

THE GOVERNMENT OF FIJI
DRAFT

NATIONAL SOLID
WASTE MANAGEMENT STRATEGY AND ACTION PLAN 2006-2010



Working Towards a Cleaner Fiji

DEPARTMENT OF ENVIRONMENT

FIJI

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ACKNOWLEDGEMENT

The Department of Environment at the Ministry of Local Government, Housing, Squatter Settlement and Environment in Fiji would like to extend its sincere gratitude to the following people for their valuable input in the development of the National Solid Waste Management Strategy by providing their contributions in the draft strategy, in developing the action plans and generally guiding us in the right direction based on their experience:

- Dr. Fabrice Mathieux
- Mr. Melchior Matakai
- Professor Bill Aalbersberg
- Professor Kanayathu Koshy
- Dr. Frank Griffin

Our appreciation also goes out to the chairs and members of the seven working groups for their continued support in providing their precious time for meetings, for working towards the key issues and action plan documents and carrying out presentations during the Waste Forums. Your contribution towards this strategy will go a long way and is exemplary in paving the way for the other citizens of the country in their attitude towards waste management (Appendix 3 provides a list of all the working group members).

Heartfelt appreciation also goes out to the stakeholders who were kind enough to take out time and attended the various Waste Forums and any person(s) not mentioned but who might have contributed in any way towards the development of the National Solid Waste Management Strategy for Fiji.

Draft

FOREWORD

To be added before publication by the Minister for Local Government, Housing, Squatter Settlement and Environment.

EXECUTIVE SUMMARY

Fiji like all other Small Island Developing States in the Pacific region recognizes that waste management is the single most pressing issue that needs immediate action. It is recognized as a major concern with the potential to cause negative impacts on our national development activities including public health, the environment, food security, tourism and trade.

Looking at the larger picture, Fiji at the moment does not have any cohesive waste management strategy. There are legislations under different Government Departments and Ministries which address solid waste, however, these need to be harmonized to increase their effectiveness. Some need to be amended to address the changing nature of today's waste.

Waste at the moment is being either thrown in the open dumpsites, illegally disposed of in the sea or on unused land, in the streets or being burnt in piles in the backyard. Burning municipal waste is a major health problem with some toxins in the smoke persisting in the environment and being carcinogenic.

At the moment, the solid waste problem in Fiji is growing in proportion. The Solid Waste Management Strategy sets out a medium to long-term program for addressing waste management issues in Fiji, so as to avoid these adverse effects. In doing so the Government of Fiji along with its development partners in the private sector, external investors and donors is making its intentions clear that this problem is a concern and we are going to address it as a priority issue.

The strategy details the current waste management practices and outlines the inadequacies that exist in the system at the moment. The proposed action plans details programs that are to be implemented at national, local and community levels. It is intended that the Strategy should provide a platform from which future waste management activities can be developed and the mechanism for coordinating them. As much as possible, the Government of Fiji will look at resourcing the proposed activities and actions but in some cases, external resources will be required and our development partners will be invited to participate on these aspects of the strategy.

The generation and disposal of wastes has direct and indirect linkages to economic development. Waste materials represent wasted money, in terms of the original cost of the materials, the costs of disposal, and also the potential value of the material as a recyclable and reusable resource. Poorly managed wastes can have negative effects on tourism, by detracting from the "Pacific Paradise" image that Fiji promotes, and by association with health warnings about infectious and vector-borne diseases. There is the potential for contamination of food supplies, which can have impacts on local markets or revenue from export crops. And there are numerous health and environmental hazards that arise when wastes are poorly managed and disposed.

Conversely, the benefits from good waste management can include reduced raw material costs, enhancement of the tourism experience, reduced health care costs. Effective measures now will also avoid the need for expensive clean-up operations in the future.

The strategy is based around the following seven major themes, which were also the basis for the working groups:

- ☞ Legislation, Regulation and Institution
- ☞ Information, Education, Awareness and Community Programmes
- ☞ Research and Development
- ☞ Waste Minimization and Recycling
- ☞ Improving Final Disposal, Monitoring and Litter Control
- ☞ Efficient pricing and Economic Instruments
- ☞ Infrastructure, Services and Collection Systems

To avoid repetitions, which may complicate the implementation of the NSWMS, the 7 working groups (themes) have been re-categorized into 4 sub-groups, in the development of action plans, based on their similarities in terms of implementation. A broad intention and specific objectives underpin the proposed activities in each sub-group. The action plans are intended to assist Fiji in moving towards the development of effective waste management systems within the country, and in accordance with our specific needs. The programs are to be implemented over the next 3-5 years and will be reviewed at the end of the fifth year.

The whole strategy and the progress of the action plans will be monitored by the National Solid Waste Management Strategy Implementing Committee or NSWMS – IC within a specified time frame to ensure that the strategy lives up to its dynamic nature, as it has been developed with the understanding that is an evolving document.

This strategy aims to identify achievable goals by analysing all the components that contribute towards achieving a target or a goal, while laxity definitely not being an acceptable reason for not achieving a target.

PART ONE

1.0 Introduction

There is an urgent need to find new and much better ways to deal with waste produced in Fiji. 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, 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.

2.0 *The Need and Purpose for a Solid Waste Management Strategy*

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 this is an accepted practice in Fiji. There is no management system for white or electrical goods,

Our waste is ending up in everywhere: Photo taken at seawall in Nasese. Suva.

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 these practices vary. There is the potential for contamination of food supplies, which can have impacts on local markets or revenue from export crops. Conversely, the benefits from good waste management can include reduced raw material costs, enhancement of the tourism experience, reduced health care costs. 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 wastes goes to the landfill. The strategy will set targets and identify actions primarily for local authorities and the producers of industrial and commercial wastes.

3.0 Scope and objectives of the waste strategy

3.1 Scope

The strategy covers wastes such as household, commercial, industrial, agricultural, mines and quarries, sewage treatment operations, demolition and construction, and special wastes¹. Liquid and gaseous wastes are not covered in this strategy.

3.2 Key Objectives

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.



A common waste disposal site; an open dump, in Fiji

¹ Special wastes are white ware 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.

4.0 The Environment Management Act and the NSWMS

This strategy will meet Part 14 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 Section 35 of the Environment Management Act in implementation of the portion on Waste and Pollution Control.

5.0 Waste Management in Fiji - Past to Present

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.

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.

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.

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.

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.

Many people in the local municipalities still do not use standard garbage bins and prefer plastic bags despite BY LAWS Cap 111.

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 343kg/person/yr.



