li>presence in marine sediments from main Matautu Wharf</li> </ul>	<ul style="list-style-type: none"> <li>Could continue to be present in the area due to high traffic use of the area, although no anti-fouling is done in country</li> </ul>
CCA/PCP	Timber treatment	Moderate	not used anymore	<ul style="list-style-type: none"> <li>the SFC site in Asau is the only area that has significant presence which should be a priority contaminated site for clean up</li> </ul>	<ul style="list-style-type: none"> <li>clean up of SFC site will eliminate future contamination</li> </ul>
Lindane (g-BHC/ HCH)	For scabies	Low	Non-consent for import since 2000 when alternative was identified	<ul style="list-style-type: none"> <li>found as degradation product beta-HCH in breast milk samples</li> </ul>	<ul style="list-style-type: none"> <li>used for medical purposes only</li> </ul>

## 4. Strategies and Action Plan Elements of the National Implementation Plan

### 4.1 Policy Statement

**Improving the quality of life of all Samoans is of paramount importance. Samoa is committed to pursuing this goal based on a competitive economy with sustained economic growth, improved education, enhanced health standards and strengthened cultural and traditional values.**

**Persistent organic pollutants (POPs) and persistent toxic substances (PTS) constitute a threat to the health of Samoa's people and the natural environment that supports its economic growth and prosperity. As a party to the Stockholm Convention on POPs, Samoa is committed to the effective and timely reduction and elimination of POPs and PTS, other than exemptions.**

**The Government of Samoa recognizes and endorses this National Implementation Plan (NIP) as its blueprint of action for achieving the goal of this policy. The NIP also recognizes the importance of stakeholders' roles in achieving this goal.**

### 4.2 Implementation Strategy

The implementation of the NIP will involve many sectors, and will engage several government agencies, institutions and non-governmental organizations. This multi-sector approach calls for an effective mechanism to facilitate collaboration and a strong and well-resourced coordinating body to have overall responsibility.

The Planning and Urban Management Agency (PUMA) of the Ministry of Natural Resources and Environment (MNRE) will have overall coordination of the POPs NIP Implementation Project. A Chemicals Management Unit, comprising of a Project Manager, Project Coordinator, and support staff is proposed to be established within PUMA to perform this function.

The existing National Task Team (NTT) for POPs will continue to function as the mechanism for interagency collaboration. This mechanism was set up to assist PUMA in coordinating the formulation of the NIP. It needs to be strengthened further with the inclusion of other key stakeholders currently not represented. The NTT will be chaired by the Assistant CEO (PUMA) and will meet regularly to review progress reports on implementation, advise PUMA as necessary and assist with coordinating inputs from different stakeholder organizations.

Other specialized technical committees will be formed and convened as deemed necessary by PUMA and NTT to deal with specific issues. This is envisaged in key areas such as pesticides, and chemicals currently imported unregulated for general industrial use.

Implementation of specific activities will involve:

- Different agencies with relevant mandates under PUMA's overall coordination. For example, all pesticides regulatory work to remain under Ministry of Agriculture (MoA), with the Pesticides Registrar directly

responsible. PUMA is also expected to play the leading role in several key activities.

- Local institutions and NGOs (e.g. National University of Samoa, OLSSI)
- Regional institutions and organizations including SPREP and University of the South Pacific;
- Private contractors and consultants, and
- Local communities, women's and youths groups and schools.

It is important to work closely with local communities (women groups, youth groups, local schools, farmers, untitled men, chiefs and village councils) to raise awareness of POPs and to obtain their support to reduce of the potential impacts of POPs and PTS.

### 4.3 Strategies and Action Plans

The National Implementation Plan (NIP) consists of several specific strategies and action plans each targeting different objectives. The objectives of each Strategy and Action Plan reflect those of the Stockholm Convention on POPs, thus establishing a direct link between Samoa's obligations under the Convention and the actions proposed in the NIP for their achievement.

The following Strategies and Action Plans define the objectives, targets and key actions proposed for Samoa's NIP, i.e.:

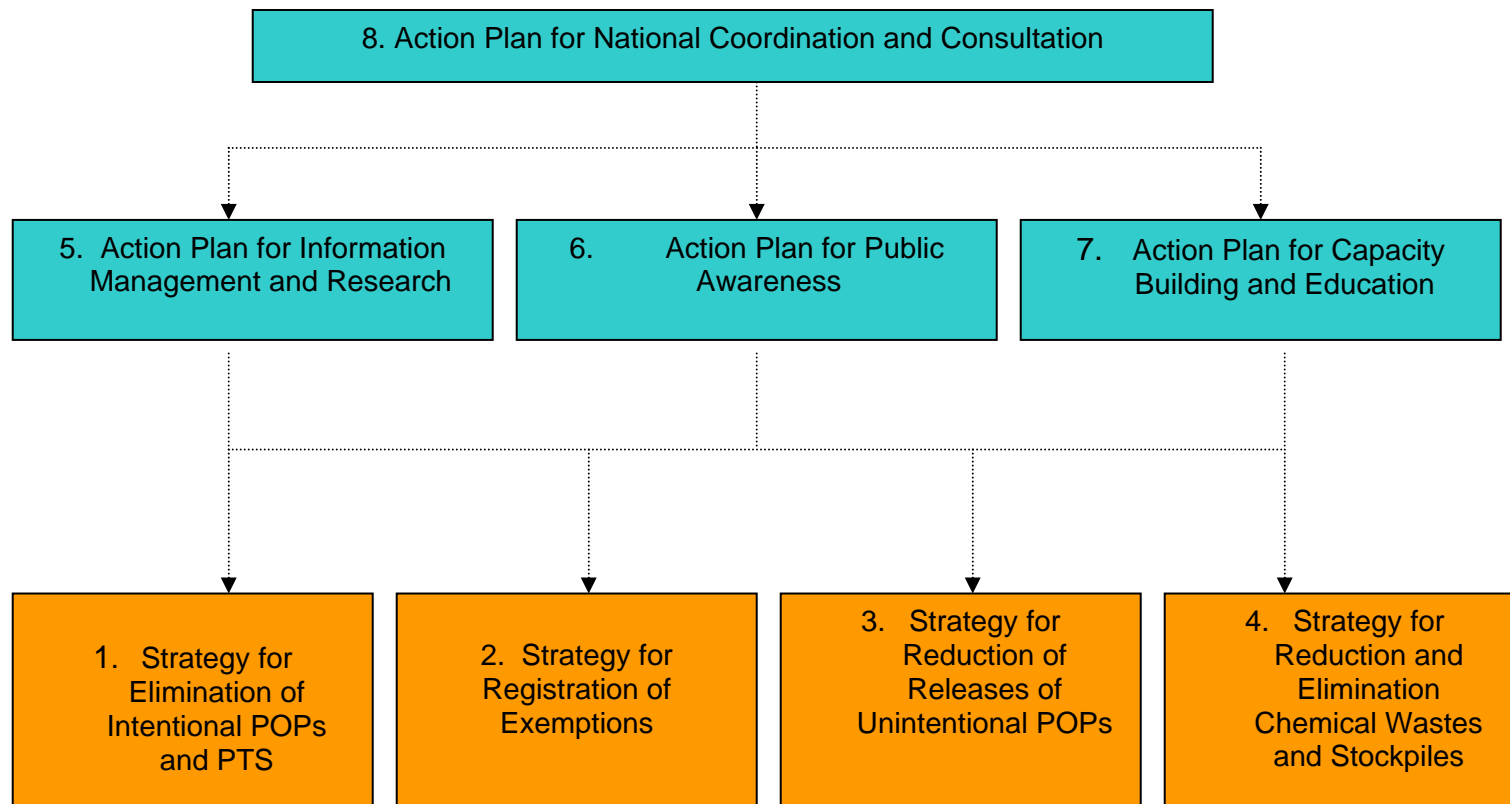
- 4.3.1 Strategy for the Elimination of Intentional POPs<sup>3</sup> and PTS
- 4.3.2 Strategy for the Registration of Exemption
- 4.3.3 Strategy for the Reduction of the Releases of Unintentional POPs
- 4.3.4 Strategy for the Reduction and Elimination of Chemical Wastes and Stockpiles
- 4.3.5 Action Plan for Information Management and Research
- 4.3.6 Action Plan for Public Awareness
- 4.3.7 Action Plan for Capacity Building and Education
- 4.3.8 Action Plan for National Coordination and Consultation

---

<sup>3</sup> POPs includes PTS where appropriate throughout

### Flow Diagram of NIP Strategy and Action Plan Inter-linkages

The following flow diagramme shows that the Strategy for national coordination and consultation is the umbrella for the remaining strategies and action plans. The next level of inter-linkages is the Strategy for information management and research, and the two action plans, i.e. those for capacity building and education, and public awareness. The specific inter-linkages are to the remaining Strategies, i.e. those for exemption, elimination of intentional POPs, reduction of unintentional POPs, and elimination of chemical wastes and stockpiles. Inter-linkage of exemption with awareness, and capacity building and education would await preparation of submission for exemption.



### 4.3.1 Strategy for the Elimination of Intentional POPs and PTS

#### Introduction

Samoa has effectively implemented several measures to reduce and eliminate the intentional releases from pesticidal and industrial POPs<sup>4</sup>. Specifically, most pesticidal POPs identified in the Convention have over the last few years been non-consented for importation under the related Rotterdam Convention. Electrical transformers containing PCBs have been phased out by most importing countries and Samoa, through the Electric Power Corporation (EPC), has discontinued their further importation. Furthermore, EPC is actively testing old (pre-1987) transformers to identify those containing PCBs for decommissioning and disposal.

Building on these actions, this strategy aims to strengthen the existing regulatory frameworks and the capacity of relevant border-control agencies to stop further POPs importation.

**Objective:** To reduce and eliminate the import, use and release of intentional POPs and where appropriate PTS in Samoa

**Target:** All intentional production (including importation) and releases to be eliminated in line with the Stockholm Convention (Article 3)

#### Actions:

##### 1. Legislative frameworks to ban POPs chemicals and regulate importation of industrial chemicals

- a. Review chemical related legislation to address legal issues identified in Institutional Capacity Assessment report.
- b. Develop a national policy for the management of toxic chemicals and wastes for Samoa taking into account the above review. Develop industrial guidelines for PUM Act.
- c. Enact the Ministry of Natural Resources and Environment Bill as a matter of priority.
- d. Provide an enabling environment to support the enforcement of existing legislation, in particular the Pesticides Regulation 1990.

##### 2. Strengthen capacity of institutions and agencies responsible for regulating chemical management.

- a. Develop and implement protocols that require importers of chemicals to disclose the list of active ingredients with products and imported chemicals to facilitate the monitoring of POPs imported under different trade-names.
- b. Train border control officers to effectively apply monitoring protocols regulating POPs importation.
- c. Regulate the import of properly labeled products in line with international trading standards and practices.

