

## 6. PACIFIC REGION WASTE MANAGEMENT

Drafted by the Secretariat of the Pacific Regional Environment Programme

### SUMMARY

*Recognize* that pollution and the growing generation of solid and hazardous wastes are major threats to the environment and sustainable development of the Pacific region, since poor management has negative impacts on the region's biodiversity, as well as on public health, water resource quality, fisheries, tourism, trade and other areas of national interest.

*Recognize* that the risk of coastal and marine pollution in the Pacific region is increasing because of increased shipping, land-based transport, development of infrastructure and industry, and increased generation of solid and liquid wastes, all of which are the effects of globalisation, urbanization, migration, and participation in international trade.

*Recognize* that the maintenance of healthy communities through better waste and pollution management is critical in building environmental resilience to the impacts caused by climate change, and in ensuring a sustainable future for Pacific islanders.

*Provide* continued support for the development of technical capacity at the country level to plan and manage pollution, solid waste, and hazardous chemicals.

*Promote* behavioural change in communities through national targeted awareness campaigns, and through provision of support for grassroots initiatives.

*Improve* monitoring of solid and hazardous waste disposal programmes and pollution incidents.

*Advocate for* a stronger focus on bi-lateral and multi-lateral partnerships to support national activities and outcomes.

### KEY ISSUES

#### Integrated Solid Waste Management

##### *Sustainable Financing:*

- About 1-2 per cent of a country's Gross Domestic Product is required to deliver full solid waste services<sup>1</sup>, however many Pacific island countries do not allocate sufficient resources to waste management, resulting in sub-standard facilities that contribute to environmental pollution and public health impacts. The wider economic impacts from poor waste management could be significant as shown in some studies<sup>2,3</sup>.
- Successful examples of sustainable financing programmes exist within the region, including the Kiribati *Kaoki Mange* Programme, and the Koror State Recycling Centre in Palau.

- There is an urgent need to replicate and expand these and other successful and sustainable financing initiatives, including user-pay systems, extended producer responsibility, and full-cost accounting,

*Waste to Energy:*

- There is growing interest in waste-to-energy driven primarily by international companies promoting proprietary technology, as a way to reduce dependence on fossil fuels for power generation, and reduce waste volumes.
- With an agreed regional goal of waste minimization, and adopting cost-effective and self-sustaining solid waste management system, the Pacific region must take a cautious approach to the adoption of potentially expensive, high-tech solutions, particularly those relying heavily on foreign expertise and supplies.

**Hazardous Substances and Wastes**

*Asbestos:*

- Asbestos-containing wastes are a major issue for many Pacific island countries with a history of use of asbestos-containing building materials in construction.
- All forms of asbestos are carcinogenic to humans and inhalation of asbestos fibres that have become airborne can cause serious lung disease or cancer.
- The regional priorities for asbestos management include conducting an inventory of the distribution of asbestos containing materials, progressive stabilization of high-risk facilities such as schools and occupied dwellings, and final disposal of asbestos containing waste materials in secure landfills.

*Electrical and electronic wastes (E-waste):*

- E-waste is a largely unmanaged and increasing problem in the Pacific region, since e-waste may contain a range of hazardous substances including heavy metals, and brominated flame retardants.
- The extent of the problem needs to be assessed, and current stockpiles of e-wastes need to be exported for safe recycling and/or disposal.
- An extended producer responsibility (EPR) model is needed to promote better life-cycle management of electronic products and to prevent the recurrence of stockpiles. This may involve investigating manufacturer return options, and creating incentives to cover re-export and proper recycling and/or disposal of E-waste.

*Used oil:*

- Used oil (lubricants and hydraulic oils) can contaminate groundwater, drinking water, the marine environment, and land (soil). Direct human contact with waste oil should be minimized and controlled to reduce human health risks.
- Used oils are a potential resource and can be combusted as fuel (such as in a cement kiln), mixed with diesel and used in power generating plants, or refined to remove contaminants (such as chemical impurities, heavy metals, dirt and additives) and reused as new oil.

- Options for used oil management are currently being considered through a regional project funded by l'Agence Française de Développement (AFD).

*Pesticides:*

- Persistent organic pollutants in Pacific islands arise from the historical use of chemicals to support national activities, and they include pesticides containing organochlorines, which were used in agricultural activities and to control mosquitoes and malaria; and capacitors and electrical transformers containing PCB oils, which were used to support light industries and power generation.
- Modern pesticides are currently used throughout the region by the agricultural sector to control weed and insect pests.

There is a lack of the specialised resources needed for the management, treatment and disposal of persistent, hazardous chemicals at a local level, and a lack of awareness of the hazardous nature of these chemicals at the community or farm scale, which often contributes to their unsafe use and storage<sup>12</sup>.

