MINISTRY OF NATURAL RESOURCES & ENVIRONMENT
Draft NATIONAL CHEMICALS MANAGEMENT STRATEGY 2008-2018

Introduction

The use of chemicals has become indispensable in many development activities in Samoa particularly in agriculture, health, education and industry. According to the Department of Statistics Samoa expended about $60 million in 2006 for the procurement of chemicals as well as another $122 million spent to import petroleum products. While there is growing national need for chemicals they can also cause health and environmental problems if not effectively controlled. This National Chemicals Management Strategy 2007-2017 (NCMS) provides a framework for the sustainable management of all chemicals through the various stages during their life-cycle – procurement, transportation, storage, distribution, use and waste disposal.

Chemicals are widely distributed in the environment. Therefore, there are many possible sources of exposure to these chemicals for humans. Chemicals can enter our body by ingestion, inhalation or by absorption through the skin and different chemicals will cause different adverse effects. In fact, not all chemicals absorbed into the body will cause adverse effects; however, it depends not only on the chemical to which one is exposed but also on the type/route of exposure and level/dose of exposure. Effects of chemicals can pose serious health defects in the respiratory system, liver, kidney, nervous system, immune and reproductive systems. Cancer is one of the leading causes of death due to exposure to chemicals. Hazardous chemicals not only have adverse effects on human health but can also disrupt ecological systems that exist in rivers, lakes oceans, seas, forests and soils. The discoveries of a growing hole in the stratospheric ozone layer, is evidence of the enhanced greenhouse effect, due to chemical contamination and pollution.

There is growing concern over the use of persistent organic pollutants (POPs) and persistent toxic substances (PTS) as exposure to such would cause significant public health and environmental problems. Of the 12 types of POPs controlled under the Stockholm Convention for POPs, eight are present in Samoa including aldrin, chlordane, dieldrin, DDT, PCBs, dioxins and furans and HCB (impurities).These chemicals are among the most dangerous that have ever been created - they are transported by air, water and migratory animals over long distances, often miles from their original sources. They dissolve in water, can easily enter the food chain, are absorbed readily in fatty tissues and can remain active for years before they break down. They are known to cause or contribute to a number of major health problems in humans including immune system alterations; reproductive deficiency; neuro-behavioural impairment and various forms of cancers.

PTS have similar properties to those of POPs and their sources, however, environmental concentrations and effects are to be addressed such as endosulfan, pentachlorophenol, lindane, organic mercury, organic lead and polynuclear aromatic hydrocarbons and other heavy metals.

Current practice

At present the management of chemicals is the responsibility of the relevant sectors using the particular types of chemicals. For instance, agriculture deals with pesticides, health with medicinal drugs and education with school chemicals. However, industry and home use a

variety of chemicals and are major contributor to air pollution, liquid and solid wastes problems.

Agriculture - The dominant approach to controlling and eliminating pests is by the use of agricultural chemicals, including pesticides and fertilizers. However there is growing concern regarding the use of pesticides as they can cause harm to humans, animals or the environment. Pesticides can result in residual pesticide accumulation in the environment, rendering the soil infertile and causing high toxicity levels in the blood of humans and livestock. There is no strategy for the disposal of surplus stock and the clean up of contaminated sites

Health - Chemicals are used in medical treatments/diagnostic tests and generate great amount of clinical wastes. They are also responsible for the importation of pharmaceutical products either directly or allow their imports through their private sector. Surplus stock are currently stored awaiting safe disposal.

Education - Colleges, universities, secondary schools, and research laboratories require chemicals for lessons, research and maintenance purposes. These chemical products include: laboratory chemicals (acids, bases, solvents, metals, salts) and art supplies (paints, stains, ink). There is no system for the disposal of old or surplus stock.

Industry – Industry is economically important in Samoa and employs many workers throughout the country. It includes buildings, factories, industrialized agriculture, ships and other vessels at sea, transport and other maintenance processes. Examples of industrial chemicals are acids, dyes, solvents, paints, cleaning agents and cosmetics. Ozone depleting substances are separately regulated in Samoa under legislation to implement Samoa's obligations under the Montreal Protocol, including the phase out of use and import of ozone-depleting chemicals. Major industrial activities have the potential for generating air emissions, wastewater effluents and solid wastes, and all of which may contain a variety of chemical pollutants. Incomplete combustions of hydrocarbons are also a major concern and can produce unintended POPs (dioxins and furans) and PTS.

Home - Surplus household products that contain corrosive, toxic, ignitable, or reactive ingredients are considered to be "household hazardous chemical waste". Products such as paints, cleaners, oils, medicines, cosmetics, batteries, and pesticides that contain potentially hazardous ingredients require special care when dispose. Improper disposal of household hazardous wastes include pouring them into waterways and domestic septic tanks or throwing them on the ground and landfills, causing damage to the ecosystem and contaminating drinking-water supplies.

