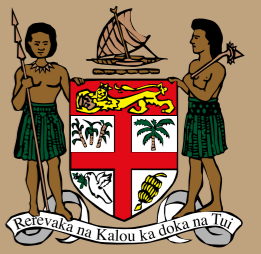


National Solid Waste Management Strategy & Action Plans 2008 - 2010

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National Solid Waste Management Strategy & Action Plan 2008 - 2010



Working towards a cleaner Fiji

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- * Dr Frank Griffin, Pollution Prevention and Waste Management Advisor, South Pacific Regional Environment Programme (SPREP)

The supporting team of seven working groups and their respective chairmen need special mention for their input in identification of key issues that form the basis of the strategy and action plan.

To you all our humble gratitude for the completion of Fiji's National Solid Waste Management Strategy and Action Plan 2008 – 2010.

Foreword

I am glad to present here a major achievement of my ministry in the Fiji's National Solid Waste Management Strategy and Action Plan 2008 – 2010. I see this document as a giant step towards the safeguard of the constitutional right of our citizen to a healthy ecology and to live in harmony with nature.

Fiji's ecosystem is extremely fragile for the buffering against contaminants. Here in Fiji, our Towns and two (2) Cities have been in the past years exposed to the destructive effects of poor waste or rubbish management. Our Villages and urban centers are strewn with rubbish and litter and uncollected garbage. Rubbish thrown into rivers, waterways, bushes, beaches or even dumped in an open areas and has become a constant nuisance.

The National Solid Waste Management Strategy sets out how we should address our problems on waste and it covers: waste minimization not limited to resource conservation, waste segregation at source, waste disposal, recycle, reuse and composting. The Strategy is a precursor to the Waste Management Regulation under the EMA 2005 which will provide for the mandatory prohibition of open dumping and establishment of sanitary landfills, sorting of wastes, recycling of wastes and respective solid waste management systems for specific type of solid wastes.

The strategy is an integrated ecological approach and should address major negative aspects of solid waste disposal especially in communities. The implementation of the Strategy is expected to significantly reduce the volume of waste residual for final disposal and thus alleviate the pressures on the capacity of the Naboro Landfill and other landfill that would be established.

I therefore congratulate the Department of Environment and the Co-Authors for the realization of National Solid Waste Management Strategy after two years of collation and compilation.

I commend Fiji's National Solid Waste Management Strategy and Action Plan 2008-2010 to you in Leading Fiji towards a Sustainable and Clean Environment.



(Mrs. Bernadette Rounds Ganilau)

Minister for Labor, Employment Relations, Tourism and Environment.

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Executive Summary

Environmentalism promotes just and equitable access to resources. The natural environment is an integral part of Fiji's products and services and the quality of nature plays a significant role in the success of any socio-economic development. As such, the generation and disposal of wastes does have direct and indirect impact on the socio-economic development of our nation.

The Government has taken steps to support sustainable resource management and encourage environment conservation through the Environment Management Act (EMA) 2005. The Act sets guidelines and policies for environmental impact assessments, waste management, pollution control and penalties.

Waste material present wasted money in-terms of original cost of materials, cost of materials, cost of disposal and also potential value of the material as a recyclable and reusable resource. Poorly managed wastes can have negative effects on tourist destination image and by association with health warnings about infectious and vector-borne diseases. There is potential for contamination of food supplies, health and environmental hazards. Conversely, good waste management, reduces raw material costs, reduced health care costs, reduce clean-up campaigns and enhancement of the tourism experience.

The Strategy details the current waste management practices and outlines the inadequacies that exist in the institutions. It provides a platform from which future waste management activities can be developed and the mechanisms for coordinating the programs. It provides implementation at national, municipality, local and community level.

1.0 Introduction

It is our intention to design a strategy that will move Fiji from an over-reliance on dumping wastes and littering to a position where it will be a model for sustainable waste management. Waste cannot be reduced without a system that manages waste from the point of generation through to disposal. Up till now, waste policies provided an end of pipe solution by focusing mainly on disposal rather than prevention. There is a need to develop a new vision for minimizing waste and managing it better.

This new Solid Waste Management Strategy for Fiji will set direction for developing sustainable waste management practices. This strategy was produced after widespread consultation and through a process of partnership with the main stakeholders involved in the production and management of waste. The strategy will establish challenging but realistic programme of change for the future, led by the Government working in close partnership with local government and other key stakeholders.

Through the Waste Forum(s) and Working Groups, we were able to draw on expertise from the industry, Non Government Organisation (NGOs), academia and specialist bodies. Waste Forum(s) provided the platform to deliberate on emerging issues and new ways of managing wastes including key issue and action plan papers prepared by the Working Groups. Working Groups were set up to advice and develop key issues papers and action plans for the different programme areas.

Our consumerist lifestyle based on heavy reliance on imported food continues to increase resulting in increase of the waste outputs causing adverse effects on our economy. The generation and disposal of wastes has direct and indirect linkages to economic development. Waste represent wasted money, in terms of, both the original cost of the materials, the costs of disposal, and also the potential value of the material as a reusable resource. Poor solid waste management has a serious constraint to our health and environment. Waste is dumped anywhere which is now affecting our reefs, lagoons, inshore fisheries and tourism. Currently waste is being thrown without regard to the environment or any cohesive thought to better waste management. Unused land plots are becoming illegal dumpsites and the so called legal dumpsites are overflowing due to no waste minimization practices. Waste is also being burnt in piles at homes and unfortunately this is an accepted practice in Fiji.

There is no management system for white or electrical goods, chemicals or any hazardous waste except a few chemicals like asbestos whereby a procedure for the disposal of asbestos is in place. However the health and

environmental implications from the unguided disposal of these substances vary. Effective measures will also avoid the need for expensive clean-up operations in the future.

This strategy will identify ways to minimize this country's waste and improve its management in close partnership with local government and other key stakeholders. The purpose of the strategy is to focus on waste reduction to ensure only residual waste goes to the landfill. The strategy will set targets and identify actions primarily for local authorities and producers of industrial and commercial wastes.

The strategy covers wastes such as household, commercial,



A common waste disposal site; open dump, in Fiji

industrial, agricultural, mines and quarries, sewage treatment operations, demolition and construction, and special wastes. Liquid and gaseous wastes are not covered in this strategy.

The key objectives of the National Solid Waste Management Strategy are to:

- * reduce the amount of waste that each community generates
- * make best use of the waste that is generated
- * develop and implement economic and social incentive mechanisms to change wasteful behavior
- * improve and upgrade existing waste management and disposal systems and encourage/ provide waste management practices, which minimize the environmental risk and harm to human health
- * Provide a guideline template for rural or community level solid waste management practices work.

There are a broad range of international and regional agreements which gives impetus to solid waste management. The obligations range from broad concerns about the sustainability of our economic development (e.g. the Earth Summit of 1992) to more specific requirements on how waste is managed. The UN General Assembly Special Session on the Sustainable Development of Small Island Developing States or SIDS held in September 1999 in New York identified waste management as a strategic issue for the sustainable development of SIDS including Pacific island countries.

SPREP recognized waste management as a priority issue within the region which was included in the most recent Action Plan produced in 2001 after extensive consultations with SPREP member countries. SPREP has finalized a regional Solid Waste Management Strategy. The need to improve Waste Management in the Pacific Region was reiterated in the Miyazaki Initiative endorsed by the leaders of Forum Island Countries (PALM 2) held in Miyazaki, Japan in April 2000. Waste management in the Pacific region is also recognized in the Type-II Initiative presented at the World Summit on Sustainable Development in Johannesburg, September 2002.

Fiji also has obligations under the international environmental agreements regarding waste management. Some of these include SPREP Convention which deals with waste issues, Waigani Convention and Stockholm Convention. Fiji signed and ratified the Stockholm Convention in 2001. Under the Stockholm Convention, a recent study conducted by the Department of Environment identified 70% of Dioxin and Furan (toxic chemicals covered under the Stockholm Convention) emissions results from burning of waste. A solid waste management strategy for Fiji is therefore needed to fulfill Fiji's obligations under the Stockholm Convention as well.