Despite one bin, the other garbage on the streets is in plastics as shown

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 JICA is reflected in the table below on the quantity of waste collected and the average collection of solid waste per person:

Table ***

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

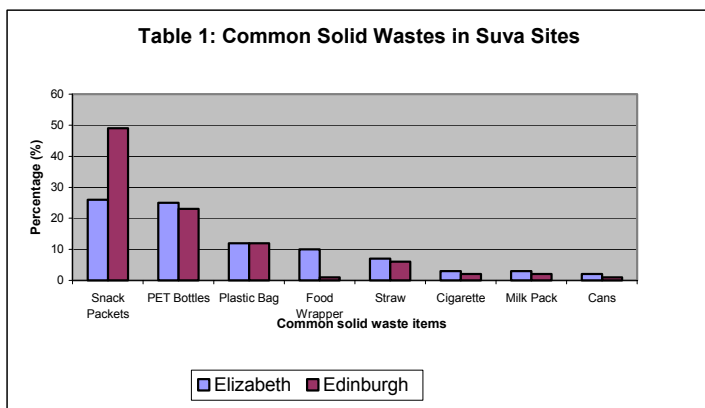
5.1 The Existing Scenario

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.

5.1.1 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 1)



5.1.2 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.

5.1.3 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

5.1.4 Industrial or Trade Wastes

Considerable amounts of solid wastes are produced by industries and disposed of at municipal dumps.

Sugar Mills

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 2: Generated waste associated with 4.3 million tons of processed cane (1996)

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

Saw Mills

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.

Gold Mine

A major source of solid waste from the mine is tailings, which are retained in tailings dams at the mine site.

Tourism

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 Waste

Other major contributors of solid waste include motor vehicles and parts (such as batteries, tyres, vehicle scraps and derelict vehicles), and white goods (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 tyres were produced per annum which corresponds to about 15,318 tons of tyres, 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 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.

(vi) Hazardous Wastes

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].

5.1.5 Existing Disposal and Collection Inefficiencies

(i) 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.

Sadly there are human scavengers at the dumpsites which are overflowing with pests and notably plastics.

(ii) 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



A Waste Care truck at the Lautoka dumpsite, municipal garbage are totally different from these kinds of trucks

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 as 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.

(iii) 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.

5.1.6 Existing Capacity to Manage Waste

(i) 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.

(ii) 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.

5.2 Progress on Waste Management

5.2.1 Environment Management Act

The Environment Management Act 2005 has a comprehensive section on waste management. Its implementation and enforcement should see a marked improvement in the standard of waste management in Fiji. Under the section 14 there is a requirement for the DoE to prepare a National Solid Waste Management Strategy. One can refer to Section 14v and 35 of the Environment Management Act of 2005 to fully comprehend the importance of this Strategy in the Act.

5.2.2 Landfills

Naboro landfill 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

The Naboro landfill will be managed by the Ministry of Local Government, Housing, Squatter Settlement and Environment and a New Zealand based company H.G Leach. The landfill is expected to service the areas of Suva, Navua, Pacific Harbour, Nasinu 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.

5.3 *Current Work in the Area of Waste Management*

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.

5.3.1 *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. Some of the studies that have been funded by the Environment Department are: Scrap Metal, Derelict Vehicle, Batteries and Tyre (SVBT) Study (2004), Litter Waste Survey (2004), An Assessment of Plastic Bag Pollution Study (1999), Solid Waste Characterization Study for Suva, Lami, Nausori, Nadi and Lautoka. This is an important step in waste management because “one cannot manage what one cannot measure”. However, further study is needed to provide in depth understanding of solid waste management challenges, provide baseline information

to monitor waste trends and ensure economic efficiency in waste management. Highlighted below are some of the major work regarding solid waste being carried out within the Department:

5.3.1 a) International Waters Project (IWP)

The IWP is working 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 organizations 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 [19], 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 is also assisting the Government in the development of the liquid and solid waste management strategy.

At national level IWP is working 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.

5.3.1 b) 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.

5.3.1 c) Persistent Organic Pollutants (POPs) Project

The POPs project is assisting 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 which basically deals with some of the chemical issues that are present in the country.

5.3.2 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.

5.3.5 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.

5.3.3 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.

5.3.4 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.

5.3.5 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.

5.4 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 produce metal products
- ☞ Waste oil energy recovery: a few companies use collected waste oil as a fuel in their furnace
- ☞ It is encouraging to see that other recycling initiatives are now being taken up as well, by Recycling Companies and initiatives such as, Recycle for Fiji Ltd.



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

Waste Recycling Initiative in Labasa!

PART TWO

6.0 Key Drivers, Vision, Principles, Policies and Programmes

6.1 Key Drivers

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 is currently finalizing 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 proxy membership to Basel Convention on the Control of Transboundary Movements of Hazardous wastes and their Disposal; 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.

6.2 Vision

Develop 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 option²
- ☞ seeing responsible waste management as part of sustainable development and committing to it fully

6.3 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.

² **Best Environmental Practical Option** is the best practical waste management option that provides the most benefits or least damage to the environmental as a whole, at acceptable cost, in the long term as well as the short term

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.

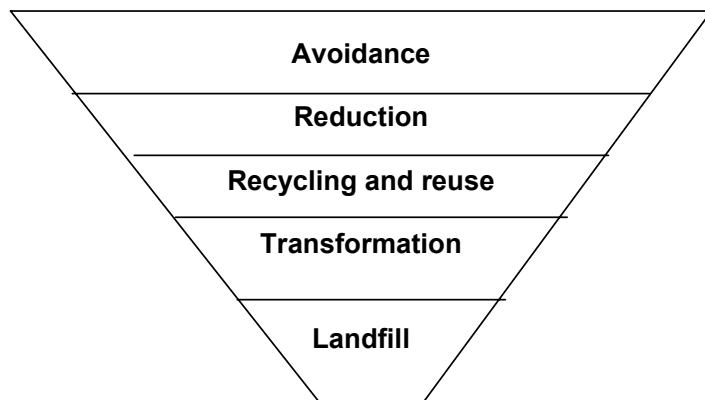
Extended Producer Responsibility

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 xxx 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. 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.

