

Waste Sector CDM - Potential Opportunities for Pacific Island Countries

The Pacific Islands



- 14 Countries
- 8 Territories
- 30 million sq. km
- 7500 islands
- Only 500 inhabited
- 10 million people

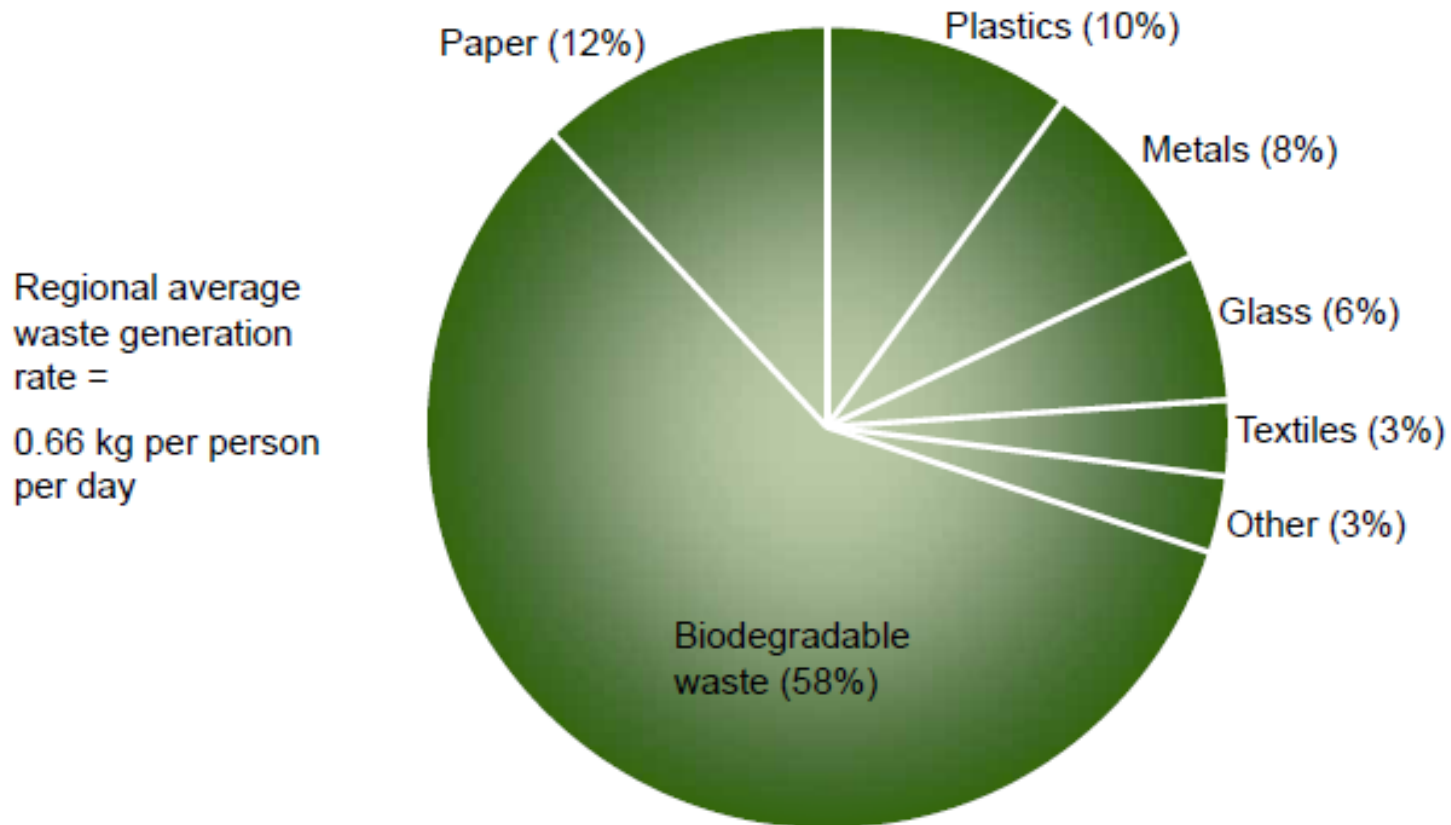
Pacific Waste Management Issues

- Population is concentrated in **urban areas**
- In recent years, number of problems in waste sector due to **changes in the socio-economic conditions**
- **illegal dumping** (in back yards, mangroves and lagoons)
- inadequate **management of landfills** and difficulty in **acquiring more land** for landfills
- lack of adequate handling of **medical (contagious) and hazardous waste** (persistent organic pollutants)
- poor **economic viability** of **recycling** (small market, difficulty of transport)
- contamination of **groundwater** and **seawater** from waste and domestic effluent