2.0 The Environment Management Act

With the preparation and final promulgation of an Environment Management Act (EMA) in March 2005, Fiji has established a comprehensive legal and institutional framework for improving the conditions for waste management in the country. The purpose of the EMA is to apply the principles of sustainable use and development of natural resources and to identify matters of national importance for Fiji with regards to the environment.

Under EMA, it requires the Minister responsible to develop regulations for a range of areas. First priority has been given to Waste Management and Pollution Control. In December, 2007, Environment Management (Waste Disposal and Recycling) Regulations was endorsed by cabinet which has come into effect on 1st January, 2008. The purpose of the regulation is to prevent the pollution of the environment by controlling the discharge of solid waste from facilities, the discharge of liquid wastes, the emission of polluting gases, smoke, steam and dust, and disposal of wastes and hazardous substances generally.

Part 5 of the Environment Management Act 2005 sets out the framework for Waste Management and Pollution Control in the Fiji Islands. It prohibits any commercial or industrial facility from discharging any waste or pollutant into the environment or handling or storing hazardous materials without a permit and gives the Waste Management and Pollution Control Administrator power to issue permits. The WPC Administrator can also monitor discharges and issue orders to prevent illegal or excessive discharges.

This strategy will meet Part 2 of the Environment

Management Act -2005 where the Department of Environment is required to prepare a National Solid Waste Management Strategy and National Environment Council will not only approve such documents but also has powers to appoint a technical committee to advise them on certain issues. This Strategy also aims to aid Part 5 of the Environment Management Act in the implementation of the portion on Waste and Pollution Control.

3.0 Past to Present

During the month of August 2001, the total quantity of waste collected was 8,407 tonnes in Suva City and 1,820 tonnes outside Suva.

Solid waste management is the single largest problem in Fiji. The waste problem is further compounded by the lack of infrastructure,

financial constraints and appropriate legislation. However, impacts of solid waste are not inevitable and proper management need to be implemented in Fiji. The 1996 population census report recorded a growth rate of 0.8% for the last decade growing from 38.7% to 46.4 % in the urban areas. Suva city alone recorded a population of 77,366 with a 90,609 additional population in the peri-urban areas. However, it is estimated that population in the major urban centres has increased markedly. It simply means that more domestic waste has to be collected and disposed of.

The local municipalities are responsible for the collection and disposal of solid waste in their municipal boundaries which is paid for by the ratepayers. In some cases there are more peri-urban dwellers than the ratepayers within the municipal boundary. For example: Nadi and Lautoka rural areas have more than 60,000 people where as Lautoka city and Nadi town has 36,000 and 9,000 citizens respectively (a total of 45,000). This clearly indicates inadequate waste collection in peri-urban areas which is the responsibility of the Rural Local Authorities. The municipalities constantly face problems with illegal dumping, misuse or non-use of receptacles, damaged and stolen communal containers and resistance to service charges. In rural areas, solid waste is generally dumped anyhow or burnt.

Sinclair Knight Merz (2000) study indicated that a large amount of waste per year is produced in rural areas in Fiji that does not get collected or properly disposed. Since most of the waste is not collected it finds its way through the water ways and lands on our beaches and foreshore areas

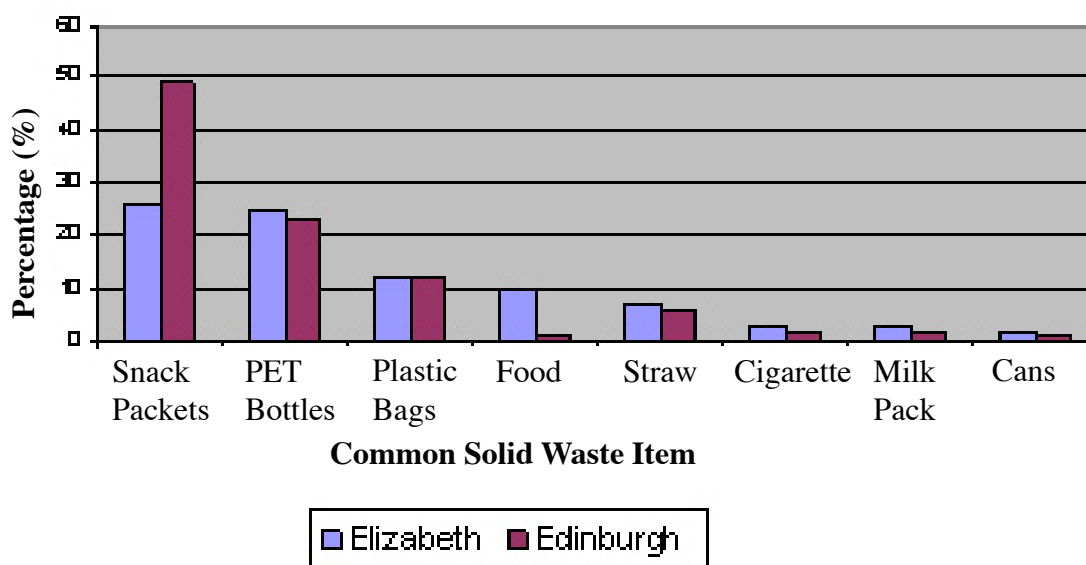
Many people in the local municipalities still do not use standard garbage bins and prefer plastic bags despite the by laws Cap 111 under the Public Health Act.

Waste produced by households in Fiji is mainly composed of biodegradable (more than 65% of the weight), paper (10-15%), plastic (less than 10%), textiles and glass. According to the SKM report 2000 the average waste generation rate per person per day is 0.4 kg which amounts to 146 kg/person/yr. Focusing on town and city level, the results of a study in 2004 by the Pacific Center for Environment and Sustainable Development (PACE-SD), University of the South Pacific (USP) for Japanese International Co-operation Agency (JICA) is reflected in the table below on the quantity of waste collected and the average collection of solid waste per person:

Table A: Municipal Councils and Waste Collected per Population Covered

Municipal Council	Population Covered	Quantity Collected (In tons per year) [share of solid waste; share of bulk waste]	Average Collection of Solid Waste (in kg/pers/day)
Ba	16000	1053 [75.4% SW; 24.6% bulk]	0.18
Lautoka	45000	11201 [79.6% SW; 20.4% bulk]	0.68
Nadi	20000	From 2730 to 4420 [from 53.1 to 64.7% SW; from 46.8 to 35.3% bulk]	0.37 – 0.61
Ra	3255	1188	1.00
Sigatoka	3500	1872	1.46
Tavua	5000	933 [78.1% SW; 21.9% bulk]	0.51

Table B: Common Solid Waste in Suva Sites



3.1 Different Types of Waste

Municipal Solid Wastes Management

In EMA waste is generally defined as: Litter, garbage, refuse excavated and dredged spoil, and other discarded materials including any derelict motor vehicles or parts, waste materials from residential, commercial or industrial facility and from community activities (excluding religious offerings), solid or dissolved material in domestic sewage or other substances in water sources, such as silt, dissolved or suspended solids in industrial wastewater effluent, dissolved materials in irrigation return or other common water pollutants.



In general, the municipal councils and rural authorities are responsible for collection and disposal of general solid waste. They also advise industries how to dispose off their wastes.

In the study of waste classification carried out by PACE-SD at USP in 2004 it was substantiated that most of the Western Regional dumpsites had three common items in the waste stream which consists of biodegradable waste, paper and plastics.

• Litter

A litter survey was carried out along the Suva Edinburgh Drive for 1.8km and 1.5km along Suva Queen Elizabeth Drive. The predominant pollutants identified in both the surveys were snack packets followed by Polyethylene Terephthalate (PET) bottles and plastic bags (Table B)

• Plastic Bags

The growing number of plastic bags is one of the major environmental pollutants and of key concern in Fiji, as it takes longer time to degrade. Plastic pollution is quite common in public areas. In 1994 SPREP carried out a waste audit with 50 households in Suva for a week and found 7% of the waste was made up of plastics. A Plastic Bag study conducted by the Department of Environment in 1999 revealed currently dumpsites are overflowing with plastics that the minimum number of plastic bags used annually is around 50 to 60 million in Fiji. Furthermore the study done by PACE-SD for JICA revealed that plastic items were either second or third highest percentage of waste classified in the different municipalities of the Western region.