Priority concerns

There is concern over each stage in the chemical life cycle – procurement, storage, transportation, distribution, utilization and waste disposal:

Procurement - A variety of chemicals are imported from a number of countries in various forms and categories poses a range of problems which raises enormous concerns. The absence of facilities and mechanisms to identify what chemicals are actually brought into this country is a serious concern for Samoa. This is to protect against chemicals that are not needed and also for the purpose of identifying chemicals which are prohibited from entry into the country. Some chemicals may be imported in bulk and then repackaged without adequate labeling, resulting in accidental poisonings.

Chemicals imported for industrial, agricultural or consumer purposes maybe sit in a stockroom until the containers deteriorate and the contents spill out or seep down into the groundwater. More importantly, is the lack of adequate legislation to control the

importation, distribution, use and disposal of these toxic chemicals to cater for a satisfactory control process.

Storage, transport and distribution - To ensure rapid and convenient access to chemicals, chemical users usually order chemicals and store them in their own laboratories / chemical storage areas. One drawback of such a practice is that unused chemicals often end up staying on shelves beyond their shelf life is there is no established system to encourage chemical transfer and exchange. The transport and distribution of chemicals from place to place require proper handling, packaging and safety measures to prevent from leaking and inhaling of chemical odor / vapor.

Utilization - Chemical users are the ones who determine what chemicals to use, and how much is needed. There is tendency towards an increase in the use of chemicals for a number of reasons such as agricultural, industrial, health, school and domestic purposes. Thus, human exposure to toxic chemicals will be increased, resulting in both health and environmental problems. Accidents with toxic chemicals are potentially more serious within the limited environment of Samoa. The limited expertise and experience in identifying poisoning by toxic chemicals will probably results in most incidents going undetected and unreported.

Waste - The origin of chemical waste in Samoa and the manner in which they are managed varies. Agricultural, consumer and industrial wastes for example, are mostly stockpiled for indefinite periods. In some instances, these waste are inappropriately stored and as such pose a threat to human health and the environment. Residual household chemicals are not separated from the remainder of domestic waste and is disposed of in the Tafaigata (Upolu) and Vaiaata (Savaii) landfills. The non-segregation of household and industrial chemical wastes poses a potential occupational health and safety as well as environmental risk. Therefore formal country-wide data/survey concerning the chemical waste generation and emissions is required in order to monitor all types and sources of chemical waste.

Disposal – Samoa does not have any centralized or dedicated hazardous chemical waste storage, treatment or disposal facilities. Most of the chemical waste is disposed off either into the nearby drains and or other outlets. Due to the lack of appropriate facilities for the disposal of chemical wastes, these substances are either store at the site of generation or at off-site location or are removed out of the country. Therefore, there is great need for dedicated facilities to store and treat chemical wastes, particularly the more toxic substances as well as to identify the quality and quantity of chemical waste generated within the country.

Awareness and capacity building – Awareness and on-going capacity building in integral to all efforts in the implementation and management of chemicals. Making the Public aware of the potential risks associated with chemicals constitutes an important part of chemical management. Ideally, an understanding of how chemicals can be harmful to human and environment will pave the way towards a better public response and participation in chemical management initiatives.

Awareness raising activities that have already been implemented during the preparation of the National Implementation Plan for POPs had been diverse and wide ranging. However, an impact assessment has not been conducted to gauge the level of understanding and any change in stakeholder attitude and behaviour with respect to chemicals. Hence there is an urgent need for awareness and educational activities (both formal and informal) aimed at increasing the general public's awareness and understanding on the use, movement, storage, release and the human health and environmental impacts of chemicals .

Management approaches

There are number of principles that would guide the implementation of the NCMS in order to promote long-term sustainability:

Life cycle management approach - integrated activities which cover and link all aspects of chemical life cycle in Samoa including procurement, storage, transportation, distribution, utilization and waste disposal. Current management systems are sector-based where different stages of chemical life cycle are controlled without adequate consideration of possible linkages to others. This has often led to inadvertent substitution of one problem for another. With the increasing focus, there is an opportunity to review chemical assessment processes to ensure that impacts of chemicals are routinely addressed at the earliest stage.

Risk-based principle - considers both the intrinsic hazard of a substance as well as the potential for exposure and the implementation of appropriate risk management strategies to reduce or control exposure. Risk-based approaches would allow continued safe use of some high hazard chemicals, as long as their applications and uses are controlled to restrict or prevent exposure.