## **BACKGROUND**

Poor waste management is a major threat to sustainable development in Pacific Island Countries and Territories as it has negative impacts on the region's biodiversity and environment, as well as on public health, water resource quality, fisheries, tourism, trade and other areas of national development. Studies have shown that the national cost of solid waste related pollution could be as much as 1.6 per cent of GDP in Palau<sup>2</sup>, and US\$2.9 million in Tonga<sup>3</sup>.

The strategic framework for the management of solid and hazardous wastes are spelt out in several regional documents including the Pacific Regional Solid Waste Management Strategy 2010-2015, an Asbestos Management Strategy and Action Plan, an E-waste Management Strategy, and a draft Health Care Waste Management Strategy.

### **Solid Waste Management**

Approximately 50% of the household wastes discarded by Pacific island populations consist of organic material. The remainder is generally comprised of recyclable items, with only a small fraction (generally less than 20% by weight) of rubbish requiring disposal in a landfill<sup>4</sup>. However, despite this, the overwhelming proportion of municipal solid waste in Pacific Island countries is typically disposed of on land by way of waste dumps and landfills, with only a small component being composted or recycled.

Disposal of large quantities of wastes to landfills or rubbish dumps is unsustainable given the challenges faced by many Pacific island countries and territories, which include the limited availability of suitable land for landfills on small islands and atolls, exacerbated by customary land tenures and "not-in-my-backyard" attitudes; the remoteness of many Pacific island countries resulting in high capital and operating costs; the small and sometimes sparse populations which limit any potential economies of scale for recycling operations; the limited institutional and human resources capacity; and the fact that waste management financing has not kept pace with growth in waste quantities.

An integrated waste management programme emphasising waste minimization combined with environmentally sound waste treatment and final disposal is therefore critical to ensuring protection of public health and the environment.

### **Waste Minimisation**

Waste minimization strategies to reduce the generation of solid wastes are a critical management component of waste management in the Pacific region<sup>4</sup>. These strategies include a focus on composting of organic waste, and the recycling of selected waste streams such as plastics, paper, metals (including lead and aluminium) and glass.

#### Waste Reduction

Organic waste, which typically comprises half of the waste disposed of by a household, can easily be composted at source. Composting at source helps reduce the waste going to dumps and landfills and reduces the collection, transportation, and disposal costs of household waste. It also produces a beneficial soil additive to support subsistence farming. Recovering the nutrient content of waste organic materials through composting is particularly crucial to small atoll states where the soils are typically alkaline with low levels of certain micronutrients essential for plant growth and health. Only a small percentage of organic wastes are composted in the Pacific<sup>4</sup>.

Other waste reduction initiatives suited to the Pacific region include restrictions on the use of thin, single-use plastic bags that often litter the land and ocean causing a range of problems from flooding to death of marine life; and controls on electrical and electronic equipment, chemicals, and hazardous materials as governed under various international agreements including the Basel and Waigani Conventions.

#### Recycling

Waste recycling in the Pacific islands context generally refers to the collection, compaction and shipping of recyclable materials to a recycling facility that is usually located off-island. These programs are typically undertaken by the private sector. Two major technical obstacles to cost-effective waste recycling in the Pacific include the lack of national recycling and re-processing facilities, and the comparatively small quantities of recyclable waste, which make it uneconomic to transport materials elsewhere for recycling and reprocessing. These obstacles are compounded by the absence of a regionally oriented or coordinated recycling mechanism. Preliminary studies of recycling options in the Pacific have concluded that improvement measures including expansion of the collection coverage of recyclable waste goods, improved working standards and conditions at Pacific recycling companies, and adoption of supportive government policies (such as container deposit legislation) are urgently required to improve waste recycling in the region.

### **Waste Disposal**

The current landfill management approach taken by most Pacific island nations (in urban areas) is to implement the Semi-aerobic Landfill Method (the Fukuoka Method), which is a cost-effective and

speedy method of stabilising waste containing biodegradable materials<sup>5</sup>. This sanitary landfill method continually removes leachate and landfill gas through a system of leachate collection and gas venting pipes. The semi-aerobic condition in the waste mass releases carbon dioxide compared to the methane released under the anaerobic conditions present in other dumpsites and anaerobic landfills. This is critically important as methane is 21 times more potent as a greenhouse gas than carbon dioxide (over a 100-year period). Replication of this method in urban centres and outer islands should be encouraged, and the potential for obtaining Certified Emission Reductions under the Clean Development Mechanism of the Kyoto Protocol should be urgently explored.