• PET Bottles

In the year 2003 from January to December, the total influx of PET bottles in Fiji was recorded around 44 million which includes 1.7 million of imports and 42 million PET bottles being produced locally. (Note that the production of PET bottles serves to mean the bottles that are blown up locally using imported pellets).



PET bottles dominate the grocery stores

Industrial or Trade Wastes Management

Industrial or Trade Waste are solid wastes produced by industries and disposed of at municipal dumps which are considerably in vast amount.

Huge amounts of bagasse, mill mud and ash is produced in one cane crushing season. Some bagasse is used as a source of fuel for the mill boilers, however stockpiles still develops. Apart from the above there are also lots of pieces of scrap metals that are just dumped around the vicinity of the mill. This comprised of rusty trams, tramlines, and other old mill machinery. Table 2 below shows the total amount of waste that was generated for the processing of 4.3 million tons of cane in 1996.

Table C: Generated waste from processed cane (1996)

Waste	1996 (kg)
Mill Mud	13,1387
Ash	8,8515
Bagasse	1,106,415

SawMills also generates huge amount of solid wastes in Fiji. There are 61 sawmills around the country processing a total volume of 212,000 m³ of round wood (Department of Forestry, 1993). With the level of wastage as sawdust reported to be approximately 50% in the sawmilling process, considerable amounts of sawdust are clearly being produced as waste. Although a small proportion of sawdust is used as a source of energy (e.g. at Tropik Woods), the bulk is left to accumulate around small premises. Problems with spontaneous combustion and runoff into waterways have been reported.

GoldMines Industry is a major source of solid waste which produced considerable amount of tailings which are retained in tailings dams at the mine site.

The tourism industry is a major generator of waste. The composition of tourism-generated waste would be significantly different from other waste sources with a higher proportion of plastics, packaging and cans. A number of hotels carry out composting of their own garden waste for use in their gardens (one can refer to the report on Solid Waste Management in certain Hotels in Fiji, which is available at the Department of Environment).

Difficult Solid Wastes Management

Difficult or Special Wastes can be referred to as White goods. White goods are defined in EMA as: White goods and other home appliances discarded as wastes, vehicle tyres, batteries, wastes from chemical and metal processing and pharmaceutical and agrochemical activities, and any other materials that require special consideration and/or facilities for their disposal.

The Department of Environment had a study done on Scrap Metals, Derelict Vehicles, Batteries and Tyres. For example over the past few years on average about 709,309 end of life tires were produced per annum which corresponds to about 15,318 tons of tires, and the estimated quantity of end-of-life lead acid batteries in Fiji over the past few years is 264,278 and currently in Fiji electrical appliances wastes are generated at the rate of 25-63kg/person per year and waste IT equipment is generated at 50 tons/year. Government assets are usually put out for tender to be disposed of and it has come to light that the disposal practices are often not environmentally sound.

Hazardous Wastes Management

Hazardous substance is defined under EMA as a substance which, due to its nature, condition and quantity is toxic and capable of posing an immediate or long term risk to human health or the environment. Also EMA defines hazardous waste as toxic, inflammable, corrosive, reactive, infective or explosive waste, and includes waste which is potentially hazardous to human health or the environment.

Increasing urbanization and importation of numerous consumer products ranging from cosmetics to laboratory chemicals used in the education sector and chemicals imported mainly under the agriculture, manufacturing and mining sectors contribute to accumulation of hazardous waste materials in Fiji. The Agriculture sector for example has stockpiles of waste/obsolete agrochemicals. Given the absence of appropriate disposal facilities and management mechanism, a lot of these hazardous chemicals have found their way into our ecosystems via leachate from rubbish dumps like the Lami dump, or through intentional dumping by some people [3-7].

3.2 Disposal and Collection Inefficiencies

• Disposal Site

Solid waste disposal facilities are currently very poor in Fiji with about 7 out of the 11 sites being located in mangroves, which is polluting the water bodies. Not a single rubbish dump around the country is environmentally safe and socially acceptable. These dumps are managed poorly. Most of these open dumpsites are infested with flies, rodents, pests, and scavengers. Besides it emits a foul smell and there are no mechanisms in place to ensure that the leachates do not leak into adjacent land and waterways.

Most of the municipalities are faced with the difficulty of finding a new site for landfills. For instance Nadi Town Council has explored 23 sites in last 12 years without much luck. Likewise more than 17 sites have been considered over a period of 6 years to replace Lami Dump with the Naboro Landfill site finally succeeding as a site for a sanitary landfill.

• Collection Problems

For the major cities waste collection is contracted to private companies. In most part of Suva, household rubbish is collected three times per week in 7 tonne compactor or covered trucks. Even though the council believes it has a high level of domestic service to the ratepayers, the community at large believes they still need to improve the system. However, waste collection trucks in other municipalities are not appropriate as they are open trucks. Collection of rubbish is becoming a major problem which is primarily due to the growing population in the peri-urban areas.

Suva City Council hires skip bins from Waste Care Ltd, to cover areas throughout the city that accumulate a lot of refuse at \$30.00 per skip bin. However, according to a waste awareness study some of the problems of the waste collection system were highlighted which included:

- * Late arrivals
- * Irregular collection
- * Inadequate collection
- * Inept handling
- * Inefficiency
- * Unavailability of bins in many settlements such as in Wailea

The Suva City Council does not have a specified rate fraction allocated to garbage services. The Health Department within the Council is merely granted budget with which to run the refuse services. The charge for solid waste management is billed within the city rate. The ratepayers do not know how much is charged for which service and similarly there is no separate account for solid waste management within the councils. Nasinu Town Council, on the other hand, is the only municipality which states the garbage collection and disposal services. The charge is \$36 per year for garbage collection and disposal and the charges are based on the number of

dust bin. In other words if a house has four flats then the garbage rate would be \$144.00.

Hence, due to lack of sorting or segregation at sources wastes such as Industrial, hazardous wastes, white goods, organic wastes and green wastes, all get dumped together. As such the recyclables are not retrieved and are wasted.

• **Pollution Due to Solid Waste Disposal**

Solid waste, when stored in a rubbish dump pollutes land, water (through leachates) and air. For instance, a recent study highlights the role of Lami Dump and other urban rubbish dumps on the concentration of heavy metals in Fiji's ecosystems [9]. Another study shows that concentration of heavy metals in some soils around the Lami Dump exceeds the so-called Dutch Standards and the land should therefore be considered as "polluted" [3]. Rubbish dumps also produce greenhouse gases (mainly methane) through fermentation processes of organic materials and therefore contribute to Global Warming [10], although minimally.

Burning solid waste contributes to toxic emissions (in particular dioxins/furans and heavy metals) and should at all costs be avoided, unless fumes are cleaned and the energy is recovered. It is often noted that most of the dumpsites are at one time or the other burning the refuse in it. In most countries dumpsite fires are banned and rightly so. Such fires are burning things like plastics at very low temperatures ideal for the formation of dioxins and furans, which are potent carcinogens. In fact according to a technical expert from New Zealand on open burning and incineration, Lami dump burning for a week can emit up to 5grammes of dioxins which is equivalent to 10 industrial incinerators in 30 years. Fiji does not have the means to sample for dioxins and furans at the moment as the technology and expertise are not available in the country.

3.3 Capacity to Manage Waste

• **Policies**

There is a lack of comprehensive policy frameworks for solid waste management while the existing legislations lack enforcement. Some of the laws that can be enforced for improper disposal, accumulation of refuse or littering are:

- * Public Health Act
- * Litter decree
- * Municipal authorities waste management by-laws
- * Fijian Affairs Act

Municipal authorities have by-laws dealing with waste management issues. The by-laws stipulate that every owner or occupier of a house, resident or shop is required to provide proper garbage pans with lids, or garbage bags (not shopping bags) for storage of rubbish at roadsides to be collected. The by-laws also prohibit the indiscriminate dumping of waste within the city boundaries.