---

<sup>4</sup> Includes PTS where appropriate throughout  
Government of Samoa  
Ministry of Natural Resources and Environment  
Planning and Urban Management Agency  
Matautu-tai, Apia  
Samoa

### 4.3.2 Strategy for the Registration of Exemption

#### Introduction

While DDT is one of the 12 banned POPs chemicals under the Stockholm Convention, under Article 4 of the Convention, Parties are allowed to register for one or more types of specific exemptions for the continued use of specific POPs chemicals where there is a justifiable need that cannot be substituted by another non-POPs chemical. The use of DDT for disease-vector control spraying is one such need.

Samoa must apply for an exemption for the continued importation and use of DDT for disease-vector spraying. This exemption is precautionary in nature, to preserve for Samoa this option should it need it in the future in the event of an imminent threat of malaria, or possibly dengue. The exemption is further justified by the lack of other alternatives to DDT for this purpose.

**Objective:** Register for DDT exemption for disease vector control.

**Target:** Registration of exemption for DDT by end of 2006.

#### Actions:

**1. Registration of exemption for DDT by end of 2006.**

- a. Prepare and transmit appropriate written notification and other reporting requirements to the Stockholm Convention Secretariat to request and register Samoa's exemption for DDT.
- b. Prepare and submit a report to the Convention Secretariat and the World Health Organization (WHO) after 3 years of exemption, as required under Annex B Part II of the Stockholm Convention.

**2. Obtain information on alternative non-POPs to exemption.**

- a. Seek from the Secretariat, WHO, et al. alternatives, other than the 4 currently used, to exemption.

### 4.3.3 Strategy for the Reduction of the Releases of Unintentional POPs

#### Introduction

Samoa releases (unintentionally) an estimated 1.4g Toxic Equivalents (TEQ) annually of dioxins and furans into the atmosphere. This is considered low compared to developed and most other developing countries. The releases will continue to increase if actions are not taken now to reduce them in areas where alternatives or best environmental practices or technology are available.

Consistent with the objectives of the Stockholm Convention on POPs and to minimize any potential risks to human health and the environment, Samoa will actively implement the following actions to reduce dioxins and furans releases by 20 percent (%) by 2010.

**Objective:** To reduce releases of from unintentional POPs.

**Target:** The releases from POPs unintentionally produced are reduced by 20% of 2003 levels by 2010.

#### Actions:

- 1. Regulatory frameworks to promote the reduction of unintentional releases of dioxins and furans from incomplete combustion processes, such as internal combustion engines and power generation plants**
  - a. Set emission standards for motor vehicles and local industries (e.g. power generation plants).
  - b. Enact national legislation to enforce emission standards for all vehicles and local industries.
  - c. Conduct public awareness activities to promote new standards amongst importers of motor vehicles and the general public.
  - d. Develop local capacity (including institutions) to test all imported vehicles and local industries power generation plants for compliance with new emission standards.
  - e. Monitor the impacts on reduction of releases for meeting the proposed target with links to the following actions (see action 4 below)
  - f. Technology to be sought with reduced releases of unintentional POPs, (e.g. fuel efficient stoves).
- 2. Improve air pollution control systems (APCS) for all major technology, eg incinerators and industries.**
  - a. Develop and implement a programme for upgrading and/ or replacing all existing public and private incinerators with cleaner technology or incinerators with effective APCS.
  - b. Industries to be encouraged to improve APCS.
- 3. Implement actions of the Waste Management Strategy which supports separation of higher dioxin releasing chemicals**
  - a. Initiate actions to promote the separation of waste materials, which generate unintentional POPs from open burning.
  - b. Promote composting as an alternative to burning organic materials, including waste.
  - c. Promote efficient waste collection and disposal facilities to reduce burning wastes.



- d. Promote reuse and recycling of plastics including packaging/ containers, and reduce use of non bio-degradables.
- e. Conduct an awareness campaign to stop burning wastes to reduce unintentional POPs.

**4. Improve efficiency of cooking with wood and other stoves**

- a. Identify efficient, and cost-effective methods of cooking and promote their use.

**5. Further assess and monitor the releases of dioxins and furans**

- a. Undertake further assessment of releases of dioxins and furans.
- b. Develop and implement a programme for the long term monitoring of dioxin and furan bioaccumulation in human tissues and environment
- c. Monitor and research the impacts on reduction for meeting the proposed target with links to the above 3 actions.

#### 4.3.4 Strategy for the Reduction and Elimination of Chemical Wastes and Stockpiles

##### Introduction

Samoa's inventory of POPs and PTS identified several contaminated sites which require immediate cleanup and or management. There are also stockpiles of POPs and PTS that were put together earlier under an AusAID/ SPREP regional initiative. The stockpiles are earmarked for shipment to and destruction at an Australian facility by about the end of 2004. The contaminated sites are targeted for clean-up as part of Samoa's NIP implementation. This strategy prescribes the relevant measures for putting this into operation.

**Objective:** Reduce and eliminate releases from stockpiles and chemical wastes

**Target:** All hazardous wastes, stockpiles and contaminated sites have been identified and disposed of and/ or remediated by 2010.

##### Actions:

- 1. Develop and implement a programme for the disposal of stockpiles and the cleaning up of contaminated sites.**
  - a Identify potential disposal sites for Upolu and Savaii.
  - b Develop selected disposal sites to enable the safe disposal of hazardous chemical wastes.
  - c Implement clean-up and management plans for identified contaminated sites.
  - d Facilitate and support the earliest implementation of the AusAID/ SPREP POPs/PTS Disposal Project that will remove existing stockpiles of POPs and PTS for destruction in Australia.
  - e Enforce Waigani/ Basel Conventions for trans-boundary movement of waste, and use Rotterdam Convention article requiring identifying transit of hazardous chemicals under Prior Informed Consent.
  
- 2. Initiate capacity building programmes for clean up and management of contaminated sites**
  - a Train staff in the safe handling and disposal of hazardous chemicals.
  - b Procure appropriate safety gear and essential equipment.
  - c Promote public awareness of the disposal sites, and of clean-up activities requiring public knowledge, participation and support.
  - d Secure the contaminated sites to minimize releases pending their remediation.
  
- 3. Identify other POPs contaminated sites and media and implement appropriate remedial actions.**
  - a Develop and implement a long term testing strategy for pre-1987 electrical transformers.
  - b Conduct testing of all sites suspected for possible contamination with POPs and PTS including dieldrin, DDT and others.
  - c Review NIP to incorporate findings and actions needed to address results of research and testing strategies.
  - d Enforce a permit system to import chemicals, especially industrial (including development).

### 4.3.5 Action Plan for Information Management and Research

#### Introduction

The lack of information regarding past importation and use of chemicals into Samoa was a constraint to determining what POPs chemicals were present in Samoa's environment. It is important that henceforth, relevant information is well recorded and maintained. Timely exchange and access to up-to-date information amongst agencies such as the Ministry of Agriculture (MoA), Ministry of Health (MoH) and the Ministry for Revenue (MfR) is essential to the effectiveness of border-control agencies. Similarly, monitoring and testing for PCBs-contaminated transformers requires the close collaboration and exchange of data and information between EPC, MNRE, MoH and several other agencies.

There are also several gaps in information and knowledge that can only be addressed through systematic and science-based research activities. Not only should these be addressed through a properly designed and executed research program, but the management of new knowledge and information to be generated must reflect a commitment to application, in sharing information with relevant implementers, and their use to update the NIP.

**Objective:** Impacts of hazardous chemicals (including POPs and PTS) on the health of Samoa's population and its environment are better understood.

**Target:** POPs-related research program and an efficient information management system is in place by 2010.

#### Actions:

- 1. Develop a national clearinghouse facility for information management and sharing to monitor POPs and PTS' chemicals movements and status.**
  - a. Support the development of compatible databases between agencies and relevant institutions.
  - b. Facilitate the sharing of data and information between agencies and institutions electronically and through the NTT.
- 2. Initiate a programme of continued monitoring of potential contaminated sites and stockpiles**
  - a. Design and implement an on-going program of environmental monitoring of POPs and PTS, targeting suspected sites and media.
  - b. Conduct training for relevant personnel and agencies to be involved in the monitoring programme.
  - c. NGOs are to link internationally for concern about such local sites and stockpiles.
- 3. Initiate research to determine the full extent and possible impacts of the current POP's bio-accumulation in animal and human tissue.**
  - a. Design and implement a long term study on bioaccumulation of POPs in animal and human tissues.
  - b. Conduct epidemiological studies for possible impacts of dioxin and furans on human health.

- 4. Strengthen long term multi-sectoral collaboration on the management of chemicals**
  - a. Support the National Task Team to coordinate the NIP Implementation phase.

- 5. Support institutions research**
  - a. Institutions are to be supported in conducting research on POPs/ PTS and other relevant chemicals and their impacts on human and environmental health.

#### **4.3.6 Action Plan for Public Awareness**

##### **Introduction**

Human health is at risk with the continued presence of POPs and PTS chemicals. This fact is not well appreciated by many people many of whom had been exposed directly to several POPs pesticides when they were considered harmless and necessary for agricultural purposes in the past. There is also lack of awareness of impacts of unintentional POPs.

It is essential that the public at all levels is made aware and informed of the risk of POPs and PTS and of how they may be best protected against contamination. The success of the NIP is at the same time dependent on the support and participation of some sectors of the community in areas including the identification of potentially contaminated sites, the management of known contaminated sites, the collection of contaminated containers and their safe disposal or management.

Communities are to be encouraged to participate in awareness activities including their specific requests and follow up within the communities.

**Objective:** Raise community and/ or public awareness and understanding of POPs and PTS.

**Target:** Public awareness in Samoan as well as English is raised at all levels with public actively participating in NIP implementation by the same time.

##### **Actions:**

- 1. Public awareness of contaminated areas.**
  - a. Implement public and community awareness activities about contaminated sites. These include workshops, seminars, media, and signboards.
- 2. Public awareness of the environmental and health impacts of POPs and PTS.**
  - a. Engage schools, villages and church groups (including women and youth groups) to raise awareness of POPs and PTS and their environmental and health impacts
  - b. Develop awareness raising information material (leaflets, T-shirts, posters) in both the Samoan and English languages and distribute them widely to schools and local communities.
  - c. Encourage other initiatives such as competitions
- 3. Public awareness of legal mechanisms and institutional arrangements for the NIP**
  - a. Promote public awareness of legal mechanisms and processes for obtaining permits to import pesticides and other potentially hazardous chemicals, using TV, radio and newspaper media

**4. Public awareness of the POPs NIP**

- a. Promote awareness of and support for the NIP in all sectors of society.

**5. Promote and utilize local knowledge of non-POPs producing alternatives**

- a. Promote public awareness of such alternatives.

**4.3.7 Action Plan for Capacity Building and Education**

**Introduction**

Samoa's technical and financial capacity to deal effectively with the reduction and elimination of POPs is limited. Capacity building is an essential prerequisite to the effective implementation of its NIP.