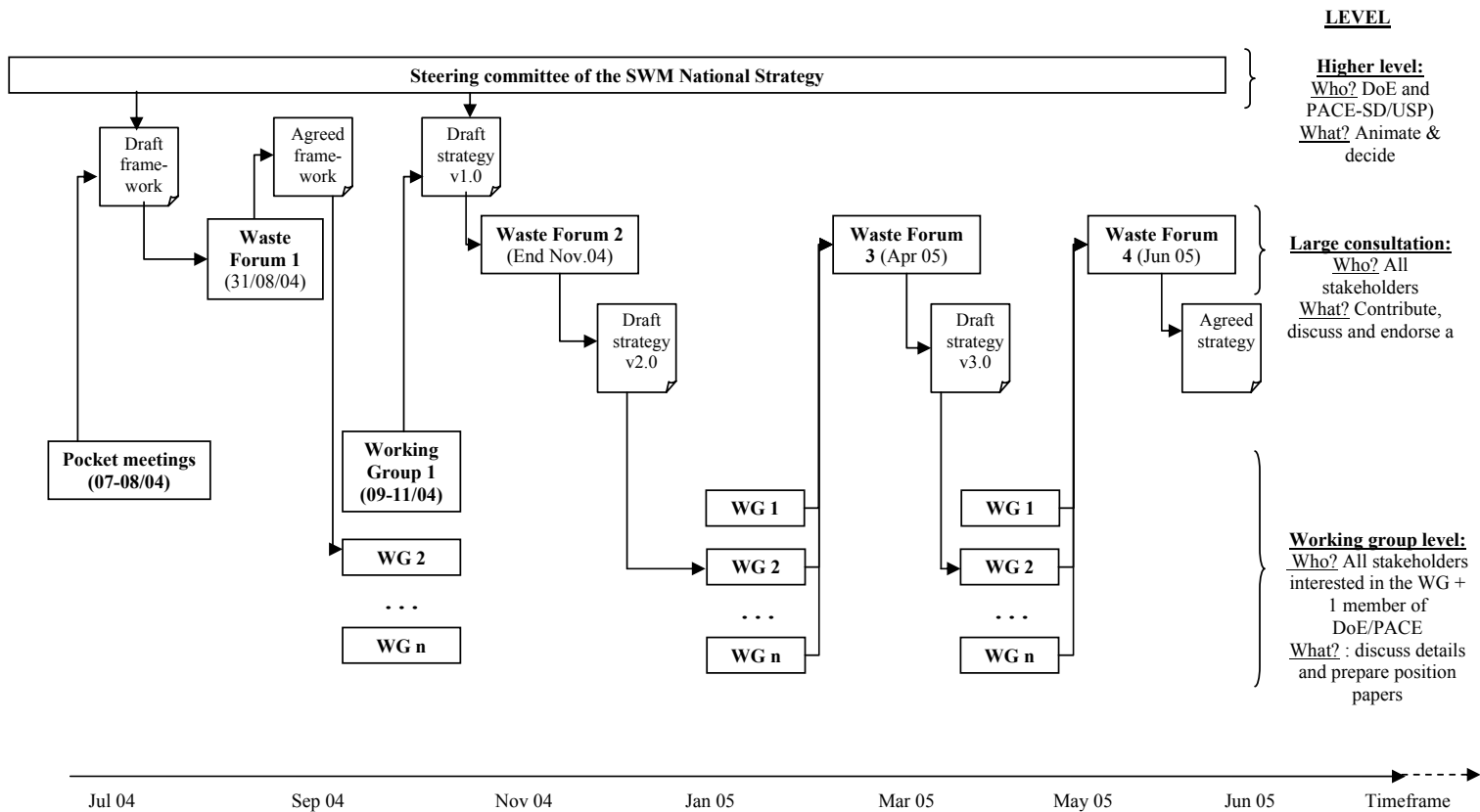


Figure xxx. Graphical representation of levels, stakeholders, documents and timeframe involved in the process of developing a National Solid Waste Management Strategy for Fiji.

6.4 Policies and Programmes

6.4.1 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 Minimization

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.

6.4.2 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 disincentives³ 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 curbside services to public. A proper collection system design and management can result in significant cost savings.

6.5 Criteria for Priority Setting

It lays down the criteria for prioritizing 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

³ Financial incentives are designed to encourage source reduction by linking an economic benefit to the implementation of source reduction activities. Financial disincentives are designed to add cost to waste-producing activities that could be avoided through source reduction activities.

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

7.0 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.

8.0 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

For detailed action plans refer to Appendix 2.

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 2006-2010.

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

The Action Plans outlined in Appendix 2 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.

9.0 Review and Monitoring

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 and review and discuss the 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.

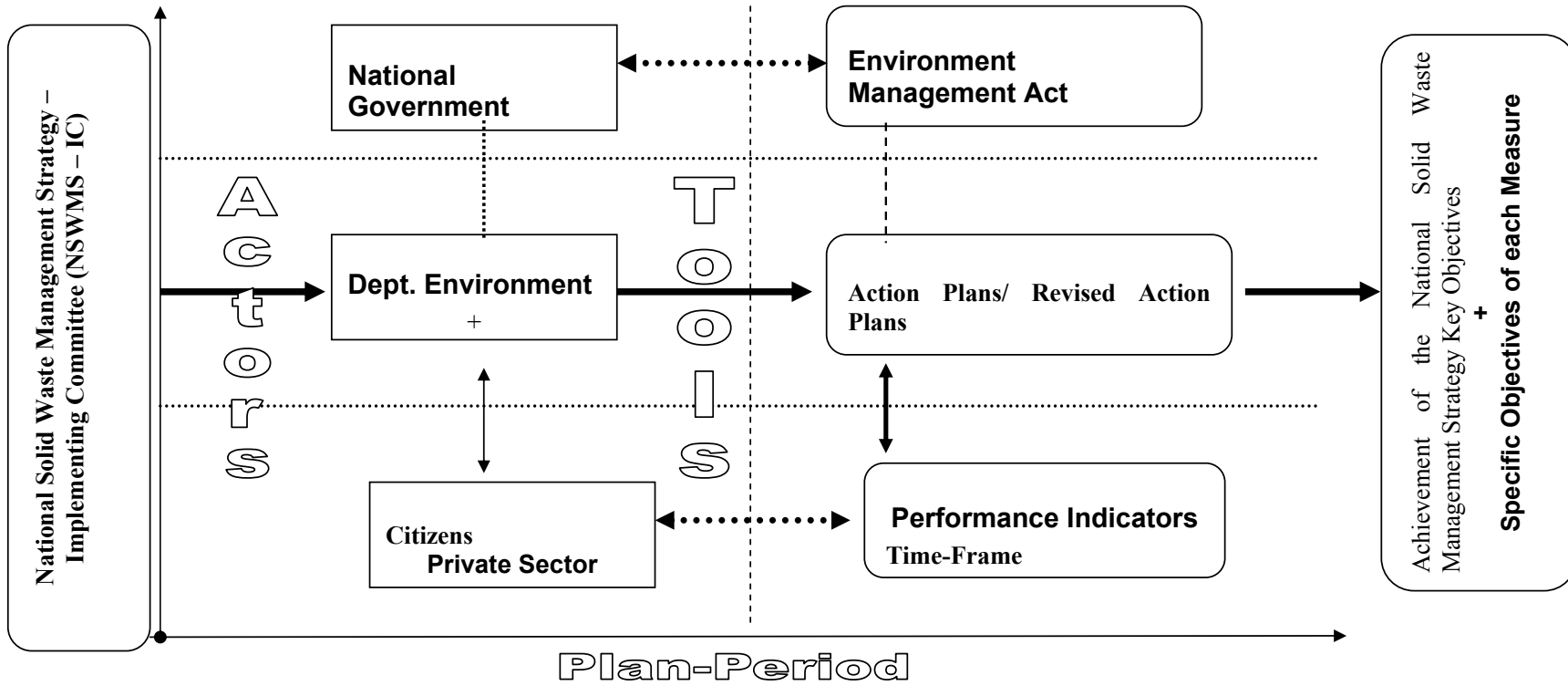
The Department of Environment will be the secretariat to the NSWMS – IC.