The Litter Decree is also in place and enforced by the health inspectors in the municipal councils. It states and defines the litter offences and the fines that people are liable to pay if they offend.

The Public Health Act has several sections relevant to solid waste including issues such as "garbage pans and accumulations", inspections to be carried out by health inspectors, duties of sanitary inspectors, etc. The Public Health Act is the main legislation for waste management in Fiji at the moment. In rural areas, it is administered by Rural Local Authorities, although for designated Fijian village areas there are Village Health By laws as well, which are not particularly effective.

For villages there is also the Fijian Affairs Act which stipulates the means of waste disposal in villages and the major means are burning and burying.

Industries such as manufacturing and packaging are not bound by any regulations to minimize waste in their production cycle. Likewise there is no single legislation in place that makes the producers responsible for their production and post-consumer waste.

• **Financial Constraints**

Due to lack of cost recovery by municipalities on waste collection, there are high costs for services and inadequate revenues, waste collection is economically inefficient. On the other hand, local municipalities do not have the financial capacity to administer waste management effectively.

The Municipal Councils are under-resourced to carry out sufficient enforcement of the Litter Decree 1991. This Act covers litter prevention, offences and procedures for prosecuting alleged offenders, and enables public authorities to appoint litter prevention offices. The lack of manpower is an issue, and improvements must be made in training of staff in implementation of the Act with existing resources, and better efficiencies in the area of enforcement.

4.0 Initiative on Waste Management

One form of waste management in Fiji is the Naboro landfill which will be the first sanitary landfill for Fiji. This landfill should alleviate the solid waste problems of the greater Suva area for the moment; however it is important to increase the life of the Naboro Landfill by developing appropriate policies. Currently some work has been undertaken to explore the possibility of having a regional landfill for the Western Division. A waste study was carried out in the Western Division by USP to determine the feasibility of having a Western Regional landfill.

Naboro landfill is managed by the Ministry of Lands, Mineral Resources and Environment and a New Zealand based company H.G Leach is operating it. The landfill is expected to service the areas of Suva, Navua, Pacific

Harbour, Nasinu, Lami and Nausori. To allow the landfill to run for its expected lifespan, proper waste management as in separation, redirection of green waste for composting etc needs to be practiced at the household level. This along with other aspects would be the focus of the advertisements to educate people about the Naboro landfill.

5.0 Current Work

A considerable amount of work is going on in the area of waste management in Fiji. Below are examples of some Government Departments, Non Government Organizations and other companies who are contributing to waste management in Fiji. There are other departments, organizations and companies who also do significant work regarding waste management.

Department of Environment

The Government through the Department of Environment had always recognized the importance of having information on waste matters to make informed decisions. Highlighted below are some of the major work regarding solid waste being carried out within the Department:

• International Waters Project (IWP)

The IWP has worked with 2 pilot communities (the concept community has a range of meanings and interpretations across a number of disciplines. For the purpose of the IWP, the term community is used in a limited sense to refer to a group of people residing in a sub-village, a village or several villages in a urban or rural setting that uses resources in a common area. The term community encompasses “local or primary stakeholders” who are those people, groups or organisations who have a direct interest in the use of given area or set of natural resources. A community will not necessarily be homogenous; it is often comprised of many sub-groups, with diverse or opposing needs, capacities and interests of Vunisinu and Nalase in the Rewa Province, to find ways to minimize the impacts of solid and liquid waste. The IWP uses a bottom-up participatory approach to engage communities and to help them find appropriate ways to manage their own environment and natural resources. The best practices in waste management will be replicated to other provinces in Fiji through the Ministry of Regional Development and Fijian Affairs Capacity Building Project. The IWP has also assisted the Government in the development of the liquid and solid waste management strategy.

At national level IWP has worked with national stakeholders to promote partnership among sectors and between government departments, non-government organizations and local communities to ensure national issues and concerns are addressed in a more integrated, holistic and participatory manner.

• Get Cash for Your Trash Campaign

With 2005 being declared as the Pacific Year of Action Against Waste by the Secretariat of the Regional

Environment Programme (SPREP), the Department of Environment together with SPREP has launched a “Get Cash for Your Trash” campaign. The main purpose of this campaign is to promote and support the work of waste recycling companies through community participation in recycling activities.

• Persistent Organic Pollutants (POPs) Project

The POPs project has assisted the Department of Environment in preparing the National Solid Waste Management Strategy as well as the National Chemical Management Plan, and the National Implementation Plan (NIP) for the Stockholm Convention, all of which relate to waste management work.

Ministry of Health

Ministry of Health has various waste management programmes. The health inspectors at the municipal councils fall under this Ministry and the various programmes carried out by these officers either at the urban or rural level is guided by the Ministry of Health.

Training and Productivity Authority of Fiji (TPAF)

TPAF provides training and undertakes projects on various issues. Environmental issues like waste management is one of them. They have recently proposed an “Eco-Circulation / Eco-country” work which is summarized below:

Developing industry and commerce in a way that minimizes harm to the environment and in a way that provides nourishment and support for the planet is known as “sustainable” development. One of the practices that form part of sustainable development is called “eco-circulation”. Simply put, this means taking unwanted waste from one process and using it as an input to another process. An example of eco-circulation is taking molasses from the output of sugar mills and using it as an input in the manufacturing process of distilleries

A positive “eco-circulation loop” will convert waste from one process into raw material for another process. Such a loop can join industry to industry and location to location and can be set up within a country, within a region and globally to help reduce environmental harm. Fiji has international obligations to help protect the environment and many organizations within Fiji are now seeking to play their part in helping the country meet those obligations through “sustainable development”.

Under the banner of “Green Productivity”, TPAF and the Asian Productivity Organization (APO) promote a “micro-level” approach to sustainable development that takes into account economic progress as well as the rights of each society to clean air, clean water and green land. Green Productivity (GP) involves creating societies that actively seek to reduce waste and to recycle and reuse

waste wherever possible. Implemented effectively, GP will help turn wastes into profits through improved productivity.

Another activity that TPAF was associated with is Zero Emission Research Initiative (ZERI) which was implemented in Monfort Boys Town, along the line of the Eco-loop.

Partners in Community Development Fiji (PCDF)

PCDF has also been carrying out waste management work at a community level as a component of some of the projects that the organization is undertaking.

Live and Learn

Live and Learn is a non-government organization which promotes environment education in schools. They have been working on waste management in schools as well, especially in the area of plastics.

National Anti-litter Campaign Committee (NALCC)

A private sector driven NALCC was formed in 2003 to address the litter problem prevalent in our major highways particularly the section of the Highway from the Coral Coast to Lautoka City. As we know this highway is besieged with resorts and hotels. One of the major activities undertaken by the National Anti-Litter Campaign Committee is the setting up of an Anti Litter Patrol that picks litter along the highway five days a week. This operation had been very successful with massive amounts of rubbish having been collected and more importantly sending a very strong message to the community in a very visible manner that as a society, litter on the side of our roads would not be tolerated. It is encouraging to see that other recycling initiatives are now being taken up as well, by Recycling Companies such as, Recyclers for Fiji Ltd.

Recycling

There are recycling companies which provides dynamic recycling/recovery activity in Fiji that includes:

Recyclable collectors: some companies collect some recyclable materials and products (e.g. scrap metals, papers, cardboard, plastic bottles, glass bottles, car batteries) from household and industries that are either re-used locally (e.g. glass beer bottles by Carlton Brewery and PET bottles by Coca Cola) or prepared and exported for recycling.

Scrap metal recyclers: a few companies recycle scrap metal in small furnaces to produces metal products
Waste oil energy recovery: a few companies use collected waste oil as a fuel in their furnace

These activities are today mainly economically driven and only waste with appreciable value is actually collected and treated.

6.0 Vision

A fully informed nation committed towards responsible solid waste management.