Capacity building and education for POPs will target key agencies directly involved in import regulation, monitoring, education and project coordination. The strengthening of local capacities involves the provision of specialized training for key personnel, provision of equipment and supplies, the procurement of additional staff personnel and operational resources, and education.

Community organisation capacities should be built up to facilitate awareness and enforcement of legislation and village council decisions.

**Objective:** Improve Samoa's capacity to effectively implement all areas of its NIP.

**Target:** Samoa's capacity to effectively implement its NIP is enhanced through effective capacity building initiatives within MNRE and other relevant stakeholders who play an integral role in the implementation, monitoring and enforcement of NIP by 2010.

**Actions:**

**1. Strengthen national capacity for border control.**

- a. Improve capacity of border control agencies (Customs and Quarantine) to access and share up-to-date information on registered chemicals, importers etc.
- b. Strengthen the capacity of the Office of the Pesticides Registrar through the provision of training, computer equipment and additional staff
- c. Illegal traffic of chemicals is to be minimized by efficient border control.

**2. Strengthen national capacity for hazardous chemical management/ environmental monitoring capacity of relevant agencies and organisations.**

- a. Support the strengthening of environmental science education at the NUS including capacity of in-service teachers
- b. Develop the capacity of appropriate local institutions (e.g. MoH) to perform chemical analyses and other technical scientific tests to support the POPs and PTS monitoring programme
- c. Provide specific training in chemical monitoring and in field testing techniques for POPs and PTS chemicals.

**3. Develop Curricula from primary to tertiary levels**

- a. Curricula modules for POPs and hazardous chemicals are to be developed for all levels in the formal education system.

- 4. Strengthen MNRE (PUMA)'s capacity to coordinate the implementation of NIP.**
  - a. Develop Chemicals Management Unit (CMU) within PUMA for the NIP and chemical related MEA.
  - b. Secure funding to enable the establishment of a CMU – the recruitment of key personnel and the procurement of needed equipment, supplies and other essential resources.

#### **4.3.8 Strategy for National Coordination and Consultation**

##### **Introduction:**

The multi-sector nature and scope of the activities of the NIP invariably demands the involvement of different agencies, private sector operators and NGOs. The inputs of these players need to be coordinated to ensure efficiency, non-duplication and proper integration. This calls for the creation of a coordinating mechanism. One such mechanism already exists in the form of the National Task Team for the GEF-funded POPs project, under the leadership of MNRE-PUMA. It is logical to build on this mechanism and on the existing arrangements governing its operation to support and promote inter-agency collaboration in the implementation of the NIP.

**Objective:** NIP implementation is effectively coordinated with the full participation of all relevant agencies and organizations.

**Target:** NIP implementation is coordinated with the active involvement of key stakeholders within year 1 of NIP implementation.

##### **Actions:**

- 1. Strengthen multi-sectoral collaboration in support of the NIP implementation.**
  - a. Establish the National Task Team for POPs as the official interagency mechanism to promote and support NIP implementation. Appoint additional members from relevant agencies not currently represented (including the MCIL).
  - b. Establish a technical expert's support team as a sub-committee of the NTT to advise the NTT on technical issues.
  - c. Ensure that the NTT meets regularly and is active in monitoring and providing guidance for the effective implementation of the NIP.
  - d. Information Communication Technology is to be used to strengthen collaboration.
- 2. Ensure Samoa's effective participation in Conventions-related conferences and meetings.**
  - a. Coordinate effectively the active participation of appropriate representatives at regional and international meetings related to the MEA Conventions.
  - b. Ensure the timely compilation and submission of national communications and reports.
  - c. Strengthen Samoa's involvement in the various working groups of the Convention.

## 4.4 National Implementation Framework

### Introduction

This NIP framework following from the previous section's Strategies and Action Plans continues from the Objective, Action and Activities for each with the addition of performance indicators and implementing agencies.

Implementation of specific activities will involve different agencies and relevant stakeholders mandates under PUMA's overall coordination. For example, all pesticides regulatory work to remain under MoA, with the Pesticides Registrar directly responsible. Other implementing agencies include:

- Government Ministries (e.g. MfR (Customs), MoH, MWTI)
- Local institutions and NGOs (e.g. National University of Samoa, SUNGO)
- Regional institutions and organizations including SPREP and University of the South Pacific;
- Private contractors and consultants, and
- Local communities, women's and youth groups and schools.

Samoa's strategy for monitoring the NIP provides a clear and concise process on how MNRE and the NTT intend to monitor the performance of the NIP in relation to resource mobilisation, inter-agency coordination, networking, information management, regulation enforcement, in-house chemical management of border control agencies, and institutional capacities of agencies to fulfil their role.

More specifically, performance indicators are given below for each of the activities in the strategies and action plans as a means of measuring the individual performance of MNRE and partner agencies in achieving their assigned roles and responsibilities. The monitoring process would ensure ample time to deploy corrective measures and support should agencies encounter difficulties. Under the Strategy for National Coordination, the NTT including Sub-committees, and the proposed technical experts support team is to be strengthened to fulfill the above role.

Surveys and questionnaires would be used as tools for indicating the level of performance, as is currently used for Government's review of Samoa's Development Strategy (SDS) 2005-2007 expected for the end of that period. Regular reporting of performance in all areas would continue, e.g. monthly to agencies and NTT, quarterly to United Nations Development Programme (UNDP), and annual to Government and UNDP. Resource management may arguably be the most important as there is proposed a greater mix of resources than during the current GEF/ UNDP-implemented Enabling Activity for POPs.

**4.4. NATIONAL IMPLEMENTATION FRAMEWORK  
For Strategies and Action Plans**

**Strategies: 4.4.1 Strategy for the Elimination of Intentional POPs and PTS**

Objectives	Actions	Activities	Performance indicators	Implementing Agencies
<p>1. All intentional production (including importation) and releases to be eliminated in line with the Stockholm Convention, ie Reduce and eliminate the intentional production and release of POPs. (Stockholm Convention, SC Article 3)</p>	<p>1. <i>Legislative</i> frameworks to ban POPs chemicals and regulate the importation of industrial chemicals</p>	<p>a. Review chemical related legislation to address legal issues identified in the Institutional Capacity Assessment (ICA) Report.</p>	<p>A legal review is completed and major recommendations implemented.</p>	<p>PUMA, AG, NTT</p>
		<p>b. Develop a national policy for the management of toxic chemicals and wastes for Samoa, taking into account the above review. Develop industrial guidelines for PUM Act.</p>	<p>National Policy is approved by Cabinet.</p>	<p>AG, MNRE, MoH, MoA, NTT, Mayors, NGOs</p>
		<p>c. Enact the MNRE Bill as a matter of priority.</p>	<p>MNRE Bill becomes law.</p>	<p>PUMA, AG</p>
		<p>d. Provide an enabling environment to support the enforcement of existing legislation in particular the Pesticides Regulation 1990.</p>	<p>Illegal importations of non-consented chemicals are stopped.</p>	<p>PUMA, MoA, MfR (Customs)</p>
	<p>2 Strengthen capacity of institutions and agencies responsible for regulating chemical management.</p>	<p>a. Develop and implement protocols that require importers of chemicals to disclose the list of active ingredients with products and imported chemicals to facilitate the monitoring of POPs imported under different trade-names.</p>	<p>Protocols are developed and used.</p>	<p>MNRE, NTT, AG</p>



		b. Train border control officers to effectively apply monitoring protocols regulating POPs importation.	Number of border control officers trained in the use of protocols.	MOA, MNRE, MfR (Customs)
		c. Regulate the import of properly labeled products in line with international trading standards and practices.	Imported food produce and other products showing chemical analyses results on labels.	MFAT, MoH, MNRE, MCIL, AG

#### 4.4.2 Strategy for the Registration of Exemption

Objectives	Actions	Activities	Performance indicators	Implementing Agencies
2. Registration of exemption for DDT by the end of 2006 Registration of exemptions(SC Article 4)	1. Registration of exemption for DDT by end of 2006.	a. Prepare and transmit appropriate written notification and other reporting requirements to the Stockholm Convention Secretariat to request and register Samoa's exemption for DDT.	Exemption for DDT is registered.	MNRE, MFAT MoH
		b. Prepare and submit a report to the Convention Secretariat and the World Health Organisation (WHO) after 3 years of exemption, as required under Annex B Part II of the Stockholm Convention.	Report submitted as required to Convention Secretariat and the WHO after 3 years of exemption	MNRE, MFAT MoH
	2. Obtain information on alternative non-POPs to exemption.	a. Seek from the Secretariat, WHO, et al. alternatives, other than the 4 currently used, to exemption.	Information obtained and decision on exemption or otherwise.	MNRE-PUMA, MoH, NTT

<b>4.4.3 Strategy for the Reduction of the Releases of Unintentional POPs</b>				
<b>Objectives</b>	<b>Actions</b>	<b>Activities</b>	<b>Performance indicators</b>	<b>Implementing Agencies</b>
<p>3 To reduce releases of unintentional POPs.</p> <p>Reduce and eliminate releases of dioxins and furans from unintentional production (SC Article 5)</p>	<p>1. Regulatory frameworks to promote the reduction of unintentional releases of dioxins and furans from incomplete combustion processes, such as from internal combustion engines and power generation plants.</p>	<p>a. Set emissions standards for motor vehicles and local industries (e.g. power generation plants).</p>	<p>Vehicle and power generation emission standards set and approved.</p>	<p>PUMA, MoH, DEC, TCB/ MWTI</p>
		<p>b. Enact national legislation to enforce emission standards for all vehicles and local industries power generation</p>	<p>Legislation to enforce emission standards is enacted.</p>	<p>AG, PUMA/MNRE, NTT, MoH, TCB/ MWTI</p>
		<p>c. Conduct public awareness activities to promote new standards amongst importers of motor vehicles and the general public.</p>	<p>Number of public awareness activities implemented.</p>	<p>TCB/ MWTI, PUMA/MNRE</p>
		<p>d. Develop local capacity (including institutions) to test all imported vehicles and local industries power generation plants for compliance with new emission standards.</p>	<p>Number of local personnel trained; appropriate equipment procured to perform emission tests for vehicles.</p>	<p>TCB/ MWTI, MNRE-PUMA</p>
		<p>e. Monitor the impacts on reduction of releases for meeting the proposed target with links to the following actions (see action 4 below)</p>	<p>Review after 3 years and final report after 5 years.</p>	<p>MNRE, EPC, MWTI, NTT</p>
		<p>f. Technology to be sought with reduced releases of unintentional POPs, (e.g. fuel efficient stoves).</p>	<p>Reports to NTT of finds and adoption.</p>	<p>MNRE, EPC, MWTI, MCIL, NTT</p>
	<p>2. Improve air pollution control systems (APCS) for all major technology, eg incinerators and industries</p>	<p>a. Develop and implement a programme for upgrading and/ or replacing all existing public and private incinerators with cleaner technology or incinerators with effective APCS.</p>	<p>Incinerators at Motootua and Tuasivi Hospital, Faleolo Airport and Matautu Wharf are upgraded to use cleaner technology.</p>	<p>MNRE, MoH, AG, MoA , SPA, Samoa Airport Authority</p>
		<p>b. Industries to be encouraged to improve APCS.</p>	<p>Numbers of improved APCS.</p>	<p>MNRE, MCIL, SAME/ COC</p>