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.

Schematic of the Institutional Monitoring Framework

Deleted:



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.

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Prioritized Key Issues:

7.1 Working Group 1: Legislation, Regulation and Institution

- Lack of public awareness of waste related legislation
- Overlapping and duplication of duties and responsibilities in existing waste related legislation
- Unharmonized and outdated status of existing legislation with new Environment Management Act

7.2 Working Group 2: – Information, Education, Awareness and Community Programmes

- Lack of integrated approach, coordination and monitoring of communication activities

7.3 Working Group 3: – Research and Development

- Ineffective implementation of the recommendations of various waste related studies
- Further research on extended producer responsibility and handling of waste

7.4 Working Group 4: – Waste Minimization

- Lack of qualitative and quantitative data for waste minimization activities
- Lack of waste minimization strategies in general and for special wastes

7.5 Working Group 5: – Improving Final Disposal, Monitoring and Litter Control

- Under-resourced rural local authorities
- Rural areas not serviced properly and effectively
- Mismanagement of dumpsites

7.6 Working Group 6: Efficient Pricing and Economic Instruments

- Insufficient economic incentives and disincentives for management of wastes

7.7 Working Group 7: Infrastructure, Services and Collection Systems

- No waste segregation at source and during final disposal
- Uncontrolled incineration and open burning
- Inadequate infra-structural support for current recycling activities
- Ineffective and inefficient collection systems (practical orientated)

Key Issues Paper for Waste Forum Working Group One:

1.0 Summary

The life cycle of solid waste begins from the moment any type of solid waste, for example a snack packet, is manufactured, till the time a consumer finishes with it and it is either thrown into a bin or on the ground. Currently the disposal of solid waste is uncontrolled in Fiji. Effective implementation of legislation is known to be the best way of controlling problems associated with solid waste. Legal instruments are used not only to control problems like littering but is also used to make producers of such waste responsible. Legislation should be targeted not only at controlling problems like littering but also for things like waste minimization and waste segregation.

In Fiji, the key players as far as the current legislation are concerned are; the Ministry of Health, the Ministry of Fijian Affairs and Department of Environment. Legislations that have been reviewed in this paper are:

- Public Health Act
- Fijian Affairs Act
- Litter Decree
- Environmental Management Act

Ministry of Agriculture, Department of Fisheries and Ports Authority of Fiji are some other relevant agencies which have legislations relevant to waste. Unfortunately, despite the existence of these laws, people are not conforming to the requirements. For example people use plastic bags for their garbage instead of proper garbage bins regardless of the by laws Cap 111 of the Public Health Act. This is mainly because there is lack of effective monitoring, the fines under the offenses are too low, there is a lack of linkage between the Acts and Bills and confusion of responsibility due to duplication of work under the various legislations.

2.0 Current Situation

There are four major pieces of legislation, which deal with solid waste management in the country. These include the Public Health and the Fijian Affairs Act, the Litter Decree and the Environment Management Bill.

2.1 Public Health Act

The Public Health Act, 1936, administered by the Central Board of Health through local authorities, contains provisions for the control of environmental problems under the law of public nuisance in part IV of the Act. A public nuisance is a situation that interferes with a public right and can therefore be construed to encompass a host of waste and pollution situations.

2.1.1 Part V: Title: Sanitary Services

A board approves all schemes, amongst which is the collection of garbage, disposal of night soil etc. and a permit is given by the Local Authority to engage in such schemes.

2.1.2 Part VII: Title: Butchers' Shop

All waste matter to be removed from a butchers' shop daily and before removal the waste is to be stored properly.

2.1.3 Part X: Title: Garbage Pans and Accumulations:

Every owner or occupier of any house etc is required to provide a sufficient number of garbage pans of a specification approved by the local authority, where no garbage collection is available; for the garbage pans to be emptied at a minimum twice weekly. (Amended by Legal Notice 206 of 1977).

Rubbish is not be scattered or heaped upon the premises or any roadway, land or foreshore or any stream or creek, otherwise an offence is deemed to have been committed against this part of the Public Health Act. 24 hours notice maybe given by the Health Inspector for an owner to remove such accumulations.

2.1.4 Part 22: Title: Special Class Requirements

The owner of every building containing flats shall provide means for the destruction of garbage or removal to a common garbage pan, garbage pans for each flat and needs approval for proper removal of such garbage.

2.1.5 Section 40: Title: Public Health (Hotels, Restaurants and Refreshment Bars) Regulations

There should be provision for portable metal receptacles, with specifications as approved by the Local Authority and these shall be secured with tight fitting lids and placed in a location to avoid being overturned by dogs.

2.1.6 Section 52: Title: Garbage Disposal By-Laws

These By-Laws are similar for the different areas e.g. Lautoka, Suva etc.

Every owner etc. of any house, residence etc. shall provide a sufficient number of bins of specifications approved by the Local Authority. These bins are to be covered, in good condition and placed in a position which is easily accessible to Municipal Councils garbage collector and where garbage pans are supplied by the Local Authority the owner of the premises shall accept, pay for, and use such pans, garbage is to be disposed off in these pans and not accumulated or scattered elsewhere, as mentioned in Part X. Actions otherwise shall be deemed as an offense against this Part of the Public Health Act.

The collector of Municipal Council is responsible for the removal of garbage from the pans at least twice weekly. Where the pan is not cleared for over four days the occupier of premises shall notify the Local Authority Inspector of this.

A fine not exceeding \$10.00 is liable of every such offence upon conviction

2.1.6 Section 52: Title: Public Health (Sanitary Services) Regulations – Removal and Disposal of Garbage.

The Central Board of Health shall give approval to the Local Authority for the disposal of garbage by incineration, controlled dumping or any other approved method. The garbage pans shall be of specifications as according to Part X of the Public Health Regulations, all garbage shall be moved at least twice weekly or often if considered necessary by the Local Authority.

Only the authorized officer of the Local Authority or the Contractor of the Local Authority or the servant of such contractor shall deposit garbage of any kind at the Local Authority dump. Any other person shall require the written permission of the Local Authority.

A person acting against the provisions of the regulations shall be guilty of an offence and on conviction pay a fine not exceeding \$10.00 and in the case of continuing offence pay a fine not exceeding \$4 for each excessive day.

2.2 Fijian Affairs Act

This Act has been very briefly summarized below, especially the section dealing with waste. The emphasis is on the disposal of waste in villages.

2.2.1 Part III: Title: Sanitation, By-Law 12

Cleaning of the villages – each occupier of a house shall be responsible for cleaning a specified area around his dwelling. The Provincial Council shall take responsible steps to ensure similar measures in the remaining area of each village. Where two areas of responsibility overlap, each occupier shall be responsible for that half of the common area nearest to his building.