The vision will be realized by communities through:

- * understanding the negative (environmental, social and economical) impacts of current waste management practices in the country and commitment by the citizens in playing their role to improve the situation
- * taking pride in making Fiji a waste conscious nation encouraging greater public awareness and participation in waste minimization and recycling initiatives
- * strongly discouraging anti-social and irresponsible activities such as burning and littering.
- * adopting more efficient and sustainable production and consumption practices
- * developing innovative and appropriate ways to avoid generating unnecessary waste
- * being creative and technologically adept to promote effective reuse, recycle and recovery of resources
- * encouraging industry and the business community to promote better waste management practices
- * encouraging the producers and importers of goods to take responsibility for their products throughout its life cycle
- * considering the available waste management options by taking into consideration the environmental impacts, in particular the waste hierarchy, social and economical costs and benefits and the best environment practices option seeing responsible waste management as part of sustainable development and committing to it fully

7.0 Guiding Principles

These principles guided the development and will guide the implementation of this strategy.

• Sustainable Development:

Sustainable development requires that waste management be carried out in a way that does not place undue social, economic or environmental burdens on either present or future generations and that ensures social equity, effective protection of the environment, prudent use of natural resources that promotes stable economic growth and employment.

Precautionary Principle

Precaution should be applied where there are threats of

serious or irreversible damage. Lack of full scientific data/information certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

• Polluter-Pay Principle

Those causing pollution should pay for the cost of cleaning up the environment and maintaining ecological diversity and health.

• Life Cycle Principle

The environmental impacts of a product during its entire life cycle should be considered, (e.g. raw materials extraction, production, use and end-of-life product). Also, one has to make sure that, during waste treatment or modification of product or process, environmental impacts are not shifted from one life cycle phase to another or from one medium to another.

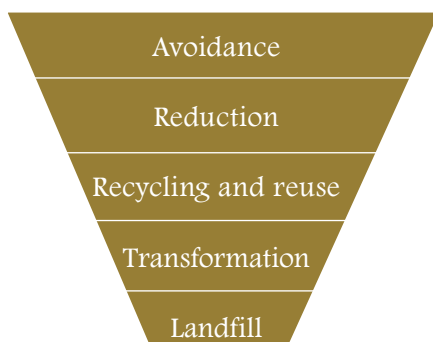
• Extended Producer Responsibility

Under Extended Producer Responsibility (EPR), the producers/importers bear a degree of responsibility for the environmental impacts of their products. It includes upstream impacts arising from the choice of materials and, manufacturing process and downstream impacts, from the use and disposal of products. EPR encourages producers and importers to consider the entire life cycle of their products. It is especially useful for products not easily recovered from the waste stream. EPR encourages businesses to prevent wastes at source, design products to be environmentally friendly and set up take back and recycling schemes.

• Waste Hierarchy

The “waste hierarchy” ranks waste management options according to their environmental benefits. Waste minimization through reduce, separation at source, reuse and recycling prevents the creation of waste and reduces the quantity and the impacts of the waste that is generated. The waste hierarchy below emphasizes the need to concentrate on waste minimization and remove the importance from final disposal.

Figure A: The Waste Hierarchy



• Consultation and Equal Opportunity

Government at all levels will consult and work with people and organisations throughout the development and implementation of the waste management strategies. Furthermore, Consultation for this strategy followed the process outlined below. All sectors of the population were involved from the earliest stage and the process provided opportunities for all sectors of the community to participate on an equal basis at the Waste Forum or through working groups to cater for different needs and interests.

8.0 Policies and Programmes

Policies

Integrated Solid Waste Management (ISWM) model will be used to deal with solid waste management. ISWM involves using a combination of techniques and programs to manage the waste stream. It recognizes three important dimensions in waste management. These are identifying:

- * stakeholders in the waste management besides official municipal workforce and what their respective interests and capacities are;
- * waste system elements from processing, production, consumption and disposal and finally;
- * sustainability aspects such as environmental, political, institutional, social/cultural, economic and technical characteristics.

Policies are needed to assist the nation to move from managing waste disposal sites to waste minimization.

These policies are:

• Sound legislation/Regulations enforcement

Unlike other developing countries, Fiji does not have comprehensive legislation committed to the management and minimisation of waste. Currently there are no provisions for waste separation and recycling; handling and disposal of difficult wastes; reduction in proliferation of non-biodegradable wastes such as packaging, waste oil, batteries, tyres, waste electric and electronic equipment (WEEE) and landfill site selection and management. Without appropriate legislation it would be difficult to support programmes and targets.

• Efficient Pricing/Economic Instruments

Environmental costs are not fully accounted for in waste management and disposal, which is crucial to successfully implementing the strategy. Currently the costs of pollution and disposal are subsidized by ratepayers and taxpayers which are not reflected in the price of the product because most litter cleanup programmes are tax-payer funded. Economic instruments (EIs), including

the concepts of polluter pays and full-cost pricing, are being increasingly accepted by governments abroad. It is therefore important to explore the use of economic instruments to influence wasteful behaviour.

EIs can adjust relative prices of products and services to reflect their true marginal social cost. This will allow consumers to decide on the basis of their own preferences and costs, what products and services to utilize. Individuals can choose either a waste reducing manner compensated by reduced solid waste management user charges, refunds, etc., or a waste producing manner resulting in higher charges, loss of refunds etc.

• Information / Education & Awareness

There is serious lack of sufficient public responsibility, civic sense and concern for healthy environment which are the primary reasons for the deplorable state of many public places. Public awareness and education should be an essential feature of waste minimization and management programmes since the level of environmental awareness is low in Fiji. The success of this strategy will rely largely on the acceptance and commitment of the nation to ensure that this strategy works. However, it must be recognized that there is a lack of adequate, accessible information that hinders effective waste minimization and management. Information programs aimed at raising awareness coupled with feedback to the community are essential.

• Waste Minimisation

It is important to embrace the established hierarchy for waste management which prioritizes, in general terms, waste management techniques in the order of their environmental impact which is as follows:

1. Avoidance
2. Reduction
3. Reuse and Recycling
4. Recovery
5. Safe Disposal

A mixture of alternative techniques can be used to reduce our waste management problem and ultimately reduce the quantity of waste requiring disposal in landfill.

Programmes

The development of the strategy to manage solid waste in Fiji will focus on the following programme areas and accordingly identify the key issues and prioritize them:

• Institution, Legislation and Regulation

When developing a strategy, it is important to weigh carefully the ability of the current collection/processing/disposal system to accommodate any proposed changes in solid waste management techniques. Institutional and legislative arrangements for minimizing and managing waste needs to be reviewed to ensure a sound basis for implementing the strategy. This review will assess the

current legislations that have waste provisions and identify legal and institutional changes that would help put the strategy into practice. It is important to clarify the roles and responsibilities of key players, including central and local government as well as provincial councils.

• Information / Education / Awareness/ and Community Programs

There is a need to develop and implement relevant and consistent information systems on waste minimization and management as a basis for decision-making. Currently there is insufficient or inconsistent data. Community programs can be developed as well to enhance community understanding of waste generation issues and management, and encourage individual efforts to reduce waste. Rewards and recognition can be used for successful community initiatives to reduce waste. In addition, other consumers, businesses, industry, government and other institutions, such as schools must be targeted.

• Research and Development

Applied research and development will play a key role in identifying innovative and appropriate solutions to maximize resource efficiency and recovery. This will go hand in hand with identifying, developing and promoting new markets for sustainable resource recovery. Links will need to be fostered with community, government and industry groups to improve collection, treatment and recycling of recyclables, and the use of recycled materials. Industry and research organizations need to develop and validate new waste management practices for industries and other major economically active sectors.

• Waste Minimisation

Individuals will be encouraged to reduce waste by making sound decisions when they purchase products. Specific programs will be developed to enable people to adopt smart consumption practices. Waste prevention is closely linked with improving manufacturing methods and influencing consumers to demand more environmentally conscious products (for example products involving less packaging, more recyclable components etc).

• Improving Final Disposal, Monitoring and Litter Control

Waste that cannot be avoided, re-used or recycled according to prevailing technical and economical conditions should be safely disposed in a sanitary landfill only as a last resort. However, close monitoring is required to minimise potential damages to the environment from landfills/open dumps. Strict guidelines need to be developed for landfill management.