Precautionary principle - states that lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. However there still needs for concern about threats of serious or irreversible environmental damage. Therefore precautionary measures should be taken such as increased research effort and creating alternatives to facilitate the most cost-effective approach to environmental impact assessment.

Polluter pays – establishment of accessible, affordable, and effective mechanisms, to ensure that those who procure, use, and dispose of chemicals must pay the full costs of any harms to human health and the environment that they cause, and that victims of such harms are quickly and fully compensated.

Good governance - concept that transparent, accountable, and honest governance is an important component of sustainable development and an essential element for the prevention and punishment of illegal traffic in hazardous and toxic materials.

Right to know – this is a specific aspect of public access to environmental information: the concept that the public has the right to know information regarding the risks to human and environmental health from chemicals including chemical accidents and waste disposal and treatment.

Goal

The main goal of the NCMS is to reduce the risks to human health and the environment from chemicals through their sustainable management. A life cycle management approach is promoted at all stages of chemical applications – procurement, transportation, storage, utilization, treatment and disposal – focusing on the main user sectors of agriculture, health, education and industry.

Objectives, outcomes and strategies

The following matrix sets out the objectives, outcomes and strategies for achieving the above goal, with the main objectives focusing on public awareness, capacity building, sustainable management and monitoring and monitoring and enforcement.

Objectives	Outcomes	Strategies
1. Greater understanding and knowledge of	○ Public awareness of chemicals particularly	➢ Conduct stakeholder awareness programmes on the dangers and

chemicals promoted	among the targeted sectors strengthened o Available information on the management of chemicals shared among stakeholders	benefits of chemicals ➢ Explain the safety requirements when dealing with chemicals ➢ Discuss the proper ways for the disposal of chemicals ➢ Clarify the proper treatment of chemical waste ➢ Highlight the adverse impacts of POPs on human health and the environment
2. Capacity building on the effective utilisation and/or application of chemicals strengthened	o Safe use of chemicals in the home promoted o Application of chemicals in agriculture improved o Utilisation of chemicals in industry improved o Application of chemicals in the health sector enhanced o Handling of chemicals among educational and research institutions strengthened	➢ Develop and update chemical inventories ➢ Set up database for information collection, analysis and dissemination ➢ Develop tests for chemical identification ➢ Develop tracking systems to monitor the safe use of chemicals (e.g. dispensing drugs to patients) ➢ Develop systems to control the over-use of chemicals (e.g. use of farm chemicals) ➢ Conduct sectoral case studies on related aspects of chemical management ➢ Implement sectoral pilot projects ➢ Develop prevention and minimization programmes
3. Safe disposal and/or treatment of chemical waste improved	o Sustainable disposal and/or treatment of chemical stockpiles implemented o Restoration and/or treatment of chemical dumpsites implemented	➢ Identify the different types of chemical waste ➢ Secure the safety of chemical stockpiles and dumpsites ➢ Establish the methodologies for the disposal/treatment of chemical waste ➢ Establish the methodologies for the rehabilitation of dumpsites ➢ Establish the methodologies for the treatment of contaminated materials (e.g. soils, water)
4. Sustainable management of chemicals enhanced	o Management plans developed to guide chemical: -procurement -transportation -storage -utilisation -treatment, and -disposal o Imports of banned chemicals controlled	➢ Prepare pollution prevention plans ➢ Prepare codes of environmental practice ➢ Prepare environmental release guidelines ➢ Prepare chemicals hazard plans ➢ Conduct chemicals audit surveys ➢ Prepare guidelines for chemicals: -labeling -handling -transportation

	○ Production of unintended POPs reduced	-storage -treatment, and -disposal ➢ Develop the analytical and sampling methods for chemicals management ➢ Conduct research on toxicology and other technical areas of chemicals management ➢ Set up licensing system to control the importation of chemicals ➢ Reduce the production of dioxins and furans from incomplete combustion ➢ Improve the efficiency of burning of woodfuel
5. Regulatory framework to monitor and/or enforce the sustainable management of chemicals developed	○ Legislation to support sustainable chemicals management enacted ○ Framework for the national sustainable management of chemicals established ○ Framework for the strategic approach to international chemicals management (SAICM) developed ○ Compliance with chemical-related Multilateral Environmental Agreements (MEAs) strengthened	➢ Formulate new legislation dealing with sustainable chemicals management in the context of waste management ➢ Monitor compliance with legislation ➢ Establish a single National Chemicals Authority including: ▪ MNRE for waste disposal, industrial chemicals and MEAs ▪ Ministry of Agriculture & Fisheries (MAF) for pesticides ▪ Ministry of Education, Sport & Culture (MESC) for schools chemicals ▪ National Health Services (NHS) for health drugs ▪ Ministry for Revenue (MfR) – Customs for border control ➢ Develop the National Chemicals Authority as the National Focal Point for SAICM ➢ Protect human health and the environment by promoting sound management of chemicals practices in all relevant national programmes ➢ Integrate sound chemicals management into relevant national development projects ➢ Meet Samoa's obligations under the Basel, Rotterdam and Stockholm MEAs

Responsibilities of the implementation agencies

Implementing agencies identified herein are unique and are different but all have a collective responsibility in ensuring a sound management of chemicals at various stages of its life cycle. These responsibilities span from health, agriculture, environmental protection, workplace, education and homes. One of the greatest challenges is the coordination of implementing

agencies efforts and mobilization of resources in ensuring a collaborative and holistic approach to achieving the goals and outcomes of this strategy.