Pacific Waste Types

- **Municipal Waste (including solid waste and wastewater)**
- **Industrial waste (including manufacturing)**
- **Hazardous wastes**
- **Construction and Demolition Waste**
- **Mining Waste**
- **Waste from Electronic and Electric equipment**
- **Packaging Waste**
- **End of Life Vehicles (ELV's) and Tires**
- **Agricultural wastes**

Typical Composition of Solid Waste in Pacific



Source: S.C. Raj (2000), *Solid waste education and awareness in Pacific Island Countries*, Pacific Regional Waste Awareness and Education Programme, SPREP, Apia.



Kiribati Solid Waste Disposal Site



**Honiara, Solomon Islands Waste
Disposal Site**



Majuro Dump site, Marshall Islands



Port Vila Dump, Vanuatu

CDM Opportunities in Waste Sector

Collection



- ✓ Rationalise the collection operations
- ✓ Alternative transportation
- ✓ Alternative fuels

Incineration



- ✓ Increase energy recovery
- ✓ Recovery of ash / slag

Landfill



- ✓ Maximise landfill gas collection
- ✓ Promote landfill gas to energy

Recycling



- ✓ Develop new recycling opportunities
- ✓ Increase recycling rates

Composting



- ✓ Optimisation of aerobic conditions
- ✓ Increase compost production

Hazardous Waste



- ✓ Increase the production of substitute fuels
- ✓ Increase recycling rates

The sector is not a major contributor to climate change: waste management activities generate ~ 3% of worldwide GHG emissions

But there are a number of possible actions to reduce these emissions

CDM Opportunities for Pacific in Waste Sector

Principle of GHG reduction	Capture of methane (produced under anaerobic conditions)	Avoidence of methane production (through aerobic conditions)
Technologies	<ul style="list-style-type: none">• Landfills• Closed reactors• Methane recovery in wastewater treatment	<ul style="list-style-type: none">• Composting• Aeration of landfills
Co-Products	<ul style="list-style-type: none">• Electricity, gas	<ul style="list-style-type: none">• Soil fertilizer

Solid Waste Management in Pacific

- Solid waste has been recognised as a **problem for the Pacific Islands for many decades** but it is only in the last **~10 years that significant progress** has been made in addressing the issue
- One of the **main driving forces** for this progress has been the development of the **Regional Solid Waste Strategy**
- **Priority concerns** for the region include **sustainable financing, integrated waste management, legislation, education and awareness, and capacity building**
- Two other aspects that is proposed to be targeted, particularly from an **international perspective** are **technology transfer and private sector engagement and support**

Solid Waste Management & CDM

- Waste management is one of the **potential sectors** under the Clean Development Mechanism.
- Suitable technologies which are potential as both CDM activities and waste management options are **composting, incineration, LFG capture/ avoidance, methane capture & utilisation from sewerage** etc.
- Under CDM, waste management projects lead to both **environmental protection, healthier community** and **income generation** through the selling of carbon credits
- Capture and utilisation of biogas from landfill will also benefit in terms of **renewable source of energy** and associated **economic benefits**

Landfill Projects under CDM

- In order to qualify, it should be **well planned and constructed**.
- The **amount of waste** dumped should be known.
- If possible, **sorting of waste** should be done to ensure that the dumped waste is largely composed of **organic matter**.
- Landfills are an **efficient, proven and cost effective** method of disposing organic wastes without releasing green house gases.
- In a well managed landfill, Biogas is likely to be produced over a period of **20 or 25 years**.