<b>4.4.3 Strategy for the Reduction of the Releases of Unintentional POPs</b>				
<b>Objectives</b>	<b>Objectives</b>	<b>Activities</b>	<b>Performance indicators</b>	<b>Implementing Agencies</b>
	3 Implement Actions of the Waste Management Strategy which supports separation of higher dioxin releasing chemicals.	a. Initiate actions to promote the separation of waste materials, which generate unintentional POPs from open burning.	Appropriate actions are implemented.	MNRE-PUMA, MoH, MPPFS, MoA, MWCSO
		b. Promote composting as an alternative to burning organic materials, including waste.	Numbers of units installed and usage.	MNRE-PUMA, FARMERS ASSN., MWCSO, MoA, NTT
		c. Promote efficient waste collection and disposal facilities to reduce burning waste.	Survey of penetration rate and access to collection facilities.	MNRE-PUMA, operators, NTT
		d. Promote reuse and recycling of plastics including packaging/containers, and reduce use of non bio-degradables.	Numbers of promotions and amounts reused/ recycled	MNRE-PUMA, partners, NTT
		e. Conduct an awareness campaign to stop burning wastes to reduce unintentional POPs.	Numbers of promotions and their effectiveness on stopping burning waste	MNRE-PUMA, villages, NTT
	4 Improve efficiency of cooking with wood and other stoves	a. Identify efficient, and cost-effective methods of cooking and promote their use.	Numbers of promotions and models, efficiency and cost-effectiveness of cooking options.	MNREM, NTT, MWCSO, villages
	5 Further assess and monitor the releases of dioxins and furans.	a. Undertake further assessment of releases of dioxins and furans.	Funding for programme is secured. Monitoring data is collected, analysed and reported publicly.	MNRE, MoH, NUS, NTT
		b. Develop and implement a program for the long term monitoring of dioxin and furan bioaccumulation in human tissues.	Funding for program secured.	MNRE, MoH, NUS

		c. Monitor and research the impacts on reduction for meeting the proposed target with links to the above 3 actions.	Monitoring data is collected, analyzed and reported publicly.	MNRE, MoH, NUS, NTT
--	--	---	---	---------------------

#### 4.4.4 Strategy for the Elimination of Chemical Wastes and Stockpiles

Objectives	Actions	Activities	Performance indicators	Implementing Agencies
<p>4 Reduce and eliminate releases from stockpiles and chemical wastes</p> <p><i>Reduce and eliminate releases from stockpiles and chemical wastes (SC Article 6)</i></p>	<p>1. Develop and implement a programme for the disposal of stockpiles and the cleaning up of contaminated sites.</p>	a. Identify potential disposal sites in Upolu and Savaii..	Disposal sites are identified, and set aside.	MNRE-PUMA
		b. Develop selected sites to enable the safe disposal of hazardous chemical wastes..	Sites are designed and properly developed to deal with hazardous chemical wastes.	MNRE-PUMA, MWTI, MoH, NTT
		c. Implement clean-up and management plans for identified contaminated sites.	All priority hotspots are cleaned up.	MNRE-PUMA, NTT
		d. Facilitate and support the earliest implementation of the AusAID/ SPREP POPs[in PICs]/PTS Disposal Project that will remove existing stockpiles of POPs and PTS for destruction in Australia.	Container shipment for disposal completed. Continued negotiation with AusAID/ SPREP for further phases for disposal of buried chemicals, contaminated sites, and/or laboratory chemicals	MFAT, MNRE, EPC, ASC, NTT
		e. Enforce Waigani/ Basel Conventions for transboundary movement of waste, and use Rotterdam Convention article requiring identifying transit of hazardous chemicals under PIC.	Number of disposals, report to PIC Secretariat of Samoa's requirement for transit, any such hazardous chemicals transit	MFAT, MNRE, SPA, MWTI, NTT

<b>4.4.4. Strategy for the Elimination of Chemical Wastes and Stockpiles</b>				
<b>Objectives</b>	<b>Actions</b>	<b>Activities</b>	<b>Performance indicators</b>	<b>Implementing Agencies</b>
	2. Initiate capacity building programmes for clean-up and management of contaminated sites	a. Train staff in the safe handling and disposal of hazardous chemicals.	Selected staff of PUMA and other agencies and organizations received training. .	MNRE-PUMA, NTT
		b. Procure appropriate safety gear and essential equipment.	Equipment and gear procured	MNRE-PUMA
		c. Promote public awareness of the disposal sites and of clean up activities requiring public knowledge, participation and support.	No. of public notices aired or issued; The extent of public participation on clean-up activities.	MNRE-PUMA, MWCSO, MoH
		d. Secure the contaminated sites to minimize releases pending their remediation.	Compliance with Cabinet directive to secure initial sites and others identified	MNRE-PUMA, owners (ASC, IPC, SFP, W. Arp, EPC), NTT
	3. Identify other POPs contaminated sites and media and implement appropriate remedial measures.	a. Develop and implement a long-term strategy for pre-1987 electrical transformers.	Testing of electrical transformers is ongoing and carried out systematically. All in-used transformers tested.	EPC, MNRE-PUMA
		b. Conduct testing of suspected sites of possible contamination with POPs and PTS including dieldrin, DDT and others.	A testing and monitoring program is implemented. Testing is carried out for other suspected sites.	MNRE-PUMA, MoH, NUS
		c. Monitor the NIP to incorporate findings and actions needed to address results of research and testing strategies.	Report of reviews conducted.	MNRE, NTT (incl. Technical Experts Support Team)
		d. Enforce a permit system to import chemicals, especially industrial (including development). TO 4.4.1 2d?	Reports of MOA and MNRE of numbers of permits issued, and latter's development of system.	MNRE-PUMA, MoA, MCIL, SAME, CoC, NTT

<b>Action Plans:</b>				
<b>4.4.5 Action Plan for Information Management and Research</b>				
<b>Objectives</b>	<b>Actions</b>	<b>Activities</b>	<b>Performance indicators</b>	<b>Implementing Agencies</b>
5 Impacts of hazardous chemicals (including POPs and PTS) on the health of Samoa's population and its environment are better understood <i>Information exchange (SC Article 9) and Research, development and monitoring (SC Article 11)</i>	1. Develop a national clearinghouse facility for information management and sharing to monitor POPs and PTS' chemicals movements and status.	a. Support the development of compatible databases between agencies and relevant institutions.	Compatible databases are set up in MNRE, MOA, MoH, Customs, EPC. SWA, others	PUMA, MoH, MOA, DEC, MoF, Customs, EPC, SWA, NUS, USP
		b. Facilitate the sharing of data and information between agencies and institutions electronically and through the NTT.	Number of incidences of successful collaboration between agencies increases over current levels. Information is shared readily between agencies.	MNRE (PUMA, DEC), MoH, MfR (Customs), MoA, EPC, and others
	2. Initiate a programme of continued monitoring of potential contaminated sites and stockpiles	a. Design and implement an on-going programme of environmental monitoring of POPs and PTS targeting suspected sites and media.	A monitoring programme is funded and is generating useful monitoring information. Findings are documented and presented/published in appropriate fora.	PUMA, MoH, NUS, EPC, MoA
		b. Conduct training for relevant personnel and agencies to be involved in the monitoring programme. (from former 3b below)	Adequate number of people trained and directly working in the research programme.	PUMA, MoH, NUS
		c. NGOs are to link internationally for concern about such local sites and stockpiles.	Number of NGOs linked to Greenpeace Fiji's Pacific POPs network and others.	SUNGO-NGOs, PUMA, NTT

<b>Action Plans:</b>				
<b>4.4.5 Action Plan for Information Management and Research</b>				
<b>Objectives</b>	<b>Actions</b>	<b>Activities</b>	<b>Performance indicators</b>	<b>Implementing Agencies</b>
	3 Initiate research to determine the full extent and possible impacts of the current POPs bioaccumulation in animal and human tissues.	a. Design and implement a long term study on bioaccumulation of POPs in animal and human tissues.	A research programme is funded with satisfactory progress made in implementation. Findings are documented and presented/ published in appropriate fora.	PUMA, MoH, NUS
		b. Conduct epidemiological studies for possible impacts of dioxins and furans on human health.	A research programme is funded with satisfactory progress made in implementation. Findings are documented and presented/ published in appropriate fora.	MNRE-PUMA, MoH, NUS
	4 Strengthen long term multi-sectoral collaboration on the management of chemicals	a. Support the National Task Team to coordinate the NIP Implementation phase.	Presence at NTT and other meetings, including specific reports, eg participants at meetings.	MNRE-PUMA, MoA, MCIL, SAME/ CoC, SWA, NTT.
	5 Support institutions' research	a. Institutions are to be supported in conducting research on POPs/ PTS and other relevant chemicals and their impacts on human and environmental health.	Numbers of reports produced.	MNRE-PUMA, NUS, USP, MoH, EPC, SWA, NTT

<b>4.4.6 Action Plan for Public Awareness</b>				
<b>Objectives</b>	<b>Actions</b>	<b>Activities</b>	<b>Performance indicators</b>	<b>Implementing Agencies</b>
6 Raise community and/ or public awareness and understanding of POPs and PTS.  <i>Public awareness (SC Article 10)</i>	1. Public awareness of contaminated areas.	a. Implement awareness activities targeting communities about contaminated areas [as a matter of priority]. These include workshops, seminars, media, and signboards [etc].	Meetings/workshops are held with all communities around affected areas.	PUMA, MWCSO, local NGOs PUMA, MoH, NTT
	2. Public awareness of the environmental and human health impacts of POPs and PTS	a. Engage schools, villages and church groups (including women and youth groups) to raise awareness of POPs and PTS and their environmental and health impacts.	Number of planned workshops successfully held in several villages in Upolu and Savai targeting different groups.  Adequate media coverage at national level.	PUMA, MWCSO, local NGOs, MESC  MWCSO, village mayors, women, youth, Farmers Associations, NCC
		b. Develop awareness raising information materials (leaflets, T-shirts, posters) in both the Samoan and English languages and distribute them widely to schools and local communities.	Awareness raising materials developed and distributed widely.	MNRE-PUMA
		c. Encourage other initiatives such as competitions.	Competitions are held successfully.	MNRE-PUMA



