



# Solid Waste Management in the Pacific Samoa Country Snapshot

## BACKGROUND

Samoa consists of two principal islands and eight islets, with a combined land area of 2,944 square kilometers (km<sup>2</sup>). Samoa's current population is estimated to be about 189,300. In 2012, per capita gross domestic product was 8,317 tala (around \$3,600).<sup>1</sup>

The island of Upolu, with an area of 1,125 km<sup>2</sup>, is the second largest island in Samoa. It has a population of approximately 138,000, including about 38,000 living in Apia, the nation's capital, which is located on the north coast. The rest of the population lives in about 170 villages, primarily along a narrow coastal fringe around the island. All of Upolu Island, including the capital city of Apia, is served by one solid waste management (SWM) system.

## TECHNICAL ASPECTS

Little data is available on the amounts and types of municipal solid waste (MSW) generated on Upolu, as regular waste assessments are not undertaken. Information that is currently available indicates that per capita MSW generation in different parts of Upolu varies between 0.38 kilograms (kg) and 0.48 kg per person per day, depending on income levels, extent of urbanization, and other factors. MSW generation rates are most likely considerably higher in Apia than in the villages. Assuming an average per capita generation rate of 0.45 kg per person per day and a population of 138,000, the MSW household generation rate is therefore about 60 tons per day, or more than 20,000 tons per year. From mid-2012 until the year 2030, assuming nominal growth in population and per capita waste generation, Upolu is therefore expected to generate in excess of 350,000 tons of household waste, which is a significant amount for a small island nation. Added to this would be

the generation of MSW by commercial and institutional establishments, the volume of which is currently unknown.

Specific data on the kinds of wastes generated on Samoa is not available, but MSW in Pacific island countries in general includes an extremely high proportion—nearly 60% by weight—of organic, or biodegradable, materials. Next come recyclable substances, like paper, plastics, glass, and metals, each constituting between 6% and 12% of the waste by weight. Other wastes include household hazardous waste, textiles, and construction and demolition debris.

### Waste Collection and Transfer

Field observations show that, for the most part, Upolu is a relatively clean and garbage-free island, where those who generate household and commercial wastes are careful in the way they handle, store, and dispose of it. Most households keep wastes on a raised platform, ready for collection by a waste pickup truck. The platforms range from flimsy wooden structures to well-designed steel ones. The objective of the raised platforms is to keep scavenging animals away from the MSW, which was a major issue in the past. This unconventional collection system is widely accepted. The only problem is that, unlike standard “wheelie bin” systems, the waste is not completely enclosed; and is therefore subject to rain and wind impacts. It is common for households to compost green waste on their properties, as well as to segregate and use food waste, such as taro and banana peelings, as animal feed.

A relatively small number of households, around 5% of the total, still either burn their waste; or dump it within their property boundaries or in vacant areas, rivers, or the ocean.

Commercial MSW is stored in a range of steel material and other containers.

1 ADB. 2013. *Key Indicators for Asia and the Pacific 2013*. Manila.

MSW is collected in standard waste compactor trucks and open-top trucks, mostly twice a week, but daily in congested urban areas. There are five private sector service companies operating through government-funded 3-year contracts. MSW is collected from every household on Upolu. Each contractor has a specific collection zone, and operates to agreed performance standards. Should there be a case of poor performance by one of the collection contractors, a procedure is in place to enforce performance, leading to termination of the contract if necessary. Contractors also deal directly with commercial and institutional establishments, collecting and transferring their MSW to the disposal facility. In many cases, establishments transport their MSW to the facility. Commercial and institutional wastes are subject to a tipping fee, the charge levied for receiving waste at a disposal facility.

### Waste Recycling

Many households segregate waste components, including food waste used as animal feed and green waste used as compost. Many also reuse valuable items, such as plastic containers.

A few recycling initiatives have been attempted on Upolu on an ad hoc basis, but currently there is only one commercial-scale private sector recycler on the island. This is a metals recycling company called Pacific Recyclers, which collects and processes ferrous and nonferrous metal scrap and ships to Australia, the Republic of Korea, and New Zealand for resale. They ship 20-foot containers averaging 12 containers per month, with a laden weight of approximately 20 tons each. The recycling yard is located adjacent to the island's only municipal disposal facility, the Tafaigata landfill facility.