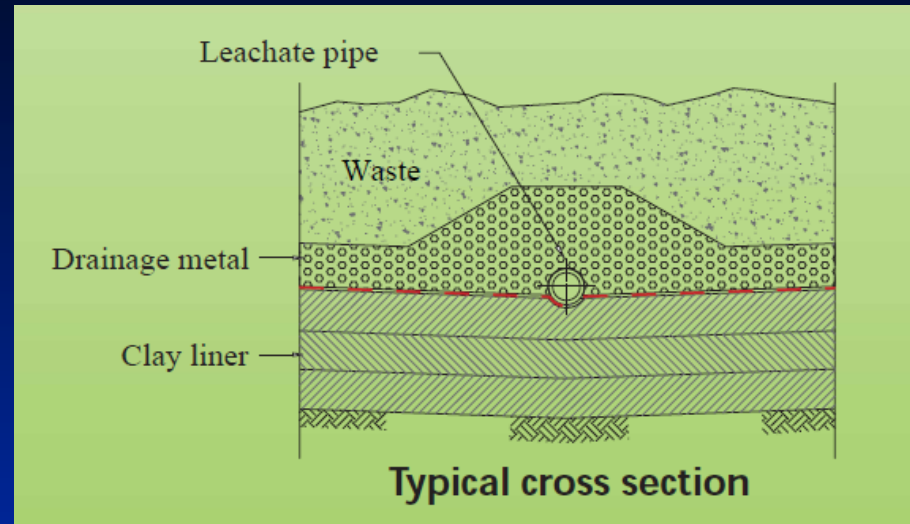
Example of Potential Landfill CDM Project in Pacific – Naboro Landfill, Fiji



- Project of the Fiji Government, funded by the European Union and the Government of Republic of The Fiji Islands
- The site was opened in 2005
- Operated by HG Leach (Fiji) Limited, as wholly owned subsidiary of H.G. Leach & Co. Ltd, Waste managers, Quarrymen and Contractors of New Zealand

Naboro Landfill, Fiji – Key Aspects

- Landfill Infrastructure - gate office, a certified weighbridge, administration block, workshop, main access roads, first stage protective clay liner, leachate drainage and treatment and storm water control systems
- General municipal and commercial wastes are accepted including some special wastes
- No hazardous wastes are accepted.



Naboro Landfill, Fiji – CDM Potential for Methane Capture & Utilisation

- Average quantity of MSW dumped per year since 2005 : 50,400 tonnes
- Data is not available for the composition of waste
- Sampling & analysis of MSW dumped need to be carried out using appropriate techniques to determine the average waste composition
- Waste composition (based on IPCC 2006 guidelines default values for Pacific countries):
Food: 60%, Paper/Card board: 6%, Wood: 2.5%, Textile: 1.5%, Inorganic/other: 30%.

CDM Assessment of Naboro Landfill Project

- CDM sectoral scope
 - Waste handling and disposal - 13
- Scale of project
 - Small Scale
- Source of emission reductions
 - Methane recovery and flaring/electricity generation from landfill gas capture
- Baseline scenario
 - venting the methane generated in landfill into atmosphere.
- Approved baseline methodology
 - Type III.G – Landfill Methane recovery (III.G./Version 6) and AMS ID – Grid connected renewable electricity generation (Version 17)
- Preliminary estimate of emission reductions
 - 14,000 – 17,000 tCO₂e

Domestic Wastewater Treatment in Pacific

- Sewage is the most significant source of marine pollution in the Pacific region
- Overflowing latrines, water seal toilets, septic systems, sewage treatment plants (if any) as well as the complete lack of sanitation facilities in some places
- In many PIC's human waste is normally collected in septic tanks at household level and transported to a dump site
- The grey water (kitchen/bathing) generally gets mixed with storm water and reaches the sea
- Improper sanitation including wastewater treatment is resulting in algae blooms and eutrophication in lagoons, dying reefs, contaminated drinking water wells and outbreaks of gastro-intestinal disease and cholera

Example of Domestic Sewage CDM Project in Pacific - Kinoya Sewerage Treatment Plant GHG Emission Reduction Project, Fiji