<b>4.4.6 Action Plan for Public Awareness</b>				
<b>Objectives</b>	<b>Actions</b>	<b>Activities</b>	<b>Performance indicators</b>	<b>Implementing Agencies</b>
	3 Public awareness of legal mechanisms and institutional arrangements for the NIP.	a. Promote public awareness of legal mechanisms and processes for obtaining permits to import pesticides and other potentially hazardous chemicals, using TV, radio and newspaper media	TV, radio and newspaper notices are released regularly.	Legal Divisions of MoA, MoH, and MNRE
	4 Public awareness of the POPs NIP.	a. Promote awareness of and support for the NIP in all sectors of society.	Wide public support.	MNRE-PUMA, MWCSO
	5 Promote and utilize local knowledge on non-POPs producing alternatives	a. Promote public awareness of such alternatives.	Wide public support	MNRE-PUMA, MWCSO

<b>4.4.7 Action Plan for Capacity Building and Education</b>				
<b>Objectives</b>	<b>Actions</b>	<b>Activities</b>	<b>Performance indicators</b>	<b>Implementing Agencies</b>
<p>7 Improve Samoa's capacity to effectively implement all areas of its NIP</p> <p><i>Capacity building and education (SC Article 10)</i></p>	<p>1 Strengthen national capacity for border control.</p>	<p>a. Improve capacity of border control agencies (Customs and Quarantine) to access and share up-to-date information on registered chemicals, importers, new technologies, and alternative chemicals.</p>	<p>Databases are developed and used widely to support border control work.</p> <p>Number of cases of non-compliance reported by Customs and Quarantine officers.</p>	<p>MfR (Customs), MOA, MoH, SUNGO</p>
		<p>b. Strengthen the capacity of the Office of the Pesticides Registrar through the provision of training, computer equipment and additional staff.</p>	<p>Pesticides Registrar's office is equipped with computer and training provided.</p>	<p>MoA, PUMA/ MNRE</p>
		<p>c. Illegal traffic of chemicals is to be minimized by efficient border control.</p>	<p>Reports of interceptions from businesses as well as at ports of entry.</p>	<p>MfR, PUMA, MoA, MCIL, MWCSO, NTT</p>
	<p>2 Strengthen national capacity for hazardous chemical management/ environmental monitoring capacity of relevant agencies and organizations.</p>	<p>a. Support the strengthening of environmental science education at the NUS including capacity of in-service teachers.</p>	<p>Project resources are shared with NUS to support its environmental science program.</p>	<p>PUMA, NUS, NTT</p>
		<p>b. Develop the capacity of appropriate local institutions (eg MoH) to perform chemical analyses and other technical scientific tests to support the POPs and PTS monitoring program.</p>	<p>Analyses and other scientific tests are carried out by local institutionS.</p>	<p>PUMA, NTT, NUS, MoH, SWA, USP</p>
		<p>c. Provide specific training in chemical monitoring, field testing techniques for POPs and PTS chemicals.</p>	<p>Number of local scientists participating in further training to undertake POPs &amp; PTS related research.</p>	<p>MNRE-PUMA, NTT, NUS, MoH, SWA</p>
	<p>3 Develop curricula from primary to tertiary levels</p>	<p>a. Curricula modules for POPs and hazardous chemicals are to be developed for all levels in the formal education system.</p>	<p>Number of curricula/ kits developed and level</p>	<p>MNRE-PUMA, MESC, NUS, USP, NTT</p>

<b>4.4.7 Action Plan for Capacity Building and Education</b>				
<b>Objectives</b>	<b>Actions</b>	<b>Activities</b>	<b>Performance indicators</b>	<b>Implementing Agencies</b>
	4 Strengthen MNRE (PUMA)'s capacity to coordinate the implementation of NIP.	a. Develop Chemicals Management Unit (CMU) within PUMA for NIP and chemical related MEA.	CMU developed and active on NIP and chemical MEAs.	MNRE-PUMA, NUS, NTT
		b. Secure funding to enable the establishment of a CMU – the recruitment of key personnel and the procurement of needed equipment, supplies and other essential resources.	Chemical Management Unit is fully staffed and resourced.  NIP implementation progressing steadily.	MNRE-PUMA, NTT

<b>4.4.8 Action Plan for National Coordination and Consultation</b>				
<b>Objectives</b>	<b>Actions</b>	<b>Activities</b>	<b>Performance indicators</b>	<b>Implementing Agencies</b>
<p>8 NIP implementation is effectively coordinated with the full participation of all relevant agencies and organisations</p> <p>[National Coordination]</p>	<p>1 Strengthen multi-sectoral collaboration in support of the NIP implementation.</p>	<p>a. Establish the National Task Team for POPs as the official interagency mechanism to promote and support NIP implementation. Appoint additional members from key agencies not currently represented.</p>	<p>NTT meets regularly and actively involve in project review and monitoring.</p> <p>NTT membership includes all key agencies and organizations, private sector and NGO representatives.</p>	<p>MNRE-PUMA, NTT, MoA, MoH, MfR, MPPFS, SWA, SAME/ CoC</p>
		<p>b. Establish a technical experts support team as a sub-committee of the NTT to advise the NTT on technical issues.</p>	<p>Team established, number of meetings, and advice to NTT</p>	<p>MNRE-PUMA, NTT (NUS, USP)</p>
		<p>c. Ensure that the NTT meets regularly and is active in monitoring and providing guidance for the effective implementation of the NIP.</p>	<p>Number of NTT meetings and guidance on implementation.</p>	<p>MNRE-PUMA, NTT</p>
		<p>d. Internet Communications and Technology (ICT) is to be used to strengthen collaboration.</p>	<p>Use of ICT reported to NTT</p>	<p>MNRE, NTT</p>
	<p>2 Ensure Samoa's effective participation in Convention-related conferences and meetings. [Participate actively in Conventions-related conferences and meetings.]</p>	<p>a. Coordinate effectively the active participation of appropriate representatives at regional and international meetings related to the MEA Conventions.</p>	<p>Number of official representatives attending.</p> <p>Number of meetings attended.</p>	<p>MNRE, NTT, MFAT</p>
		<p>b. Ensure the timely compilation and submission of national communications and reports</p>	<p>Number of meetings and submissions.</p>	<p>MNRE-PUMA, NTT</p>
		<p>c. Strengthen Samoa's involvement in the various working groups of the Convention</p>	<p>Number of working groups in which there is participation.</p>	<p>MNRE-PUMA, NTT</p>

#### **4.5 Indicative Financial Plan**

A strategy for proposed sources of funding the NIP follows as also in 5 Priority Projects. Alternative sources proposed include Samoa Government funding as well as in-kind contributions, especially the Global Environment Facility (GEF), and Bilateral donor partners. The latter include one already in progress of Australian Assistance in International Development (AusAID) through the Secretariat of the Pacific Regional Environment Programme (SPREP)'s "POPs in Pacific Island Countries (PICs)" which has facilitated the disposal of stockpiles of POPs and intractable, obsolete pesticides. Further phase(s) may ensue to deal with buried pesticides and contaminated sites as well as obsolete laboratory chemicals.



4.5 Indicative Financial Plan									
For Strategies and Action Plans									
Strategies:									
4.5.1 Strategy for the Elimination of Intentional POPs and PTS									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
1 To reduce and eliminate the import, use and release of intentional POPs and where appropriate PTS in Samoa  <i>Reduce and eliminate the intentional production and release of POPs (Stockholm Convention, SC Article.3)</i>	1 Legislative framework to ban POPs chemicals and regulate the importation of industrial chemicals.	a. Review all chemical related legislation to address legal issues identified in the Institutional Capacity Assessment (ICA) Report.	15,000	0	0	0	0	\$15,000	GEF/ Bilateral
		b. Develop National Policy for the management of toxic chemicals and wastes in Samoa. Develop industrial guidelines for PUM Act.	2,500	0	0	0	0	\$2,500	GEF
		c. Enact the MNRE Bill as a matter of priority.	0	0	0	0	0	0	Samoa Govt.
		b. Provide an enabling environment to support the enforcement of existing legislation, in particular the Pesticides Regulation 1990.	5000	5000	5000	5000	5000	\$25,000	Samoa Govt

4.5.1 Strategy for the Elimination of Intentional POPs and PTS									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
	2 Strengthen capacity of institutions and agencies responsible for regulating chemical management.	a. Develop and implement protocols requiring the importers of chemicals to disclose the list of active ingredients of products and imported chemicals to facilitate the monitoring of POPs imported under different trade-names.	15000	5000	5000	0	0	\$25,000	GEF/ Bilateral
		b. Train border control officers to effectively apply monitoring protocols regulating POPs importation.	0	15000	15000	0	0	\$30,000	GEF/ Bilateral
		c. Regulate the import of properly labeled products in line with international trading standards and practices	0	0	10000	10000	0	\$20,000	GEF/ Bilateral



4.5.2 Strategy for the Registration of Exemption									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
2 Register for DDT exemption for disease vector control  <i>Register of specific exemptions (SC Article 4)</i>	1 Registration of Exemption for DDT by end of 2006	a. Prepare and transmit appropriate written notification and other reporting requirements to the Stockholm Convention Secretariat to request and register Samoa's exemption for DDT.	20000	0	0	0	0	\$20,000	GEF/ Bilateral
		b. Prepare and submit a report to the Convention Secretariat and WHO after 3 years of exemption, as required under Annex B Part II of the Stockholm Convention.	0	0	0	12000	0	\$12,000	GEF/ Bilateral
	2 Obtain information on alternative non-POPs to exemption	a. Seek from the Secretariat, WHO, et al. alternatives, other than the 4 currently used, to exemption.	0	0	0	0	0	0	Samoa Govt.