Some consideration should be given towards banning certain types of waste entering sanitary landfills, such as used tyres, metals, biodegradable rubbish (because they are recyclable or treatable), or batteries and chemicals (because they are hazardous and need pre-treatment).

Litter problem in Fiji is a major issue. Litter is no longer viewed as an aesthetic problem but rather as a broader environmental issue. Nowadays, litter is seen as an issue involving paper, bottles and food packaging. It has important implications on tourism and for the encouragement of inward investment leading to an impact on the economy. An integrated approach to litter prevention is likely to be the most effective method of tackling the litter problem. Integrated approaches include education, regulatory and enforcement strategies and financial incentives.

• **Efficient Pricing / Economic Incentives**

Incentives and disincentives can be targeted at consumers and industry to change behaviour, reduce resource use and improve recovery and recycling rates. Financial mechanisms should be developed in order to fund initiatives (pilot, acquisition of technology, subsidisation, etc.) that could contribute to the setting-up of an efficient waste management system in the country. Possible sources of funding include charges for landfilling, and fee/ payback systems on packaging, tax exemptions, product disposal charges etc.

• **Infrastructure, Services and Collection Systems**

It is important to consider the infrastructure, services and collection systems used for domestic wastes. The challenge is how to significantly reduce the collection costs and provide other kerbside services to public. A proper collection system design and management can result in significant cost savings.

9.0 Criteria for Priority Setting

It lays down the criteria for prioritising actions that will assist in achieving the vision, goals and targets set out in this document.

• **Volume and Risks**

Wastes cause a wide range of environmental risks and harm to human health. Some wastes can be highly toxic and pose immediate risk while other wastes such as some plastics, paper to name a few are highly visible but their risk is minimal

• **Achievability**

Policies and actions must be achievable and realistic to ensure success. Attitudinal change will take time.

• **Public Concern**

Policies and actions must respond to public concerns.

• **Cost Effectiveness**

Measures that offer the best value for money will take priority.

• **Community based solutions on proper waste management**

Solutions that meet the needs and aspirations of local communities and which maximize their involvement are likely to provide the most sustainable outcome.

Part Three

10.0 Key Priority Issues

It is always necessary to prioritize the key issues that arise out of analysing a situation. As it is, it may not be socially or economically feasible to adopt all the issues that arise. Hence there is a need to prioritize the issues. Some issues might also be more prevalent and risk posing than others hence needing urgent attention when compared to other issues. This is the procedure that was followed with the key issues that arose of waste management situations. The seven different working groups prioritized the key issues and this was adopted by the stakeholders.

11.0 Action Plans

For the success of any strategy it is highly important that the action plans target goals that are realistic and achievable. This can only be done by taking into account the sensitivity of the issue being dealt with, the current efforts towards obtaining the goals and the achievability of the required resources.

It is apparent that some of the issues raised in this document, have already been addressed in other strategies or plans that the Government has produced. An example of one such action is the assessment of waste incinerators (mostly medical waste) in the country. This has already been covered under the National Implementation Plan for the Stockholm Convention that the POPs unit at the Department of Environment have prepared.

The action plans in this document were developed based on the prioritized key issues. At the stakeholder consultation, it was unanimously decided that there were certain cross cutting issues amongst the programme areas and most of the action plans based on the priority key issues reflected this. Hence the programme areas were decided to be just indicators of highlighting the key issues for developing action plans.

For the strategy the action plans for the programme areas have been grouped as follows based on how they contribute towards waste management in Fiji:

1. Direct Measures

- * Waste Minimization
- * Infrastructure, Services & Collection Systems
- * Improving final disposal, monitoring and litter control

2. Policy Development & Advocacy

- * Legislation, Regulation & Institution

3. Capacity Building & Awareness Raising

- * Research & Development
- * Information, Education, Awareness and Community Programs

4. Incentives for Change

- * Efficient Pricing & Economic Instruments
- * Detailed Action Plans are available at the Department of Environment.

The implementing agencies of the action plans include the following:

- Department of Environment
- Ministry of Health
- Ministry of Regional Development and Fijian Affairs
- Department of Women
- Municipal Councils
- Non Government Organizations
- Recycling Companies
- Educational Institutes

Of course the implementation of the strategic action plans most importantly will include communities. The above generally includes the major implementing agencies, however there are other ministries, departments and organizations who will also assist in the implementation of this strategy. The implementation of the activities will be within the time frame of 2008-2010.

The Action Plans are developed from the work that the original working groups had put together in the initial stages of the development of this document. The original Working Groups that were assembled included:

- WG1: – Legislation, Regulation and Institution
- WG2: – Information, Education, Awareness and Community Programmes
- WG3: – Research and Development
- WG4: – Waste Minimization
- WG5: – Improving Final Disposal, Monitoring and Litter Control
- WG6: – Efficient pricing and Economic Instruments
- WG7: – Infrastructure, Services and Collection Systems

12.0 Review and Monitoring

The Action Plans details the various activities that need to be undertaken at the national, local and community level to assist with the improvement of the management of waste in Fiji. Performance monitoring and reviewing processes are essential components of most government activities, and waste management is no exception. There is a need for regular collection of information on waste generation and disposal rates, and for this to be linked with information on changes in population, economic growth and development, including tourism, and any other factors with the potential to impact on waste generation rates. This information will provide a basis for planning of future waste management needs, such as the development of new landfill facilities and other supporting infrastructure. It should also provide useful input to the assessment of other development proposals, such as new tourist facilities. Perhaps one of the key points to stress here is the need for clear and effective linkages between the government agencies involved with waste management and those with a more central planning role.

The procedures for collecting and recording waste information are well developed and established at the international level, and include estimates of total waste volumes delivered to the landfill, and regular surveys of the composition of these wastes. This information should be made available to all stakeholders in Fiji and be used for evaluating the effectiveness of other components of the waste management program. For example, an effective waste minimization program should be reflected in overall reductions in waste quantities and changes in waste composition.

The National Solid Waste Management Strategy Implementing Committee (NSWMS-IC) will be responsible for the review and monitoring of the action plans under each programme area. This committee will consist of all the identified agencies under the programme areas. However it is imperative that the action plan review and monitoring is internalized.

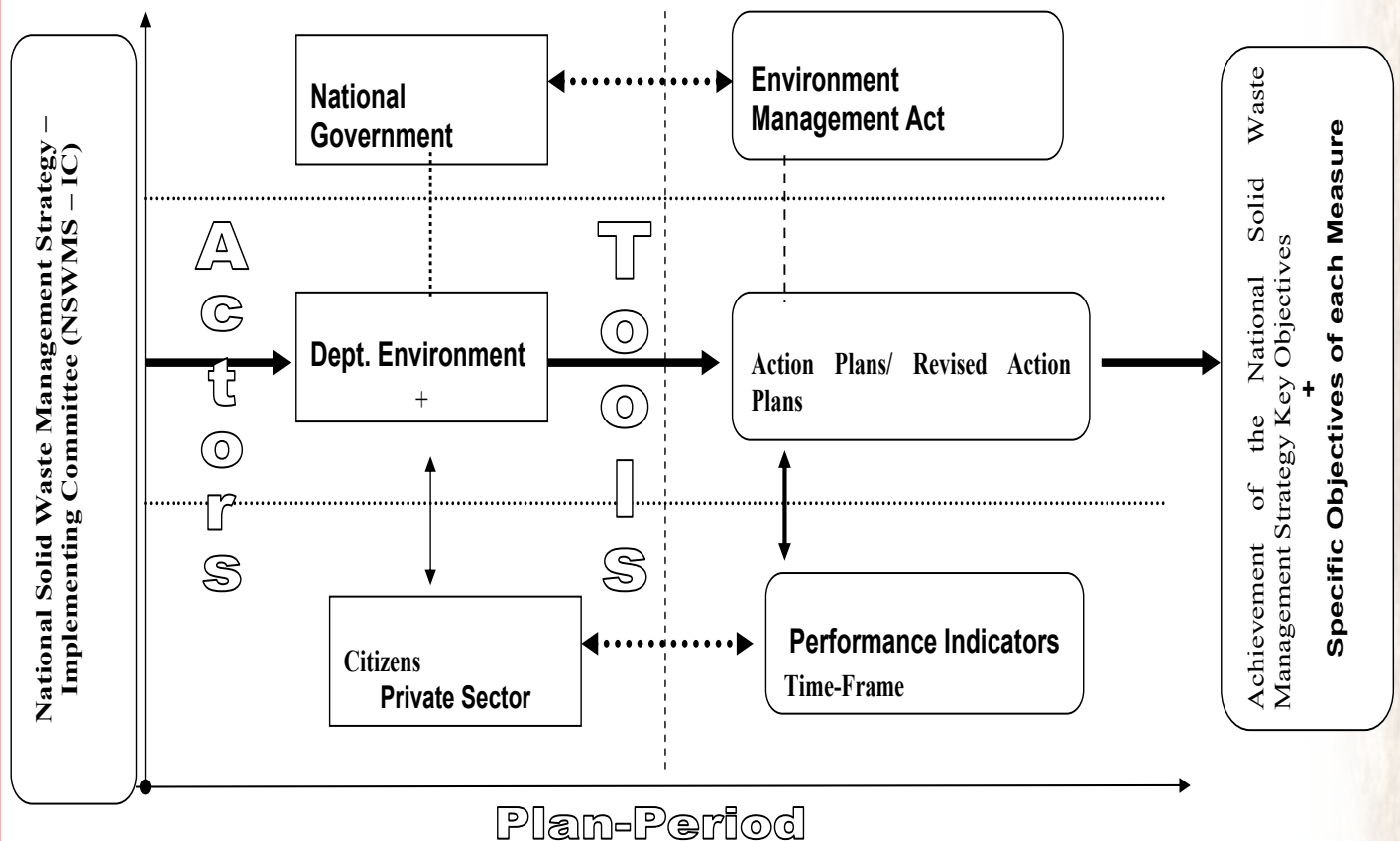
The NSWMS – IC shall meet on a six monthly basis to review whether the work undertaken in each programme area is going according to schedule.