### **Climate Change**

Climate change impacts such as increased sea level rise, increased rainfall, and increased cyclone intensity can damage waste management infrastructure leading to pollution, which increases anthropogenic stresses on natural systems and undermines the adaptive capacity and resilience of these natural systems. Adverse weather events also generate disaster waste, which must be safely managed to minimize further adverse environmental and public health impacts. Building adaptive capacity within the waste management sector to cope with climate change impacts is a critical adaptation to climate change. The semi-aerobic (Fukuoka) landfill also contributes to reductions in greenhouse gas emissions from the waste management sector since the degradation of waste under semi-aerobic conditions favours the production of carbon dioxide over the more potent methane gas.

### **Hazardous waste management**

The Pacific region is also faced with the necessity to implement sustainable management methods for a range of hazardous materials that are generated or used in the region. These include health care wastes, asbestos, electrical and electronic wastes, pesticides and used oil.

### **Health care wastes<sup>6</sup>**

Disposal of hazardous medical wastes including expired pharmaceuticals, soiled bandages and dressings, and contaminated sharps is often carried out through low temperature combustion (open burning) or by uncontrolled dumping in landfills. Improper disposal of medical wastes can result in contamination of water supplies or aquatic environments and burning of medical wastes at low temperatures results in the release of toxic pollutants to the air. Landfill dumping of medical wastes results in unacceptable community health risks and expired drugs may be acquired by children or scavengers if disposed in a landfill. An integrated framework to manage pharmaceuticals and progressively implement routine medical waste disposal through controlled high temperature incineration (or other appropriate method) is essential for infection control and protection of the health of many smaller Pacific island communities.

### **Asbestos<sup>7</sup>**

Asbestos containing wastes are also a major issue for many Pacific island countries with a history of use of asbestos containing building materials in construction. All forms of asbestos are carcinogenic to humans and inhalation of asbestos fibres that have become airborne can cause serious lung disease or

cancer. Natural disasters and aging building deterioration releases asbestos fibres into the atmosphere. The inventory of the distribution of asbestos containing materials in Pacific countries, and the subsequent progressive stabilization of asbestos in priority buildings such as schools and occupied dwellings is a critical regional priority. Final removal of asbestos containing waste materials from Pacific island countries to secure landfills will minimise potential long-term community health impacts<sup>8</sup>.

### **E-wastes<sup>9</sup>**

Discarded electrical and electronic equipment that no longer serves its original purpose (E-waste) is a largely unmanaged and increasing problem in the Pacific region. Electrical and electronic equipment may contain a range of hazardous substances including heavy metals, brominated flame retardants and other toxic substances. The inventory of the extent of the problem, and completion of an initial export of current stockpiles of E-waste products for safe recycling and/or disposal is a regional priority. Model institutional measures to prevent the recurrence of stockpiles through better life-cycle management of electronic products are also needed, including investigation of manufacturer return options and creation of a model tariff or deposit system to cover re-export and proper recycling and/or disposal at the end of product life.

### **Used oil<sup>10</sup>**

Used oil contamination can have a major impact on natural resources such as groundwater, drinking water, the marine environment, and soil quality. As a consequence, there are major environmental health and community safety considerations around the fate of used oil. Direct human contact and emissions to air, water and the soil should be minimised and appropriately controlled, to reduce environmental and human health risks. Used oils can be combusted as fuel (usually in plant boilers, space heaters, or industrial heating applications such as blast furnaces and cement kilns). It can also be used as a diesel additive to power electricity generation. Alternatively, used oil can be refined to remove contaminants (such as chemical impurities, heavy metals, dirt and additives) and reused. There is no comprehensive management system in place in the Pacific to manage used oil at the present time, although options are being considered through a regional programme funded by AFD.

### **Pesticides**

Historically, a range of persistent organic pollutants were imported into the Pacific region to assist the development of island economies. These included pesticides containing organochlorines, which were used in agricultural activities and to control mosquitoes and malaria. In addition, capacitors and electrical transformers containing PCB contaminated oils were also used to support light industries and power generation, and contaminated oil remained within disused capacitors and transformers. Modern pesticides are currently used throughout the regional by the agricultural sector to control weed and insect pests. As a consequence, most Pacific Island countries are often at increased risk of human exposure and environmental contamination from these types of chemicals. This is a consequence of the lack of the specialised resources needed for the management, treatment and disposal of persistent, hazardous chemicals at a local level, and a lack of awareness of the hazardous nature of these chemicals at the community or farm scale, which often contributes to their unsafe use and storage.

## REFERENCES

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## KEY DOCUMENTS & HYPELINKS

### General reference documents:

<http://www.sprep.org/Waste-Management-and-Pollution-Control/References/>

### AFD Project:

<http://www.sprep.org/Projects/afdsprep-regional-solid-waste-management-initiative>