4.5.3 Strategy for the Reduction of Releases of Unintentional POPs									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
<p>3 To reduce releases of unintentional POPs</p> <p><i>Measures to reduce or eliminate releases from unintentional production (SC Article 5)</i></p>	<p>1 Regulatory framework to promote the reduction of unintentional releases of dioxins and furans from incomplete combustion processes, such as internal combustion engines and power generation plants.</p>	a. Set emissions standards for motor vehicles and local industries (e.g. power generation plants).	0	20000	0	0	0	0	GEF/ Bilateral
		b. Enact national legislation to enforce emission standards for all vehicles and local industries power generation.	0	2000	0	0	0	2000	Samoa Govt
		c. Conduct public awareness activities to promote emission standards amongst importers of motor vehicles and the general public.	0	10000	10000	0	0	\$20,000	GEF
		d. Develop local capacity (including institutions) to test all imported vehicles local industries power generation plants for compliance with new emission standards.	0	120000	50000	25000	25000	\$220,000	GEF/ Bilateral
		e. Monitor the impacts on reduction of releases for meeting the proposed target with links to the following actions (see action 5 below)	0	0	20,000	0	20,000	40,000	GEF/ Bilateral
		f. Technology to be sought with reduced releases of unintentional POPs, (eg fuel efficient stoves).	0	10,000	0	0	0	\$10,000	GEF/ Bilateral

4.5.3 Strategy for the Reduction of Releases of Unintentional POPs									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
	2 Improve air pollution control systems for all major incinerators and industries.	a. Develop and implement a programme for upgrading and or replacing all existing public and private incinerators with cleaner technology or incinerators with effective air pollution control systems (APCS)	0	50000	50000	50000	50000	\$200,000	GEF
		b. Industries are to be encouraged to improve APCS.	0	2,000	2,000	2,000	2,000	\$8,000	Samoa Govt.
	3 Implement Actions of the Waste Management Strategy, which support separation of higher dioxin releasing chemicals.	a. Initiate actions to promote the separation of waste materials, which generate unintentional POPs from open burning.	0	0	15000	15000	15000	\$45,000	GEF/ Bilateral
		b. Promote composting as an alternative to burning organic materials, including waste.	0	0	15,000	15,000	15,000	15,000	GEF/ Bilateral
		c. Promote efficient waste collection and disposal facilities to reduce burning wastes.	0	0	15,000	15,000	15,000	\$45,000	GEF/ Bilateral
		d. Promote reuse and recycling of plastics including packaging/ containers, and reduce use of non bio-degradables.	0	0	15,000	15,000	15,000	45,000	GEF/ Bilateral
		e. Conduct an awareness campaign to stop burning wastes to reduce unintentional POPs.	0	0	15,000	15,000	15,000	45,000	GEF/ Bilateral

4.5.3 Strategy for the Reduction of Releases of Unintentional POPs									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
	4 Improve efficiency of cooking with wood and other stoves	a. Identify efficient, and cost-effective methods of cooking and promote their use.	0	0	0	15,000	15,000	30,000	GEF/ Bilateral
	5 Further assess and monitor the releases of dioxin and furans	a. Undertake further assessment of releases of dioxins and furans.	0	50,000	20,000	20,000	20,000	\$110,000	GEF/ Bilateral
		b. Develop and implement a program for the long term monitoring of dioxin and furan bioaccumulation in human tissues.	0	25,000	10,000	10,000	10,000	55,000	GEF/ Bilateral]
		c. Monitor and research the impacts on reduction for meeting the proposed target with links to the above 3 actions.	0	25,000	10,000	10,000	10,000	\$55,000	GEF/ Bilateral

4.5.4 Strategy for the Elimination of Chemical Wastes and Stockpiles									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
<p>4 Reduce and eliminate releases from stockpiles and chemical wastes</p> <p><i>Measures to reduce or eliminate releases from stockpiles and wastes (SC Article 6)</i></p>	<p>1 Develop and implement a programme for the disposal of stockpiles and the cleaning up of contaminated hotspots.</p>	a. Identify potential disposal sites for Upolu and Savaii.	15000	15000	0	0	0	\$30,000	GEF/ Bilateral
		b. Develop selected sites to enable the safe disposal of hazardous chemical wastes.	0	100000	100000	0	0	\$200,000	GEF/ Bilateral
		c. Implement clean-up and management plans for identified contaminated sites.	0	50000	50000	50000	50000	\$200,000	GEF/ Bilateral
		c. Facilitate and support the earliest implementation of the AusAID/ SPREP POPs/ PTS Disposal Project that will remove existing stockpiles of POPs and PTS for destruction in Australia.	10,000	0	0	0	0	10,000	AusAID/ SPREP
		e. Enforce Waigani/ Basel Conventions for transboundary movement of waste, and use Rotterdam Convention article requiring identifying transit of hazardous chemicals under Prior Informed Consent.	10,000	0	0	0	0	10,000	GEF/ Bilateral
	<p>2 Initiate capacity building programmes for clean-up and management of contaminated sites</p>	a. Train staff in the safe handling and disposal of hazardous chemicals.	0	20000	0	0	0	\$20,000	GEF/ Bilateral
		b. Procure essential equipment and safety gear for personnel.	0	5000	0	5000	0	\$10,000	GEF/ Bilateral
		c. Promote public awareness of the disposal sites and of clean-up activities requiring public knowledge, participation and support.	0	5000	5000	0	0	\$10,000	GEF/ Bilateral
		d. Secure the contaminated sites to minimize releases pending remediation.	10,000	0	0	0	0	10,000	AusAID/ SPREP

4.5.4 Strategy for the Elimination of Wastes and Stockpiles									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
	3 Identify other POPs contaminated sites and environmental media and implement appropriate remedial actions.	a. Develop and implement a long term testing strategy for pre-1987 electrical transformers.	5000	5000	5000	5000	5000	\$25,000	GEF/Bilateral
		b. Conduct testing of suspected sites for possible contamination with POPs and PTS including dieldrin, DDT and others.	0	5000	5000	5000	5000	\$20,000	GEF/ Bilateral
		c. Review NIP to incorporate findings and actions needed to address results of research and testing strategies.	0	0	0	0	0	0	Samoa Govt.
		d. Enforce a permit system to import chemicals, especially industrial (including development).	10,000	0	0	0	0	\$10,000	GEF/ Bilateral

<b>Action Plans:</b>									
<b>4.5.5 Action Plan for Information Management and Research</b>									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
5 Impacts of haardous chemicals (including POPs and PTS) on the health of Samoa's population and its environment are better understood.  <i>Information exchange (SC Article 9), and Research... (SC Article 11)</i>	1 Develop a national clearinghouse facility for information management and sharing to monitor POPs and PTS' movements and status.	a. Support the development of compatible databases between agencies and relevant institutions	0	0	60000	0	0	\$60,000	GEF/ Bilateral
		b. Facilitate the sharing of data and information between agencies and institutions electronically and through the NTT.	0	0	2000	0	0	\$2,000	Samoa Govt
	2 Initiate program of continued monitoring of potential contaminated sites and stockpiles.	a. Design and implement an on-going program of environmental monitoring of POPs and PTS targeting suspected sites and media.	0	60000	50000	40000	40000	\$190,000	GEF/ Bilateral
		b. Conduct training for relevant personnel and agencies to be involved in the monitoring programmed. (From former 3c below)	0	15,000	15,000	0	0	\$30,000	GEF/ Bilateral
		c. NGOs are to link internationally for concern about such sites and stockpiles.	0	0	0	0	0	0	NGOs
	3 Initiate researches to determine the full extent and possible impacts of the current POPs bioaccumulation in animal and human tissues.	a. Design and implement a long term study on bioaccumulation of POPs in animal and human tissues.	0	25000	25000	25000	25000	\$100,000	GEF/ Bilateral
		b. Conduct epidemiological studies to investigate the impacts of dioxins and furans on human health.	0	25000	25000	25000	25000	\$100,000	GEF/ Bilateral

4.5.5 Action Plan for Information Management and Research									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
	4. Strengthen long term multi-sectoral collaboration on the management of chemicals	a. Support the National Task Team to coordinate the NIP Implementation phase. (see 4.5.8 1A)	10000	10000	10000	10000	10000	\$50,000	GEF/ Bilateral
	5 Support institutional research	a. Institutions are to be supported in conducting research on POPs/ PTS and other relevant chemicals for human and environmental health.	50,000	50,000	50,000	50,000	50,000	\$250,000	GEF/ Bilateral

4.5.6 Action Plan for Public Awareness									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
6 Raise community and/ or public awareness and understanding of POPs and PTS.  <i>Public information, awareness... (SC Article 10)</i>	1. Public awareness of contaminated areas	a. Implement public and community awareness activities about contaminated sites. These include workshops, seminars, media, and signboards.	10000	10000	10000	10000	10000	\$50,000	GEF/ Bilateral



4.5.6 Action Plan for Public Awareness									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
		b. Use all forms of media to raise public awareness of the environmental impact of burning biomass.	0	10000	0	0	0	\$10,000]	GEF/ Bilateral
		c. Encourage other initiatives such as competitions.	0	10,000	0	0	0	\$10,000	GEF/ Bilateral
	2. Public awareness of the environmental and human health impacts of POPs and PTS	a. Engage schools, villages and church groups (including women and youth groups) to raise awareness of POPs and PTS and their environmental and health impacts.	30000	25000	10000	10000	10000	\$85,000	GEF/ Bilateral
		b. Develop awareness raising information material (leaflets, T-shirts, posters) in both the Samoan and English languages and distribute them widely to schools and local communities.	12000	12000	10000	10000	10000	\$54,000	GEF/ Bilateral
		c. Encourage other initiatives such as competitions.	2,000	2,000	2,000	2,000	2,000	\$10,000	GEF/ Bilateral
	3 Public awareness of legal mechanisms and institutional arrangements for the NIP.	a. Promote awareness of legal mechanisms and processes for obtaining permits to import pesticides and other potentially hazardous chemicals, using TV, radio and newspaper media.	2000	2000	2000	2000	2000	\$10,000	Samoa Govt

4.5.6 Action Plan for Public Awareness									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
	4 Public awareness of the NIP	a. Promote awareness of and support for the NIP in all sectors of society.	4000	4000	4000	4000	4000	\$20,000	Samoa Govt
	5 Promote and utilizes local knowledge on non-pops producing alternatives.	a. Promote public awareness of such alternatives.	2,000	0	0	0	0	\$2,000	Samoa Govt

4.5.7 Action Plan for Capacity Building and Education									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
7 Improve Samoa's capacity to effectively implement all areas of its NIP. ...education (SC Article 10)	1 Strengthen local capacity for border control	a. Improve capacity of border control agencies (Customs and Quarantine) to access and share up-to-date information on registered chemicals, importers, new technologies, alternative chemicals.	0	0	0	0	0	\$0	Samoa Govt.
		b. Strengthen the capacity of the Office of the Pesticides Registrar through the provision of training, computer equipment and additional staff.	0	25000	25000	0	0	\$50,000	GEF/ Bilateral
		c. Illegal traffic of chemicals is to be minimized by efficient border control.	20,000	0	0	0	0	\$20,000	GEF/ Bilateral

4.5.7 Action Plan for Capacity Building and Education									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
	2 Strengthen the national capacity for hazardous chemical management /environmental monitoring capacity of relevant agencies and organizations	a. Support the strengthening of environmental science education at the NUS including capacity of in-service teachers.	0	25000	25000	25000	25000	\$100,000	GEF/ Bilateral
		b. Develop the capacity of appropriate local institutions [eg MoH] to perform chemical analyses and other technical scientific tests to support the POPs and PTS monitoring programme.	0	50000	50000	50000	50000	\$200,000	GEF/ Bilateral
		c. Provide specific training in chemical monitoring and in field-testing techniques for POPs and PTS chemicals.	0	0	25000	0	0	\$25,000	GEF/ Bilateral
	3 Develop curricula from primary to tertiary levels	a. Curricula modules for POPs and hazardous chemicals are to be developed for all levels in the formal education system.	4,000	2,000	2,000	2,000	4,000	\$14,000	GEF/ Bilateral
	4 Strengthen MNRE (PUMA)'s capacity to coordinate the implementation of NIP	a. Develop Chemicals Management Unit (CMU) within PUMA for NIP and chemical related MEA.	150,000	100,000	100,000	100,000	100,000	\$550,000	GEF/ Bilateral
		b. Secure funding to enable the establishment of a CMU– the recruitment of key personnel and the procurement of needed equipment, supplies and other essential resources.	150000	100000	100000	100000	100000	\$550,000	GEF/ Bilateral