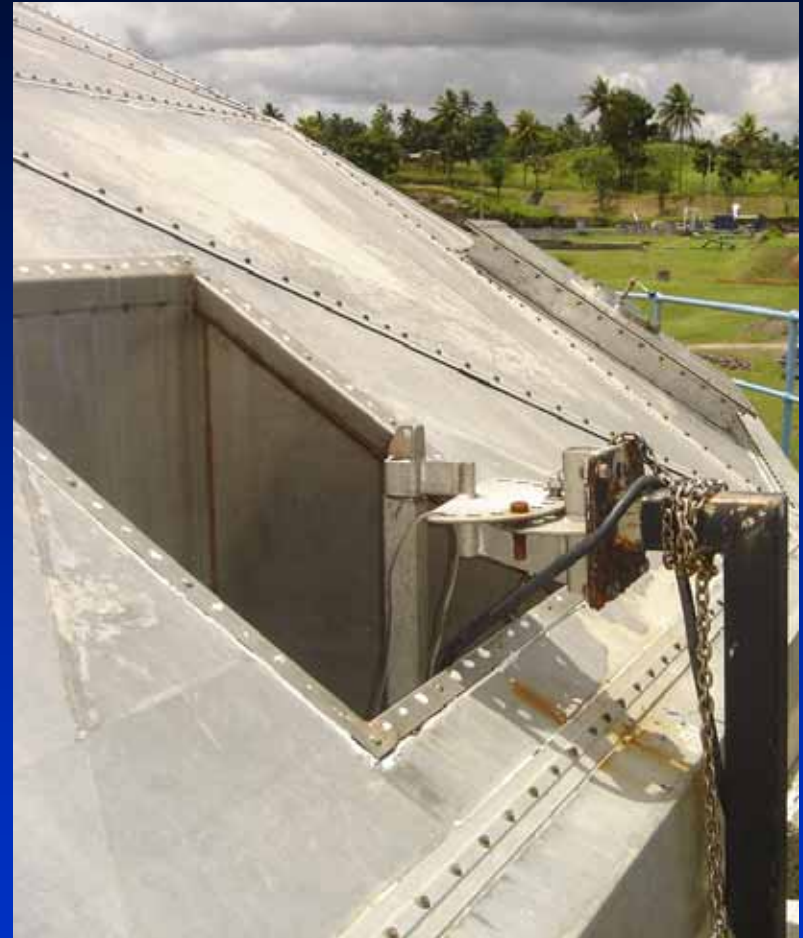
CDM Project Description

- **Main objective:** to recover and flare methane generated by the anaerobic decomposition of organic matter in sludge of an existing sewerage treatment plant.
- **The project activity proposes** to move from a potentially **high GHG emission** option of open air venting of methane to **environmentally benign** option of capture and combustion of methane
- Developed by **Water Supply & Sewerage Department (WSD)/Water Authority of Fiji** under the Ministry of Works, Transport and Public Utilities, Government of Fiji Islands.
- The project is located at **Kinoya, Suva city**, Viti Levu Island, Republic of Fiji Islands

Current scenario

➤ Current Scenario

- The methane generated from decomposition of sludge in the anaerobic digester is currently being vented into the atmosphere.
- Proposed CDM Project intervention
 - flaring by installing appropriate flaring equipment



CDM Assessment

- CDM sectoral scope
 - Waste handling and disposal - 13
- Scale of project
 - Small Scale
- Source of emission reductions
 - Methane recovery and flaring from anaerobic digestion of wastewater sludge
- Baseline scenario
 - venting the methane in wastewater & sludge into atmosphere.
- Approved baseline methodology
 - Type III.H - Methane recovery in waste water treatment (III.H./Version 16) and
- Estimated annual emission reductions
 - 22,000 tCO₂e

CDM Project Status

- **Project Design Document (PDD)** has been developed by support from Technical Support Facility, ADB
- **Certified Emission Reduction Purchase Agreement (CERPA)** has been signed with Asia-Pacific Carbon Fund
- Project has completed **Validation** by DOE
- Project has been **submitted for registration** with the CDM Executive Board and has passed through “Completeness Check” & “Information & Reporting Check”.
- The envisaged operational date for the project is during **August/September 2011**.

Recommendations

- Significant opportunities exist for developing SSC projects under waste sector in Pacific Island nations
- Potential projects include:
 - Methane recovery and utilization from landfills & wastewater treatment – anaerobic decomposition - Electricity & Gas
 - Methane avoidance – aerobic treatment – composting/aeration of landfills – Soil Fertilizer
- Naboro landfill if developed as CDM project will be 'first of its kind' in Pacific and can be a role of model project.

THANK YOU