2.2.2 By-Law 14: Disposal of Rubbish

The Provincial Council is to provide pits kept in clean condition where rubbish can be buried or burned or other facilities for rubbish disposal. Other facilities for rubbish disposal maybe used as specified by the advisor on Public Health. Rubbish shall not be deposited in any other place than in accordance with Paragraph (1).

2.2.3 By-Law 15

Dead animals or refuse or putrid food shall not be thrown into any latrine.

2.2.4 Part IV, By-Law 17

All dead animals are to be burned or buried.

2.2.5 Part V

Water Supplies – Provincial Council shall ensure that water supply of the village is protected from contamination. No dead animal shall be buried or placed in a position so that the water supply of any village is contaminated.

2.2.6 Part VI: General 24

The Roko Tui, Assistant Roko Tui or Advisor on Public Health or an authorized person shall be responsible for the enforcement of these By-Laws.

Person failing to carry out provisions of these By-Laws shall be guilty of an offence and liable on conviction to a fine not exceeding \$20.00 or imprisonment for a term not exceeding 2 months or both.

2.3 Environment Management Bill

It is envisaged that the Environment Management Bill will become the key legal instrument to manage Fiji's waste and pollution problems. The Bill ensures that waste producers are made more responsible.

Part 5 – Waste Management and Pollution Control

2.3.1 Clause 35

Permits shall be required to discharge waste or pollutants by a facility into the environment or to handle, store, process or control any hazardous substance or to produce any waste, pollutant or hazardous substance or engage in any activity that may have an adverse effect on the environment.

2.3.2 Clause 36

The Waste and Pollution Control Administrator may upon application with the required fee included, either accept or refuse to grant a permit under this part or suspend a permit or conditions of a permit.

2.3.3 Clauses 37 and 38

A facility without a permit discharging waste or pollutant into the environment is liable for inspections or remedial actions under this part and a Waste and Pollution Control Administrator may issue a notice to the facility for it to apply for and obtain a permit. A facility failing to comply with the mentioned notice commits an offence and on conviction is liable to a fine not exceeding \$100,000.

2.3.4 Clause 39

An order to stop work shall be issued to the facility by the Waste and Pollution Control Administrator in the case of emergencies or a breach under this part. Upon the issue of an order to stop work the permit is deemed to be suspended. The stop work order may be removed if the emergency or breach ceased to exist.

2.3.5 Clause 40

If the Minister considers that an emergency has arisen in an area in relation to a pollution incident, the Minister may with the approval of the cabinet, declare an environmental emergency in that area by order in the Gazette.

2.4 Litter Decree

The Litter Decree 1991 defines who litter prevention officers are, the powers and duties of the litter prevention officers, offences in respect of litter prevention officers, offences such as depositing litter in a public place, breaking of bottles, cost of removing litter, penalties and notices. The Litter Decree is being reviewed by the Department of Environment. Following is a brief summary of the litter decree 1991

Litter Decree 1991	Summary
Part II – Litter Prevention Officers	Any public authority may from time to time appoint any suitable person to be a litter prevention officer. The following persons shall by the virtue of their office be deemed litter prevention officers: Every police officer Every officer appointed for the purposes of the Public Health Act The Port Master and the Deputy Port Master Every Forest Officer or Forest Guard
Powers and Duties of Litter Prevention Officers	If a litter prevention officer finds a person depositing litter or has cause to believe that a person deposited litter in a public place, the officer may require the person to: Forthright place the litter in the nearest receptacle If for any reason it is not practicable for the litter to be placed in a receptacle, to remove the litter within 24 hours to a site for the disposal of litter If there is no receptacle nearby then to dispose of the litter to the satisfaction of the officer If an officer finds any person committing an offence against any of the sections under this Decree the officer shall require the person to state his true name and place of residence.
Public Authorities to Provide Receptacles in Public Place	Every public authority shall at all times provide and maintain in every public place under its management adequate receptacles to allow the place to be free of litter.

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Litter Decree 1991	Summary
Part III – Offences	A person depositing litter in a public place, willfully breaks bottles or glass in a public place, and either directly or indirectly permits litter to be deposited and abandoned may be convicted of an offence and be liable to pay fines of a certain value or face imprisonment or both. The offender may be ordered to clear the area or incur the cost of removing litter.

3.0 Key Players

The government departments/ ministries which have key role to play for solid waste management are:

- Ministry of Health
- Department of Environment
- Ministry of Fijian Affairs
- Ministry of Commerce

Table 1.1 Role of the Key Players

Key Players	Role in Solid Waste Management
Ministry of Health	The Ministry of Health is involved in solid waste management through the Public Health Act. It is the Health Inspectors, which come under Ministry of Health and are given powers under the Public Health Act who monitor the disposal of garbage making them one of the key players in this issue. The Health Inspectors in the Municipal Councils and the Rural Local Authorities also report to the Ministry of Health.
Department of Environment	At present, the Department of Environment does not have any legislative powers to deal with solid waste management. However, with the hopeful enactment of the Environment Management Bill into law would empower this Department with adequate legislations to deal with the issue of solid waste. In the Environment Management Bill, there is a Part on Waste and Pollution Control Unit.
Ministry of Fijian Affairs	The Ministry of Fijian Affairs has a role player in solid waste management through the Fijian Affairs Act whereby the Provincial Councils are given power to monitor solid waste management in villages.
Ministry of Commerce	Ministry of Commerce does not have any specific taxes on items to minimize waste. There are taxes though on the import of certain items, which can serve a dual purpose and act as a deterrent on waste production.

3.1 The Customs Department

It is also important to note that the Customs Act provides for levying of tariffs on imported and exported goods. These are set annually as part of the national budgetary process. As a flexible act under which duties are collected there is significant potential both to create economic incentives and disincentives and for possible collection of an addition duty to fund repatriation or local recycling of SVBT (and other) materials.

For example, new tyres and retreated tyres attract the same 35% duty. From a waste perspective the retreated tyres should have a higher duty since they have a shorter lifetime and curb the tire-disposal problem in Fiji as well as perhaps compete with local recycling.

4.0 Key Issues

The above mentioned are some of the main legislations related to solid waste. A cross section of these show certain key issues existing as far as the legislation, regulation and institutions related to waste are concerned. These issues have been stated below in order of priority (high to low):

- People are not aware about the existence of the Public Health Act and the Fijian Affairs Act on matters related to waste.
- There is ineffective monitoring of the above-mentioned Acts and Decrees by the relevant authorities.
- The fines and penalties under the Acts and Decrees are not large enough to effectively act as a deterrent. These are usually ignored by the authorities as the cost of getting a person arrested and on trial can in certain cases be more than the fine itself. The offenders tend to take advantage of this situation.
- The Public Health Act, at first impression, appears to have sufficient provisions for the regulation of all types of waste and pollution situations. However, for the reasons given below, the Act is, in fact quite inadequate for effective environmental management of wastes and pollution in Fiji's circumstances⁴:
 - The legislation was drafted for the simple types of nuisance situations that were likely to arise when the level of development in Fiji was relatively limited. With increasing development, the issues of concern have become quite complicated and the administration of the Public Health Act for these situations would be quite cumbersome.
 - The responsibility for ensuring that wastes are being managed in an appropriate manner seems to rest on the local authority rather than on the waste generator. The local authorities are therefore required to carry out intensive monitoring and inspections which has resource implications that local authorities under present circumstances, are not able or prepared to provide.
 - The penalties of contravention of the provisions are incredibly low and are of absolutely no deterrence to offenders.
- The board in the Public Health Act and the board mentioned in the Environment Management Bill may duplicate some of the work related to waste issues. There currently no linkages between the Environment Management Bill and other existing legislations.