4.5.8 Action Plan for National Coordination and Consultation									
Objectives	Action Plans	Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL (SAT)	Proposed Source of Funding
<p>8 NIP implementation is effectively coordinated with the full participation of all relevant agencies and organizations</p> <p>[National Coordination, and Participation at the Chemical MEAs/ POPs Convention]</p>	<p>1 Strengthen multi-sectoral collaboration in support of the NIP implementation.</p>	<p>a. Establish the National Task Team for POPs as the official interagency mechanism to promote and support NIP implementation. Appoint additional members from key agencies not currently represented (including MCIL).</p>	10000-20000	20000	20000	20000	20000	\$100,000	Samoa Govt
		<p>b. Establish a technical experts support team as a sub-committee of the NTT to advise the NTT on technical issues.</p>	0	2000	2000	2000	2000	\$8,000	Samoa Govt.
		<p>c. Ensure that the NTT meets regularly and is active in monitoring and providing guidance for the effective implementation of the NIP [see a above for budget]</p>	0	0	0	0	0	0	Samoa Govt.
		<p>d. Information Communication Technology is to be used to strengthen collaboration.</p>	30,000	5,000	5,000	5,000	30,000	\$75,000	GEF/ Bilateral

<b>4.5.8 Action Plan for National Coordination and Consultation</b>									
<b>Objectives</b>	<b>Action Plans</b>	<b>Activities</b>	<b>Yr 1</b>	<b>Yr 2</b>	<b>Yr 3</b>	<b>Yr 4</b>	<b>Yr 5</b>	<b>TOTAL (SAT)</b>	<b>Proposed Source of Funding</b>
	2 Ensure Samoa's effective participation in Conventions-related conferences and meetings.	a. Coordinate effectively the active participation of appropriate representatives at international meetings related to the MEA Conventions.	25000	25000	25000	25000	25000	\$125,000	GEF
		b. Ensure the timely compilation and submission of national communications and reports.	0	15000	0	0	0	\$15,000	GEF
		c. Strengthen Samoa's involvement in the various working groups of the Convention.	0	0	0	0	0	\$0	Samoa Govt.
<b>TOTAL ESTIMATED BUDGET</b>			<b>\$632,500</b>	<b>\$1,139,000</b>	<b>\$1,067,000</b>	<b>\$802,000</b>	<b>\$800,000</b>	<b>\$4,330,500</b>	
		Indicative Samoa Government Contribution (other than in-kind)	\$23,000	\$27,000	\$27,000	\$25,000	\$25,000	\$127,000	
		Indicative GEF/Bilateral Funding	\$599,500	\$1,112,000	\$1,040,000	\$777,000	\$775,000	\$4,203,500	
		Indicative AusAID/ SPREP Funding	\$20,000	0	0	0	0	\$20,000	

## 5. Priority Projects

In developing the NIP, some priority actions needing immediate attention over the next couple of years were highlighted to initiate the implementation. These priority actions were identified from the NIP workshop and through consultations with the NTT. The priority actions along with potential funding agencies and opportunities are being identified for the NTT and relevant Ministries and organizations to assist with the development of projects. Local budgets continue to be a very tight source of funds pending identification under Government's Sustainable Development Strategy.

It should be further noted that, although the priority actions below have been identified for immediate attention, other circumstances such as availability of funding for other actions could result in their implementation before the ones below. Due to uncertain availability of funds from the GEF National Capacity Self Assessment (NCSA), that opportunity has been deleted from three of the following. Likewise, the completion of the POPs Enabling Activity has required re-identification as NIP Enabling Activity opportunities.

Objectives	Priority Setting	Funding Opportunity
To eliminate the intentional release of POPs chemicals	Develop National Policy for Chemical Management in Samoa	GEF: NIP Enabling Activity, MNRE: Department Budget
	Train border control officers to effectively regulate the importation of chemicals including products with POPs chemical content	GEF: NIP Enabling Activity Ministry budgets
Reduce and eliminate releases from unintentional production	Strengthen national Regulatory frameworks to reduce dioxin and furan releases	GEF: NIP Enabling Activity, Ministry budgets
	Reduce release of unintentional POPs through domestic burning	GEF: NIP Enabling Activity Bilateral Aid
	Install proper air pollution control systems for all major incinerators and industries	Ministry budgets/ Bilateral Aid, Private sector investment
	Continued assessment and monitoring of dioxin and furans releases	GEF: NIP Enabling Activity
Reduce and eliminate releases from stockpiles and chemical wastes	Public awareness programmes for communities around contaminated areas.	GEF: NIP Enabling Activity, Ministry Budget
	Conduct programme for cleaning up stockpiles and contamination from hot spots	AusAID: POPs in PICs Project GEF: POPs implementation
	Initiate capacity building programmes for clean up and management of contaminated sites	GEF: NIP implementation Bilateral Aid
Information management and research	Develop a database to monitor the movement and status of POPs levels.	GEF: NIP Enabling Activity
	Initiate programs of continued monitoring of potential contaminated sites and stockpiles.	Ministry Budgets
	Initiate a study to determine the full extent and possible impacts of the current POPs bio-accumulation in animal tissue and humans	Bilateral Aid, or GEF: NIP implementation
Strengthening National Coordination	Strengthen the functions and roles of the National Task team for POPs to facilitate information exchange and implementation of NIP	MNRE budget
Public awareness	Public awareness programmes on POPs and NIP	Ministry Budget, and Bilateral Funding

## 6. Bibliography

1. Aalbersberg, B. n.d. Recent Chemical Analysis of Foods at the Institute of Applied Sciences University of the South Pacific.
2. Aalbersberg, B. and Thaman, B. 2001. Persistent Organic Pollutants (POPs) in Pacific Island Countries (PICs). Proceedings: Sub-Regional Awareness Raising Workshop on the PIC Procedure, POPs and the Basel and Waigani Conventions, 2-6 April 2001, Cairns, Australia.
3. Amano, S. 2002. Preliminary assessment of site investigation at Tafaigata landfill. SPREP, Apia.
4. Agency for Toxic Substances and Diseases Registry (ATSDR). 1997. Toxicological Profile for Polychlorinated biphenyls.
5. Agency for Toxic Substances and Diseases Registry (ATSDR). 2000. WHO Publication. Concise International Chemical Assessment Document 55.
6. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. 2000. National Water Quality Management Strategy. Australian and New Zealand Environment and conservation Council and Agricultural and Resource Management Council of Australia and New Zealand.
7. *Basel and Waigani Conventions* – Interlinkages amongst Chemicals and Hazardous Waste-related Conventions
8. Cable, W. 2001. Preliminary Dioxin...Inventory of Samoa. In UNEP Chemicals Proceedings: Sub-Regional Awareness Raising Workshop on the Prior Informed Consent Procedure, Persistent Organic Pollutants and the Basel and Waigani conventions, 2-6 April, 2001, Cairns, Australia.
9. Cable, W. 2002. Potential Persistent Toxic Substances (PTS) in Samoa: Sources and Concentrations, Issues and Related Activities. Paper presented at the GEF Regionally Based Assessment of Persistent Toxic Substances (PTS) –Region IX Technical Workshop, Apia, Samoa.
10. Canadian Environmental Quality Guidelines 1999 Canadian Council of Ministers of the Environment. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life (updated 2002). <http://www.ccme.ca>
11. Department of Agriculture 1956. *Laufasi Ola* Vol.1
12. Food and Agriculture Organization (FAO) and United Nations Environment Programme (UNEP) Chemicals. 2000. PIC Circular XII. December 2000:29.
13. FAO and UNEP. 1999. PIC: Synopsis of Notifications of Control Actions Received Before 11 September 1998 Under the Original Procedure. PIC Circular December 1999.

14. Fryauff, D.J. 1982. Pesticide use and regulation in Western Samoa: A report outlining current pesticide usage and expenditure, a review of government regulations with recommendations for change and improvement, and the occurrence of insecticide residues in Western Samoa. Samoan-German Crop Protection Project.
15. Global Programme of Action [GPA] for the protection of the Marine Environment from Land-based Activities. 2003. Persistent Organic Pollutants in the Marine Environment. GPA Clearing-House Mechanism (<http://pops.gpa.unep.org>).
16. Government of Samoa. (GOS) 2002. Samoa Enabling Activity: An Initial Assistance to Samoa to Meet Its Obligations under the Stockholm convention. for POPs. <http://www.undp.org.ws/ecfprojectsamoa.htm>
17. GOS, MNRE). 2002. Potential Persistent Toxic Substances (PTS) in Samoa: Sources and Concentrations, Issues and Related Activities.
18. GOS, Ministry of Natural Resources and Environment (MNRE). 2003. Preparation of an Initial Inventory of Persistent Organic Pollutants (POPs) and Persistent Toxic Substances (PTS) Presence, Levels and Trends in the Samoan Environment. Montgomery Watson Harza (MWH; New Zealand) Ltd., Christchurch, New Zealand.
19. GOS, MNRE. 2004a. Assessment for POPs and PTS in Samoa
20. GOS, MNRE. 2004a. Inventory of POPs and PTS in Samoa
21. GOS, MNRE. 2004c. POPs and PTS Institutional and Capacity Assessment for Samoa
22. Government of Western Samoa, Public Work Department and Kreditanstalt fur Wiederaufbau (KfW). 1993. *Apia Sewerage Project Water Quality and Biological Studies*. GKW Consult Water Supply, Waste Disposal, Sanitation Consulting Engineers, Mannheim, F.R. Germany in association with G.M. Meredith & Associates Ltd., Engineers, Architects and Planners, Apia, W. Samoa.
23. Malua, T.L., B. Cable and P. Heveldt. 2004. Persistent Organic Pollutants (POPs) and Persistent Toxic Substances (PTS) pages 27-34 in Samoa's Environment. Environment Forum 2003, National University of Samoa, Lepapaigalagala. <http://www.mnre.gov.ws/dcoumentsforum/2004.pdf>
24. Malua, T.L. and B. Cable. In press. Samoa's National Implementation Plan for Persistent Organic Pollutants: Reaching Consensus. Samoa's Environment Forum 2004, National University of Samoa, Lepapaigalagala.
25. Ministry for the Environment (NZ). 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. <http://www.mfe.govt.nz>
26. Ministry for the Environment (NZ). 1997. Health and Environmental Guidelines for Selected Timber Treatment Chemicals. <http://www.mfe.govt.nz>
27. National Environmental Protection (Assessment of Site Contamination) Measure (NEPM). 1999. <http://www.ephc.gov.au/nepms>