In the event that any concerns are raised from persons outside the NSWMS – IC regarding the work being implemented before the six monthly period, this will be reported to the NSWMS – IC in writing and a date will be identified by the Committee to meet regarding the concern.

Alternately, should any member in the NSWMS - IC recognize the need to meet, review and discuss the

Schematic of the Institutional Monitoring Framework

Schematic of the Institutional Monitoring Framework



Suggestion for performance indicators and time frame is that the implementing agencies of the various suggested actions can prepare a proposal and submit it to the NSWMS-IC for their perusal, alternately a terms of reference for the work can be developed as a monitoring measure that the terms of reference are being addressed thoroughly.

monitoring of the work being implemented before the six monthly meeting, the concerned committee member needs to write and notify the committee of a suitable time to meet.

The Department of Environment will be the secretariat to the NSWMS – IC.

A review of the whole document will be carried out every five years in meetings which will be identified as Waste Forums, whereby the need to make changes to the existing document or to include new aspects with respect to time will be discussed.

In the event that the stakeholders feel and can justify the need to meet earlier or later than the allocated time frame they may do so by notifying the NSWMS – IC in writing, who will decide on the date and time of the respective Forum.

Suggestion for performance indicators and time frame is that the implementing agencies of the various suggested actions can prepare a proposal and submit it to the NSWMS-IC for their perusal. Alternately a terms of reference for the work can be developed as a monitoring measure that the terms of reference are being addressed thoroughly.

Draft Fiji National Solid Waste Management Strategy and Action Plans

The actions plans in this document aim to have connectivity and clarity with all the discussions and suggestions that were carried out during the formulation of the solid waste management strategy.

1. Direct Measures

Intention: To take direct measures on operational and management issues such as waste minimization, infrastructure, services and collection systems; and to improve disposal practices, monitoring, reinforcements and control litter

Objective 1: Collate and consolidate current available national data on all waste streams and identify gaps and means to collect required data by June 2008.

Synthesize all relevant waste reports and provide estimates of solid waste at various levels (national, municipal councils; local rural authorities provincial level), solid management issues and identify any gaps in data.

Provide this baseline data and information on the waste streams to all authorities to assist them develop their local solid waste management plans

Based on the above synthesis, recommend areas with data

gaps to be the foci of applied solid waste management research in academic institutions and other partners
Based on the above synthesis recommend to all authorities responsible for solid waste management to install or improve the means to collect solid waste data (through normal operations) and install a national reporting mechanism (database)

Objective 2: Identify appropriate waste minimization options for solid waste by June 2009.

Identify waste minimization measures that applicable to urban and rural dwellers, so as industries for ubiquitous 26 waste streams such as green waste and organics

- Pilot these waste minimization measures in selected residential areas in cities and towns (3 residential areas including one squatter settlement), at least 5 villages in each Province and at least 5 secondary and 5 primary schools (urban and peri-urban) in each division
- Install national and local reduction targets ubiquitous waste streams reach all urban dumpsites (including the Naboro sanitary landfill)

Objective 3: Strengthen and add-value to efforts by individuals and the private sector to recycle and reprocess recyclables for overseas markets by December 2008

- Set up a database of all private entities in the recycling and reprocessing industry
- Work together with the recycling and reprocessing industry to raise awareness to the public about the range of services they provide
- Develop polices under current legislation to enhance recycling and reprocessing activities especially for PET, SVBT and WEEE
- Expand the collection of recyclable items to rural areas to set national coverage by at least 50% of the entire country

Objective 4: Assist municipal councils and local rural authorities and to enhance their solid waste management (e.g. collection) systems by 2009.

- 26 Waste streams that comprise more than 7% of solid waste disposed in dumps, commonly present in litter and more importantly can be dealt with locally through, minimization at source and can be recycled or reprocessed for export overseas:
- develop (if none is available)/enhance their solid waste management plans, using the NSWMS as a guide and develop effective monitoring and reinforcement of legislations
- Evaluate the performance of the Litter Decree and reinvigorate its enforcement
- Explore means to extend solid waste collection to squatter settlements and communities within the hinterland of cities and towns

- Replicate the best practices in solid waste management systems implemented in squatter settlement as Department of Environment work.
- Develop a financing proposal to implement sections of their solid waste management plans that require assistance
- Provide practical municipal solid waste management training for appropriate personnel

Objective 5: Explore the means to better manage solid waste in rural areas by June 2008.

- Assist (financially and technically) Provincial Councils to develop their solid waste management frameworks under their development plans (Tikina, District and Provincial Level) Replicate the best practices in solid waste management systems implemented in rural villages as under the IWP work
- Pilot the implementation of the framework in at least 3 villages in each Province Pilot and sustain the waste minimization measures (identified in Objective 2) in at least 3 villages in each Province and at least 3 secondary and 3 primary schools in each Province
- Promote the implementation of activities that can be done so without much financial or technical assistance through awareness raising and the pilots
- Set up a national collection mechanism at rural level for solid waste that cannot be dealt with at village level

Objective 6: Upgrade current dumpsites in urban centres by 2009.

- Set up minimum operating guidelines for all dump sites and the Naboro Landfill
- Upgrade at least 3 current dumpsites to meet the operating guidelines (this work has already been highlighted for action under the National Implementation Plan for the Stockholm Convention)
- Explore the possibility for a regional sanitary landfill for western Viti Levu.
- Identify the link between having a proper resourcing mechanism which can eventually lead to better management of dumpsites.

2. Policy Development & Advocacy

Intention: To develop effective policies and hence to harmonize all solid waste management legislation with EMA and improve coordination of solid waste management activities amongst all concerned ministries and departments

Objective 1: To identify all major gaps and recommendations from legislative reviews on waste legislation carried out so far in Fiji by June 2008 and develop effective policies and hence identify any new gaps and overlaps in and between legislations related to waste.