Although not yet operative, a tire-recycling center is being developed adjacent to the existing metals recycler. There are no systems in place for the effective disposal of end of life vehicles and white goods.

The government is yet to develop and promote long-term, island-wide waste minimization, waste reduction, and recycling programs on Upolu, although it is committed to introducing these initiatives.

### Waste Disposal

Upolu's MSW is transferred directly to the Tafaigata sanitary landfill facility, the only designated municipal landfill on the island. The facility is located about 10 km west of Apia, in a relatively remote agricultural area, at an elevation ranging from 110 to 140 meters above sea level. It is well connected by feeder roads to Apia and other areas. The facility is

relatively large and extremely well laid out. It covers an area of 950 meters by 350 meters (over 30 hectares); and has internal access roads, a gatehouse, a recycling materials segregation and storage area, a hazardous waste incinerator, waste water lagoons, and a landfill.

The site has a fence on the northern side, and uninhabited agricultural land with relatively thick vegetation to the east, south, and west. It has only one major access point, which goes past the main gatehouse. The site is supervised and managed by the government. There are a number of authorized operatives at the site, including machine drivers and a group of metal scrap waste segregators.

Authorization is needed to access the site. Truck movements are relatively well-managed. The gatehouse, office, and ancillary building are permanent structures at the entrance, with good visibility of vehicles entering and leaving the site. Tipping fees are paid at the gatehouse. Although unpaved, the site access roads are in good condition, allowing traffic to move freely to and from the landfill and other facilities.

MSW is dumped and spread over a wide surface area and covered with soil. This method unnecessarily exposes people to large areas of waste and also increases the potential of rain infiltration. The disposal surface is generally untidy, with large areas of scattered wastes. Conventional composite liner systems are not installed in the facility, although basic compaction of the underlying soils is completed prior to the placement of waste.

Leachate collection, which minimizes the effect of hazardous liquids escaping from waste, is confined to rudimentary leachate collection pipes that drain leachate under gravity to a primary holding pond near the landfill. Although a conventional landfill gas (LFG) collection and retention system is not installed at the facility, it is reported that LFG pipes are installed in the waste cells, allowing LFG to escape into the atmosphere without treatment or flaring.

The Japanese International Cooperation Agency (JICA) and the Secretariat of the Pacific Regional Environmental Programme (SPREP) have been actively involved in the development and operation of the Tafaigata facility and the overall SWM system. Assistance has been extended from as early as over a decade ago to the time when the dumpsite was upgraded. JICA and SPREP have recommended actions to be taken in the SWM sector that include (i) banning of uncovered MSW transfer trucks, (ii) improving monitoring of MSW collection contracts, and (iii) strengthening overall long-term planning for the sector.



Tafaigata Sanitary Landfill Facility

Photo by N. Allen

### Medical Waste Management

The Ministry of Health (MOH) is directly responsible for regulating the medical waste management system. The National Health Service operates the system for the collection, storage, transfer, treatment, and disposal of medical waste. The system includes a color-coded bin system to allow for the segregation of infectious and hazardous wastes from general MSW (yellow for medical waste and green for MSW). A special-purpose vehicle collects medical waste from the four regional hospitals, 20 clinics, three mortuaries, and other smaller facilities on the island; and transfers the wastes directly to the national hospital in Apia. From here, all medical wastes are transferred to the medical waste incinerator at the Tafaigata disposal facility for thermal treatment. The ash is placed in a pit located at the disposal facility, and the pit is covered every day with soil.

The two-chamber incinerator operates 7 days a week, handling an average of 12 240-liter wheelie bins of medical wastes every day. Four full-time staff are involved in system operations: a driver, an incinerator operator, and two other operatives. The MOH has completed training programs for health professionals, including in the safe segregation of wastes. JICA and the World Bank have been actively involved in developing and funding the medical waste management system on Upolu, which operates relatively well.