⁴ Proceedings of the first National Waste Minimization and Management Workshop for Fiji, 12-15 September 1994, Fiji School of Nursing, Tamavua, Suva

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- The existing legislations are very outdated when compared with the current global trends. Extended producer responsibility is the concept adopted by many countries around the world. Manufactures of goods that generate solid waste are made responsible for its disposal. The cost of disposal is incorporated in the cost of the particular item. Legislations will have to be reviewed with economic instruments in mind.

Key Issues Paper for Working Group Two

1.0 Summary

Education is indispensable to a society. It is encouraging to note that in Fiji the Ministry of Education has an Environment Education (EE) regulation and has been reviewing school curricula to infuse environmental issues. Major tertiary institutions are also undertaking research, producing newsletters and writing articles for scientific journals. In the non-formal education sphere, non-governmental organizations and line ministries are sponsoring community EE programs. Fiji does not have specific environmental policies, nor a set of EE policies, with respect to business and industry.⁵

Public education and awareness should be an essential and ongoing feature of any waste management program. Environmental awareness needs to be raised to engender individual responsibility and civic pride. The deplorable state of many public areas such as beaches parks and kerbs show that our people lack civic pride and are irresponsible. Furthermore public awareness should involve ordinary citizens to actually be involved in waste management.

This paper will focus on the current EE initiatives in Fiji by the various organizations and also highlight the key issues that make these initiatives ineffective. The main areas in this working group are Information, Education, Awareness and Community Programs.

2.0 Current Situation

Presently there are information such as waste quantities and quality available with the municipal councils and relevant departments but they are not readily available to the public. There is an information and knowledge gap between the urban and rural area as well. In addition, there is a need to distinguish between environmental education and awareness. Environmental awareness is a component of environmental education.

2.1 Findings from the Suva Waste Awareness Survey⁶

The general level of awareness is high in Suva. However there is need for waste awareness and education programs to focus on specific areas. These specific areas, amongst others include:

- hazardous waste,

⁵ Bhandari B, Abe O (2001), *Environment Education in the South Pacific Region – status, issues and practices (a condensed version)*, IGES publication

⁶ A-N-D Consultants (2000), *Waste Awareness Baseline Survey for Suva, Apia and South Tarawa*, SPREP and EU publication

- waste as a resource and
- adverse effects of uncontrolled waste disposal.

In the recent past approach to waste education has been of general nature using mass media as the main channel of communication. From this general approach waste education has to become more specific, contact oriented, activity related and community based.

There is a need for agencies promoting better waste management to combine awareness and education campaigns with small participatory waste projects at community level.

2.2 Organizations and Their Environmental Awareness/Education Initiatives

Education/ Awareness work on waste issues are currently done by the following agencies:

2.2.1 Municipal Councils

Municipal Councils do awareness on waste issues. Waste issues are incorporated into the general awareness work that they do in communities or schools. The extent of this work depends on available financial and human resources.

Suva City Council for example, has a Health and Education Unit that undertakes waste management and environmental education programs through the local media or by community visits by the Health Inspectors. This unit also does school visits within the Suva City Boundary to make presentations on waste minimization concepts such as reduction, recycling and reuse of solid waste.²

2.2.2 Curriculum Development Unit (CDU), Ministry of Education¹

Ministry of Education has waste and other environmental issues incorporated into the school curriculum. The following table provides a summary:

Table 1: The Table Showing the Level of Education and Environmental Issues

Level	Efforts
Classes 1-6 Elementary Science	<ul style="list-style-type: none"> ▪ Emphasis on nature studies such as care of surroundings, keeping the school compound clean, study of the garden community, Study of pond water and it's quality. ▪ A module on energy and conservation has also been introduced by CDU.
Classes 1-6 Health Science	<ul style="list-style-type: none"> ▪ Emphasis on healthy lifestyles, including proper waste management and healthy environments

Level	Efforts
Forms 1-4 Basic Science	<ul style="list-style-type: none"> ▪ Proper sanitation is a major issue at lower primary level⁷ ▪ Primary focus is on understanding that biological, ecological and physical aspects of the environment are inter-linked. ▪ Understanding of how man's actions affect the environment, and the effect of the physical and social environments on our health. ▪ Topics include effects of different types of pollution, effect of excessive fertilizer use on our health, greenhouse phenomenon and depletion of the ozone layer. ▪ In Form 1, the module "Living Things" discusses the role of the Department of Environment, and its actions to protect our threatened organisms. ▪ Form 2 teaches a module on "Land and Environment" ▪ The two modules in Form 3 called "Marine Environment and Us" and "Patterns in the living World" cover environmental issues. ▪ Form 4 includes forest ecosystems in the module "Man and His Influence on the Ecosystem."
Forms 5-7 Biology Physics Geography Economics Accounting	<ul style="list-style-type: none"> ▪ There are a range of subjects in both Arts and Science, which incorporate environmental issues. ▪ Students learn ecological principles, readily available resources in the environment, man's impact on the environment and its consequences ▪ There are lessons on energy conservation and alternative energy sources. ▪ Geography includes many environmental concerns in dealing with people's impact on the environment. Case studies in tourism, mining and other primary industries are used, and the concept of ecotourism is introduced. ▪ Economics includes surveys of how manufacturers can produce goods without polluting the environment. ▪ Accounting covers a section on business ethics that considers the impact of production and sale of goods and services on the environment.

CDU also conducts teacher-training sessions, which enables CDU to establish environment education trainers in each district. These trainers set up environmental clubs and through these clubs they:

⁷ Information obtained from Mrs. Kunabuli (2004), Ministry of Education, Curriculum Development Unit.

- Establish school based projects
- Organize outdoor activities for students
- Commemorate cleanup days, Environment Day, Arbor Day etc
- Train primary school teachers

2.2.3 Non Government Organizations (NGOs)

(a) Live and Learn Environment Education ⁴

This non-governmental organization also carries out education and awareness work in schools.

They work closely with the Ministry of Education/ Curriculum Development Unit/ Head Teachers Associations in promoting action-based environmental & development education in schools & communities.

The main objective of this organization is the Integration of environmental & development concepts through education programs for the younger generation of the South Pacific community. This is achieved through:

- curriculum development
- capacity building
- interactive environmental education programs
- development of resource materials for schools.