- Collate and synthesize the legislative reviews carried out as part of the POPs and IWP projects, and legislative reviews carried in other relevant government ministries
- Set up a working group comprising representatives from all concerned ministries and departments to coordinate the legislative harmonization process.
- Install a working mechanism between ministries and departments deal with operational aspects of the different legislation, where issues such as information sharing and joint enforcement should be fleshed out

Objective 2: Clarify the roles of Government ministries and departments with respect to the NSWMS by the end of 2008

Identify at the ministerial and department levels (all Government stakeholders), the aspects of the national solid waste strategy that can be taken up through normal operations without major financial or human resources

3. Capacity Building and Awareness Raising

Intention: To incorporate better solid waste management practices into the school curricular; initiate targeted research on appropriate solid waste management practices, technology and issues, and to develop and implement an integrated communication plan for the NSWMS which includes communities

Objective 1: To enhance the coverage of aspects pertaining to waste management practices/issues in current primary and secondary school curricular; and courses offered by tertiary institutions by June 2009

- Assemble a team to work with CDU to incorporate aspects of waste management (including waste) into the formal curriculum.
- Pilot the waste minimization measures to be identified in objective 2 (Direct Measures) as part of student projects for school based assessment or under themes such as environment day and arbor day
- Encourage FIT, FSM and USP to develop or consolidate course offerings in waste management (including solid waste)

Objective 2: To provide a series of short training for communities on better solid waste management practices in at least 5 villages and settlements per Province by June 2008 (to be implemented with pilots)

- Develop a community training guide on better solid waste management and hold pilot training for villages identified in (objective 5, Direct Measures)
- Revise the community training guide based on feedback from the pilot training Translate the community training guide to Fijian and Fiji Hindi
- Disseminate the community training guide nationally

Objective 3: To implement targeted research as part of pilot projects on waste minimization (objective 2, Direct

Measures), extended producer responsibility (EPR) and the recommended areas identified in Direct Measures (objective 1) by December 2009

- Assemble a team to investigate the application of EPR in Fiji for a select group of waste streams such as PET, WEEE and SVBT Provide the findings of the EPR investigation as background information for Groups 1 (Policy Development & Advocacy) and 2 (Incentive for Change)
- Assemble a team to investigate innovative financing mechanism that may be applied in municipal councils and rural local authorities
- Provide the findings of the innovative financing mechanism as background information to municipal councils and rural local authorities as background information for their solid waste management plans (objective 4, Direct Measures)
- Encourage and assist academic institutions to carry out applied research on waste minimization and recommended areas identified in Direct Measures as part of their on-going activities

Objective 4: To raise Public awareness about the NSWMS and solid waste management issues in general throughout the lifetime of this strategy (2008-2009)

- Develop and implement an integrated communication plan for NSWMS
 - (a) Raise public awareness about NSWMS in general
 - (b) Assess the awareness level of the public on key solid waste management issues
 - (c) Raise awareness about the Naboro landfill
 - (d) Engage and assist NGOs and interested parties to sustain the implementation of the integrated communication plan as part of their normal activities
- Reassess the awareness level, mitigating measures taken by individuals to improve solid waste management at their homes and communities and national performance as the solid waste reduction targets (objective 2, Direct Measures) on annual basis Incorporate lessons learnt in the following year or immediately depending on each specific situation

Objective 5: To learn lessons from similar waste management works carried out in other communities and apply the principles of work done to other communities in Fiji and identify and possibly involve community/ National champions in this work (2008-2009).

Objective 6: To carry out research and identify appropriate technology in waste minimization for the country.

4. Efficient Pricing and Economic Instruments

Intention: Improve solid waste management practices and hence introduce resourcing mechanisms through the application of economic incentives and disincentives particularly for parties involved in recycling/reprocessing for export; and commercial operators.

Objective 1: To put in place economic incentives and disincentive mechanisms that support recycling activities

- Assemble a team to investigate a range of economic incentives/disincentives (for recycling and reprocessing for export), carry out stakeholder consultations and carry out cost benefit analysis of each appropriate incentive/disincentive to determine their suitability for Fiji
- Identify the means in which suitable incentives/disincentives can be incorporated into relevant legislation and policies
- Initiate the incorporation of suitable incentives/disincentives through the normal Government process

Objective 2: To put in place economic incentives and disincentive mechanisms that will encourage industries, Government and large institutions to minimize their solid waste output by December 2009

- Use the findings of the EPR investigation (objective 3, Capacity Building and Awareness Raising) and other relevant studies such as the one referred to objective 1 and synthesize a report to be used as a background information for legislation and policy development
- Identify the means in which suitable incentives/disincentives can be incorporated into relevant legislation and policies
- Initiate the incorporation of suitable incentives/disincentives through the normal Government process
- Encourage the government (ministries, departments and statutory bodies), industries, supermarkets and institutions such as USP, FIT, FCAE, LTC to develop and implement their own solid waste management plans

13.0 References

1. OECD, OECD environmental outlook. 2001: Paris (France). 309p. <http://www.oecd.org/publications/e-book/9701011e.pdf>.
2. EU, Towards a thematic strategy on the prevention and recycling of waste. 2003, European Union: Brussels (Belgium). 59p. <http://europa.eu.int/comm/environment/waste/strategy.htm>.
3. Chandra, S., Investigations into the Lami municipal dump as a source of heavy metal contamination, in Department of Chemistry. 2002, The University of the South Pacific: Suva (Fiji), MSc Thesis. 164p.
4. Maata, M., The decomposition of tributyltin (TBT) in tropical marine sediments, in Chemistry Department. 1997, University of the South Pacific: Suva (Fiji), PhD thesis.
5. Mataka, M., Online photochemical oxidation and flow injection conductivity determination of dissolved organic carbon (DOC) in estuarine and coastal waters, in Chemistry Department. 1999, University of the South Pacific: Suva (Fiji), MSc thesis.
6. Tabudravu, J.N., Experimental and field evaluation of enteromorpha flexuosa as an indicator of heavy metal pollution by zinc, lead and copper in coastal water of Lami, Fiji, in Chemistry Department. 1995, University of the South Pacific: Suva (Fiji), MSc thesis.
7. UNEP, Regionally Based Assessment of Persistent Toxic Substances: Pacific Islands Report. 2002, United Nations Environment Programme (UNEP) Chemicals: Switzerland, December 2002. 66.
8. Mathieux, F., Mataka, M., Koshy, K., Solid Waste Management and recycling in the Fiji Islands - Preliminary analysis of the situation in the Western region of Fiji and the handling of some difficult waste. 2004, Pacific Centre for Environment and Sustainable Development - The University of The South Pacific: Suva, March 2004. Report to Japan International Cooperation Agency and Fiji Department of Environment. 156p.
9. Institute of Marines Resources, Priority environmental concerns in Fiji. 2003, The University of the South Pacific: Suva (Fiji). 37p.
10. Mani, F., Methane concentration in Fiji air: a study of its emission trends and source strengths, in Department of Chemistry. 2004, The University of the South Pacific: Suva (Fiji), MSc Thesis.
11. NALC, National Anti-Litter Campaign Homepage. 2004. <http://www.nalc.com.fj>,
12. Janin, M., Ecodesign approach in company - A stake : Building a coherence between tools and design process, in Institute Design, Mechanical Engineering and Environment. 2000, ENSAM: ChambÈry (France), PhD thesis. 435p. In French. <http://pastel.paristech.org/documents/disk0/00/00/01/82/index.html>.
13. Government of Japan, The Basic Law for Establishing the Recycling-based Society. 2000. <http://www.env.go.jp/recycle/low-e.html>, Accessed on 15/04/2004.
14. EU, Recycling forum - Final report. 2000, European Union: Brussels (Belgium), September 2000. <http://europa.eu.int/comm/enterprise/events/recycling/recycling.htm>. Accessed on 11/05/2004.
15. Sinclair-Knight-Merz, Naboro Landfill - EIS and engineering studies. 1997, Department of Environment: Suva (Fiji).
16. SPREP/UNEP, Guidelines for municipal solid waste management planning in Small Islands Developing States in the Pacific Region.
(Samoa). http://www.sprep.org.ws/solid_waste/report_doc.asp. Accessed on 11/05/2004.
17. Thaman, B and Lovell, E. R. 1999. An Assessment of Plastic Bag Pollution in Fiji: Environmental and Economic Aspects, Biological Consultants, April 1999, Fiji.