### INSTITUTIONAL ASPECTS

The main legislative document concerning SWM in Samoa is the Waste Management Act 2010. The Act covers the collection, management, disposal, and recycling of solid waste. The Act provides for registration and licensing of waste operators, permits for dumping and incinerating wastes, sets environmental standards for the management of waste, and provides for community involvement in waste management.

The institutions involved in SWM are the following:

#### **Ministry of Natural Resources and Environment.**

The Waste Management Section of the Ministry of Natural Resources and Environment (MNRE) manages the SWM sector with a small team: a chief executive officer, two senior officers, two junior offices, and seven cashiers. They have offices in Apia and at the Tafaigata disposal facilities. In addition to the overall planning and management of sector activities, this team is also responsible for contract procurement and management of Samoa's six collection contracts.

**Ministry of Finance.** The ministry allocates funds received from overseas donors for SWM projects and programs.

**Ministry of Health.** The ministry is responsible for the regulation of the medical waste management system, which is operated directly by its National Health Service.

**Ministry of Women, Community and Social Development.** The ministry plays a vital part in the development of Samoa's 300 or so villages. Village representatives meet ministry officials monthly to discuss development concerns and learn of government strategies. SWM is often one of these concerns. The ministry's Family and Community Wellbeing Program promotes village, household, and general environmental cleanliness, including composting, in over 200 villages.

**International donor agencies.** JICA, SPREP, and the International Finance Corporation (IFC) have been active in the sector, providing support and targeted investments for the MSW. The IFC is currently providing support to the Government of Samoa to competitively tender a concession for the country's solid waste management operations.

**Samoa Umbrella for Nongovernment Organizations.** An umbrella organization that assists vulnerable Samoan groups; and provides inputs to government policy from nongovernment organizations, including community-based and civil society bodies. These organizations are acutely aware of the status, deficiencies, and needs of the SWM sector; and, through their network of members, are able to influence policy in SWM and the environmental sector, in general.

## FINANCIAL ASPECTS

According to the MNRE, in 2012, the government budget for the SWM sector was 2.281 million tala, equivalent to \$0.97 million. This budget funds the MSW collection contracts, Tafaigata landfill equipment contract, landfill maintenance works, and cleaning of public areas. Funding is provided directly from the central government budget, and households are not charged for solid waste collection or disposal. Commercial and institutional MSW is collected and transferred by private sector operators under individually negotiated arrangements. All commercial and institutional MSW entering the landfill is subject to tipping fees. The NHS charges fees for the collection and transfer of medical wastes from private medical waste generators, and are also subject to tipping fees at the landfill site.

The MNRE is able to provide a reliable and relatively cost-effective service to the entire island of Upolu, despite facing significant challenges in the remoteness of some

areas served, and the limited quantities of waste collected compared with the distance travelled. Private haulers' charges for commercial and institutional MSW collection and transport appear to match the generators' ability and willingness to pay. Commercial and institutional MSW, and privately generated medical wastes, provide additional revenue to the government through the tipping fees charged at the landfill facility.

## PUBLIC AWARENESS

MNRE supports Waste Awareness Day every year; publishes monthly environmental newsletters; and invests in initiatives such as biogas and composting projects. The Ministry of Women, Community and Social Development, working in most villages in Samoa, actively promotes environmental cleanliness, of which SWM is an integral part.

In a 2012 survey of 50 randomly selected individuals on Upolu island, 90% of respondents said they use municipal SWM service. All respondents opposed the imposition of SWM tariffs, many of them strongly. An impressive 86% were willing to further educate themselves, their families, and the community on SWM. About half considered the municipal MSW collection service *good* and 6% found it *very good*; 28% said the service was *poor* and 16%, *very poor*. About 46% of respondents rated collection contractor performance *good*. About two-thirds considered the frequency of waste collection *good*, while one-third said it was *poor*.

## CONCLUSIONS

In comparison with many other Pacific SWM systems, the system on Upolu is well advanced. To further improve the sector, three areas of support have been identified: formulation of a national SWM strategy and development of an island-wide waste minimization and recycling program. ■

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