Some of their Environmental Education programmes include:

SUSTAINABLE SCHOOLS PROGRAMME

Green Schools / HOPE 'Helping Our Planet Earth':

Focus: Primary schools

Eco-schools

Focus: Secondary Schools

WATER EDUCATION PROGRAMME

River Care

Focus: Secondary Schools

Water and Youth

Focus: Tertiary Institutions

Annual World Water Day Celebrations

Focus: Primary, Secondary, Community

(b) Greenpeace

This nongovernmental organization has education and awareness materials available on waste for the public. These materials are in the form of CD's, booklets, brochures etc. There is also a library at Greenpeace, which has reports relevant to waste, and other environmental issues.

2.2.4 Department Of Environment ¹

Department of Environment has a unit, Environment Education and Awareness Programmes, which is responsible for organizing mass awareness-raising activities. Some of the activities carried out by the DOE in education and Awareness include:

- Airing environmental programs on the television and radio
- Distributing brochures on various environmental issues such as ozone, sustainable development etc.
- Conducting public awareness campaigns for Environment Week
- Organizing poster and essay competitions on environmental themes.
- Organizing workshops for the village communities, teachers, municipal councils, saw millers, and Fiji Sugar Corporation workers.
- Providing guest speakers to clubs, schools, universities, NGO's, government line ministries and departments.
- Working in partnership with the NGOs to deal with littering at sports events and festivals, as well as anti plastic campaigns.

The Waste and Pollution unit at the Department of Environment also plays a key role in raising awareness on waste management. A community programme on waste management in a squatter settlement, Wailea, is being undertaken by the waste and pollution unit as a case study.

A company has been contracted to undertake awareness activities to educate people on waste minimization. This is one of the activities under the Naboro landfill project. The main focus of this mass media campaign is waste minimization.

2.2.5 Tertiary Institutes ¹

Some of the major tertiary institutions in the country include University of the South Pacific, Fiji Institute of Technology (FIT), Fiji College of Agriculture, Fiji School of Medicine (FSM), Teacher Training Institutes and the Training and Productivity Authority of Fiji (TPAF).

The University of the South Pacific (USP) offers programs in their different schools and environmental studies are an integral part of most of these programmes. There are Bachelors of art and science degrees in environmental studies and postgraduate degrees in environmental programs. The courses are based on resource conservation and management, analyzing the conventions and treaties, policy formulation, environmental law etc. There is also a Pacific Center for Sustainable Environmental Development (PACE) based at USP, which looks at environment issues, including waste. They also do research on such issues.

The other tertiary institutions also offer environmental courses. For example, FIT has introduced a Chlorofluorocarbon Accreditation Module, which is in line with the Ozone Depleting Substances Act. The Fiji Institute of Technology also offers a Diploma in Environmental Science and the Auckland University of Technology's Bachelor of Applied Science (majoring in Environmental Science). These programmes have waste and other environment issues incorporated into their curricula, into units such as Environmental Issues, Environmental Law (topics include Fiji's Environmental Management Bill, EMS ISO 14001), Environmental Science, Coastal Management and Natural Resource Management. About 70 students are annually enrolled into these two programmes offered at FIT

FIT's School of General Studies is also involved in environmental research with NZ\$296,000 funding from NZAID for 2 major projects; catchment issues/management and working together with NZ's NIWA and Live & Learn, to develop a Stream Health Monitoring Assessment Kit (SHMAK) specifically for Fiji. Both of these projects have strong linkages with Waste Management, especially the catchment issues/management projects where 60 villages were visited along the three rivers: Wainibuka, Waimanu and Dreketi and an awareness programme for river pollution (waste management) was part of the project.

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Apart from this the unit Occupational Safety, Health & Environment (OSHE) is compulsory for all students studying in the Engineering Schools and the School of General Studies. The OSHE unit has a subtopic Waste Management. About 1800 students are enrolled annually in this unit. For awareness purposes, the FIT annually celebrates an "Environment Clean Up Day" where all staff members clean up the FIT environment on the various FIT campuses around Fiji.

TPAF run courses on ISO14000 and FSM guidelines on environmental health.

2.2.6 Ministry of Health

Ministry of Health carries out environmental education and awareness through the Health inspectors that are present in the municipal councils. These health inspectors are responsible for spreading awareness on waste issues in the urban

and rural areas depending on the particular area that is being looked after by the particular health inspector.

Apart from this, there are also workshops conducted and brochures given out on environmental health by the Ministry of Health and some of these focus on waste issues as well.

2.2.7 Ministry of Women

Similar to Ministry of Health, Ministry of Women has Officers who go out into the field and carry out environment education and awareness work. These officers also go out into the rural areas and talk to the women regarding general environmental issues. There are also brochures etc available to spread this information.

2.2.8 Ministry of Information ¹

Ministry of Information is one of the Government's major information agencies. It provides a linkage between the government, media and the public. The Ministry had a program on the television, *Dateline*, produced by its film and television unit, which has a mixture of news including the environment.

2.2.9 Mass Media ¹

The mass media in this country plays a pivotal role in nation building and is very receptive to the environmental problems in Fiji. The media is a key means through which environment education can be spread to the public. There are local newspapers for example the *Fiji Times* and the *Daily Post*, which have news on the current situation of the environment, any environmental disasters and fun pages and comic strips to educate the public about environmental issues. Newspapers are also available in the Fijian Language (*Nai Lalakai*) and Hindi (*Shanti Dut*) so that the non-english speaking communities are also included in the education process.

The various radio stations in English, Hindi and Fijian organize occasional talk back shows and environmental programmes for their listeners. There are especial programs for the children as well and increased awareness work is done during occasions like environment week etc.

The local television, Fiji One, airs special programs in the three main languages, which focus on general social issues. Occasionally environmental issues are also incorporated into these programs as well and where necessary pictures are shown to the public to highlight the severity of the situation, for example an extremely littered area is shown on television during clean up campaigns.

3.0 Key Issues

Awareness programs are not totally ineffective as people in Fiji are fully informed on what is to be done. Unfortunately EE programs have not been able to change attitude and behaviour. To change behavior, EE programs have to go hand in hand with effective implementation of legislation.

Current awareness programs can be changed to incorporate some very important aspects of waste management which are currently being omitted. The following priority areas were identified in the report¹:

➤ *Waste as a Resource:*

The concept that waste is not a waste, as generally thought, but resources that can be put to several uses need promotion.

➤ *Effects of Uncontrolled Waste Disposal:*

The understanding of the adverse effects of uncontrolled waste disposal is skewed in favour of one or two diseases and water pollution. The message content should deal with the entire range of adverse consequences.

➤ *Agents of Dispersal and Scattering of Waste:*

This is an important concept that needs explanation and understanding. Hopefully, when people understand and appreciate this concept, something will be done about it.