28. New South Wales Environment Protection Authority. 1995. Contaminated Sites Sampling Design Guidelines.
29. New Zealand Food Safety Authority. 2002. Food Standards Australia New Zealand. <http://www.foodstandards.govt.nz>
30. *National Toxics Campaign Fund. 1993. Laboratory Test Results. Personal communication to the Director, O Le Siosiomaga Society, Apia.*
31. Planning and Urban Management Agency (PUMA), MNRE. 2003 (internal report). POPs Enabling Activity –D2 Prepare initial inventory of POPs imports...; D3 – Prepare initial inventory of obsolete POPs ... . PUMA, Apia.
32. Ritter, L. et al., 1995, IPCS Assessment Report *Persistent Organic Pollutants: An Assessment Report on DDT, Aldrin, Dieldrin, Endrin, Chlordane, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene, Polychlorinated Biphenyls, Dioxins, and Furans*, International Programme on Chemical Safety.
33. Samoa Drinking-water Standards. 1999. Samoa Drinking-water Standards Working Group (Final Draft)
34. South Pacific Regional Environment Programme (SPREP). 2000. *Management of Persistent Organic Pollutants in Pacific Island Countries.*
35. SPREP. (2003). Samoa POPs Project Country Plan
36. SPREP.2003. *SPREP Waigani Handbook* - provides interlinkages among Chemicals and Hazardous Waste related Conventions (Stockholm, Rotterdam, Basel and Waigani Convention). Available in CD-ROM and hard copy.
37. Taule'alo, T.I. 1993. Western Samoa: state of the environment report. Apia, Western Samoa: SPREP.
38. United Nations Environment Programme (UNEP) Chemicals. 2000. *GEF: Regionally Based Assessment of PTS*. Geneva, Switzerland.
39. UNEP Chemicals. 2000. *Survey of Currently Available Non-incineration PCB Destruction Technologies*. UN/UNEP.
40. UNEP Chemicals. 2001. Proceedings – Sub-regional awareness raising workshop on Prior Informed Consent Procedure, Persistent Organic Pollutants and the Basel and Waigani Convention. 2-6 April 2001, Cairns Australia. UNEP
41. UNEP Chemicals 2002. *Pacific Islands Regional Report: Regionally Based Assessment of Persistent Toxic Substances.*
42. UNEP Chemicals 2003a. *GEF Global Report: Regionally Based Assessment of Persistent Toxic Substances*

43. UNEP Chemicals. 2003b. *Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases*. UNEP Chemicals, Geneva.
44. UNEP and SPREP. 2000. Regional Plan of Action for Land-Based Pollution.
45. UNEP/World Bank. 2004?. *Guidance for developing a National Implementation Plan for the Stockholm Convention* (Draft Only).
46. United States Food and Drug Administration. 1993. Centre for Food Safety and Applied Nutrition. Guidance Documents for Trace Elements in Seafood. <http://www.cfsan.fda.gov/~frf/guid-sf.html>
47. United States Environmental Protection Agency Region 6. 2000. Human Health Medium-Specific Screening Levels. <http://www.epa.gov/region06>
48. van Es, H. M. (1990). Pesticide Management for Water Quality Principles and Practices. Cornell University. <http://pmep.cce.cornell.edu/facts-slides-self/facts/pestmgt-water-qual-90.html>
49. Van leeuwen FXR, Yonnes M. WHO revises the Tolerable Daily Intake (TDI) for Dioxins. Organohalogen Compounds 1998. 38:295-298
50. Wallace, E. 1997. Manual of Agrichemical Identification and Emergency Management. Agro-Research Enterprises Limited, New Zealand.
51. Western Samoa Water Authority. 1996. National Water Resources Master Plan Study (Stage 1) Vol. 1 – Final Report. Rofe, Kennard & Lapworth in association with G.M. Meredith & Associates Ltd. Apia, Samoa and Sutton Surrey, England.
52. World Health Organization 1993. Environmental Health Criteria on PCB and Tephnyls. 2<sup>nd</sup> Edition.
53. World Health Organization 1997. Environmental Health Criteria (EHC) 195. Geneva, Switzerland
54. World Health Organization 1999. Study of dietary intake of chemical contaminants.
55. World Health Organization 1998. WHO experts re-evaluate health risks from dioxins. Press release WHO/45

## Websites

56. International Chemicals Organization website [www.inchem.org](http://www.inchem.org)
57. German Food Standards Press release website [www.umweltbundesamt.de](http://www.umweltbundesamt.de)
58. POPs Convention website [www.pops.int](http://www.pops.int)
59. UK Food Standards website: [www.foodstandards.gov.uk](http://www.foodstandards.gov.uk)
60. UNEP website: [www.unep.org](http://www.unep.org)
61. UN Framework Convention on Climate Change: <http://unfccc.int/>
62. <http://www.deh.gov.au>
63. SPREP: <http://www.sprep.org.ws/>
64. MNRE: <http://www.mnre.gov.ws/>

### Annex 1: List of People Consulted

Organisation	Name(s)
Agriculture Store Corporation	Toomata Aki Tuipea, General Manager; Taele Leuta Saifoloi, Farm Manager (Nu'u)
ARCO Chemicals	Ms Lolovai Leutele, Assistant Manager
British American Tobacco	Tagaloa Elisara Gale
Consultants (National and International)	PECL: Muliagatele Iosefatu Reti, Sam Sesega, Cedric Schuster, Faainuisemalie Latu, Arona Palamo; Graham Environmental Consulting Ltd, Auckland, NZ: Dr Bruce Graham; –, MWH (NZ) Ltd.: Dr Paul F Heveldt, Marty O'Cain
Electric Power Corporation	Muaausa Joseph Walter, Genral Manager; Taulealeausumai A. Tiotio, Asst. General Manager; Folasaaitu Crawley, Manager Vaitele; Sale Faletolu – NTT members
Farm Supplies Ltd.	Ms Loise Panoa Moala, General Manager
Faleula Farmers Association	Sevao Akeimo, Maugaalii Lafaele
Ministry for Revenues (Customs)	Tuilaepa Ropati Kamu, Nanai Malaeleua Sua, Maui Alama Mose, Faafetai Lautua – NTT members
Ministry of Agriculture	Pimalolo Maiava, Registrar of Pesticides; Asuao Kirifi Pouono, A/CEO Quarantine; Tofa Siitia – Principal Quarantine Officer; Karryn Kwan, Legal Officer; Fata Alo Fania, Senior Crops Officer (NTT member)
Ministry of Education, Sports & Culture	Taasoalii Saivaise, Hofeni Ah Voa
Ministry of Finance	Lina Esera, Paul Meredith – NTT members
Ministry of Foreign Affairs and Trade	Desna Solofa, Samantha Marfleet – NTT members
Ministry of Health	Lafai Sinei Fili, Manufeafo Lameko Tesimale - NTT members; Paulo Pemita Seuseu
Ministry of Natural Resources & Environment (MNRE)	Theresa Potoi-Vaai, Principal Legal Officer; Dhayani Yogesvaran, Senior Legal Officer; Lameko Tasimale Senior Capacity Building Officer;
MNRE - Planning and Urban Management Agency (PUMA)	Taulealeausumai Laavasa Malua, A/CEO; Fetoloai Yandall-Alama, Project Manager – POPs; Pili Cable, Project Coordinator – POPs; Pauline Gabriel Tufuga, Project Assistant – POPs; Faafetai Sagapolutele, Principal Urban Management Offcr.; Jude Kohlhase, Principal Strategic Planning Offcr.; Filomena Nelson, Principal Disaster Management Offcr.; Pipi P. Leavai, Sr. Climate Change Offcr.; Sunny Seuseu, Sustainable Devt. Offcr. (SDO); Fotuitaua Y. Kerslake, SDO; Eiko Fuimaono, SDO
Ministry of Women, Community and Social Development	Avaisega Sara Tauai, Diana Roma – NTT members
Ministry of Works, Transport and Infrastructure	Sione S Faitala – NTT member; Leo Bartley, Tafai Toilolo
National University of Samoa	Dr. Jacinta Moreau - NTT member

<b>Organisation</b>	<b>Name(s)</b>
Petroleum Products Supplies	Iopu Pua
Samoa Ports Authority	Fagaloa Tufuga, Legal Officer; Popese Motuga - NTT members
Samoa Recycling Ltd/Samoa Association of Manufacturers and Exporters	Jeff Atoa
Samoa Tourism Authority	Christina Leala
Scientific Pest Management	Paul Tomane
Secretariat for Pacific Community (SPC)	Dr Sada Nand Lal, Entomologist, Suva Fiji
Secretariat for Pacific Regional Environment Program (SPREP)	Dr Frank Griffin, POPs Adviser; Clark Peteru – Legal Officer
United National Development Programme	Easter Galuvao, Veronika Levi, Meapelo Maiai
University of the South Pacific (USP) – Alafua Campus	David Hunter, Daya Perera - NTT members
<b>Consultation Workshops with:</b>	
Government Agencies (16 September 2004)	Attorney General's Office Anastacia, Sarona Audit Office Faolotoi Reupena Central Bank of Samoa Margaret Chan Cheuk Legislative Assembly Sootaga Min. of Communication & Info. Technology Leuelu Seiu Min. of Police, Prisons & Fire Services Fata A Salale Min. of Prime Minister & Cabinet Filemoni L. Min. of Public Service Corp. Penny Alama Ombudsman Office Mauala Seiuli Samoa Housing Corp. Anesi Faalafi Samoa Land Corp. Ioane Evalu Samoa Life Assurance Corp. Tutonu Samoa Polytechnic Nonumalo Salesa Samoa Shipping Corp. Tapuai Soti SamoaTel Ltd. Leuma, Margaret
Samoa Chamber of Commerce and Industry Inc. (6 September 2004)	Maria Melei (Vice President); Laeimau Oketevi Tanuvasa (Secretary); Beverly Barlow; John Boyle; Patrick Chan Mow; Ned Brown; Fatu Tauafiafi; Adele Kruse; Arthur Penn; David Sami; Luni Vaeau; Lian Taaloga; Klaus Stunzner; Matilda Meredith Tapusoa; John Ryan
Samoa Umbrella for Non-Government Organisations (20 August 2004)	Raymond Voigt; Faranisisi Ierome; Faiese Talataina; Pesila A. Asiata; Taloolemaagao Olana; Vaasilifiti M Jackson; Mafi Oloapu; Leicester Dean; Eseta Mataituli; Vivian L. Suatele; Fepai Kolia; Tuolima Taala; Masunu T. Utumapu; Sauni Marie Fong; L. Faatino; Faamamalu Asiata; Foketi Silomiga; Tapusalala Faatonu; Olivia F. Latu; Rosalia Me

<b>Consultation Workshops with:</b>	<b>Total Numbers</b>
Village Mayors and Farmer Representatives of Savaii (13 October 2004)	140
Village Mayors and Farmer Representatives of Upolu (20 October 2004)	166
Women and Youth representatives of Savaii (14 October 2004)	130
Women and Youth representatives of Upolu (21 October 2004)	184