MNRE - Has the overall responsibility for the direct and indirect effects of releasing chemicals into the environment as emissions and waste to air, water and land. Also responsible for policy development in the field of natural resources management and sustainable development.
MAF – regulates the use of pesticides and other agricultural chemicals.
NHS – responsible for management and safe disposal of health medicines and drugs used in hospitals and health care facilities.
MESC – responsible for school scientific development and laboratory chemicals
MfR - Customs – boarder control authority responsible for the inspection of all chemical imports and enforcement of legislation.
Ministry of Women, Community, Sports & Development – coordinates outreach programmes for rural communities.

Relevant international agreements
Samoa is a party to the following MEAs dealing with the international management of chemical, implemented by MNRE:

- Basel convention on the control of trans-boundary movement of hazardous waste and their disposal.
- Convention to ban the importation into Forum island countries of hazardous radioactive waste and to control the trans-boundary movement and management of hazardous Wastes within the south Pacific region (Waigani).
- Rotterdam convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade.
- Stockholm convention on POPs.

Relevant national policies
National waste management policy
Health care waste management policy
National implementation plan for POPs

Glossary
Aldrin – insecticide used against soil pests.
Bioaccumulation – The uptake of substances from the environment, their concentration, and retention by organisms. It includes the process by which a pesticide becomes concentrated in living organisms, the build-up of a chemical in organisms at concentrations greater than the levels in their environment.
Chlordane – insecticide for termite control.
Consumer chemicals – chemicals used in homes obtained or sold in shops. These include bleaches, detergents, cosmetics, air fresheners, deodorizers, cleaners, paints and solvents.
DDT – insecticide used mainly against mosquitoes for malaria control.
Dieldrin – insecticide use on fruits, soil and seed crops.
Dioxins – by-products of combustion processes (especially of plastics) and of chlorine products .
Endrin – rodenticide and insecticide .
Furans – by-products of combustion processes.

Hazardous chemicals – Substances that are toxic, persistent and liable to bioaccumulate or which give rise to an equivalent level of concern .

Heptachlor – insecticide used against soil insects.

Hexachlorobenzene (HCB) – fungicide, also a by-product of combustion processes.

Industrial chemicals – chemicals used in industry, include dyes, solvents, adhesives, plastics, laboratory chemicals, paints as well as chemicals used in cleaning products, cosmetics and toiletries.

Pesticides – any substance or mixture of substances intended for preventing, destroying or controlling any pest including vectors of human or animal diseases.

Mirex – insecticide for ants and termites, also used as fire retardant.

POPs – organic compounds that are highly resistant to degradation by biological, photolytic or chemical means. POPs remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of living organisms and are toxic to humans and wildlife.

PTS - substances which are harmful to human health and environment with a half-life in any medium – water, air, soil and biota (plants and animals) of greater than eight weeks and bioaccumulate in the tissue of living organisms. Have similar properties to those of POPs.

Toxaphene – an insecticide.

Toxicity – A physiological or a biological property which defines the ability of a chemical to do harm, or produce injury, to a living organism by other than mechanical means.

Wastes – substances or materials which are disposed of, or are intended to be disposed of, or are required to be disposed of.

References

Government of Samoa. 2003. Samoa national implementation plan for POPs. MNRE.
Government of Samoa. 2002. Samoa enabling activity: an initial assistance to Samoa to meet its obligations under the Stockholm Convention on POPs. MNRE.
Environmental Management Group. 2004. Capacity building for chemicals management: a situation and needs analysis. SAICM.
Intergovernmental Forum on Chemical Safety. 2000. Priorities for action beyond. Third Session of the IFCS.
MNRE. 2003. Institutional Capacity Assessment Report
SPREP 2000: Management of POPs in PICs
Multi-stakeholder and Multi-sectoral Preparatory Committee. 2006. Chemicals Management. Strategic Approach to International Chemicals Management (SAICM). UNEP.

Responsible officer

Tu'u'u Dr. Ieti Taule'alo
Chief Executive Officer, MNRE