➤ *Waste Segregation and Minimization:*

There are a number of important concepts in this priority area, which need to be popularized. These concepts include, waste segregation, sorting waste at source, transfer station and waste minimization. Waste minimization in turn requires an understanding and appreciation of avoidance reduce, reuse and recycling concepts.

➤ *Legal Instruments and Implications*

People in general and in particular all generators, operators, and regulators of waste activities should be made aware of all the existing Acts and Legal instruments that address waste. There is adequate legislation but enforcement is lacking because of limitations such as not enough enforcement officers etc. The awareness campaign should proceed stepwise. Take one aspect of legislation, educate, allow time for change, and then move on to another aspect. Legislations should also be made more conducive to the enforcers.

➤ *Obligations of Waste Collectors:*

Waste collectors/ contractors/ Workers need to be educated about their obligations. The meaning of consequences, irregular collection, inadequate service, inept handling, etc should be clearly explained. Contractual obligations and legal requirements, whenever applicable should be quoted.

➤ *Responsibility of Waste Generator:*

Waste generators could be individuals, households or corporate bodies. Each one should know their rights as well as their responsibilities. The focus should be on mandatory requirements for bins, right timing of placement, right day of placement, restraining pets and dogs.

➤ *Littering and illegal Disposal:*

Individuals, households, and corporate bodies should be informed about the specific consequences of illegal dumping. Focus should be on illegal acts and corresponding penalties. Illegal disposal and littering could be related to adverse effects of uncontrolled waste.

➤ *Plastic as Pollutants:*

The problem of plastic bag pollution originates with the increasing demand by customers, and an increase in production because it is cheap. In general, various measures should be taken in order to control or deal with the increasing use and disposal problems associated with plastic bags. Firstly, educate the public on the problem caused by plastic bags. Plastic use in modern life is a new phenomenon and its polluting potential is immense. People need to understand various aspects of plastics. What are plastics, their different grades and how to identify them? Create awareness about how various forms of plastic enter waste stream and cause environmental problems and ways in which plastics can be reused and recycled. Technological measures include the development of degradable plastic bags and the recycling of plastic. In addition, the reduction and reuse of plastic bags should be encouraged.

➤ *Waste Education*

Presently enough focus is not given to the people in the educational sector to provide waste minimization education. Teachers and students need to be more involved in this work. People in the village or rural area are left out of these types of education and awareness programs on waste management. People are not responsible for their actions and fail to take ownership in such situations.

Issue	Organization currently	Target Group/Area Currently Covered
General environmental education and awareness including waste minimization and separation issues	<ul style="list-style-type: none"> - Department of Environment - Live and Learn Environment Education - Ministry of Health (including municipal councils) - Ministry of Women - Training and Productivity Authority of Fiji 	<p>Schools, community based groups, general public, women and women's groups</p> <p>Industrial workers, however this is on a very small scale at the moment with only TPAF involved.</p>

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	Ministry of Education	<i>Missing: Industrial, commercial and business operators Nadi Town Council has informed that their Town Council does carry out general environmental awareness with the Industrial workers. This is the case for most of the municipal councils)</i>
Hazardous Waste	Department of Environment	Schools, farmers and industry workers
Waste Collection and Waste Collectors	Municipal Councils	General Public but this is done on a very small scale and not much emphasis is given on these issues in the awareness work done by the municipal councils. (Nadi Town Council has mentioned that the Municipal Councils allocate funds for this program. It is the Rural Local Authorities and the Rural Dwellers who do not have this service and awareness)
Waste Legislations and Regulations	Ministry of Health	Health Inspectors <i>Missing: General Public but in this case it is usually the workers like the Health inspectors etc who are made aware by the relevant ministry of their duties under the Acts and Legislations and the general public lacks awareness (Nadi Town Council mentioned that the Health Inspectors are guided by the council and informed of the Public Health Act, some other officers for example police, forest and ports may not be aware of their respective portions in the legislations. However that is what we meant that the health inspectors for example are aware of their legislations but the general public lack this information)</i>

Key Issues Paper for Group Three:

1.0 Summary

An important component of waste management is research and development. This is something that is essential in all the other programme areas as far as the development of waste management strategy is concerned. This programme area range from waste minimization to economic incentives, all of which incorporate research and development.

Research and Development can play a key role in highlighting the problems and more importantly coming up with appropriate solutions for various waste related problems. The research work done in areas of recycling, collection etc. can go hand in hand with the work that the other programme areas are doing and eventually this can be used to develop and validate new waste management practices for the industries and other sectors, which have an influence on the economy.

The programme area is quite immense and was narrowed down by identifying the waste items, which are of greatest concern to Fiji's situation. Following are the waste items that will be considered in this paper:

- P.E.T Bottles
- Plastic Bags
- Snack Packets
- Scrap Metals
- Derelict Vehicles
- Tyres
- Batteries
- Waste Electrical and Electronic Equipment (WEEE)
- Medical Waste
- Solid Industrial Waste
- Paper

Key issues will be identified based on the depth of research already done and the gaps that exists.

2.0 Current Situation

Fiji has had various research work in the area of waste. This had been done by the Department of Environment, University of the South Pacific and other such organizations, which would include Fiji School of Medicine etc. Some of the work has not been published therefore; it is not available to the public.

2.1 P.E.T Bottles

A Litter survey was done along Edinborough drive, Queen Elizabeth drive & Queens Highway particularly from Nadi Airport to Votualevu roundabout by the Department of Environment in 2004. Results confirmed that PET bottles were found in greatest volume, which justified the need for government to make strategies to control PET bottles.

2.2 Plastic Bags

An Assessment of Plastic Bag Pollution in Fiji was done in 1999. The report is very detailed and covers all aspects of the plastic bag situation in Fiji. The areas considered are: quantification of plastic bag use in Fiji, people's perception, current policies contributing to the increase in use, cost to consumers etc.

The report provides a list of recommendations for controlling the plastic bag problem in Fiji. The two key recommendations were:

- reducing the desirability of using plastic bags by imposing a tax on plastic bags so that the cost becomes a consideration in their use.
- awareness on alternatives to plastic bags

2.3 Snack Packets

Litter survey along Edinborough drive, queen Elizabeth drive & Queens Highway particularly from Nadi Airport to Votualevu roundabout quantified the snack packets by the brand name. This information is needed to justify the need for Extended Producer Responsibility (EPR). The various companies should be made responsible for the snack packets as it is still their product. EPR is the latest global fashion.

2.4 Scrap Metals, Derelict Vehicles, Tyres and Batteries (SVBT)⁸

Detail research has been done to quantify the volume of SVBT in Fiji in 2004. For each of the waste item in this category the report has information on: material flow description, quantity of end-of-life items, current disposal methods and recommendations for better waste management. This report has sufficient information to enable government to make decisions on controlling these wastes and thus there is no need for any further research.

2.5 Waste Electrical and Electronic Equipment

JICA funded a research on Solid Waste Management and Recycling in the Fiji. It was a preliminary analysis of; the situation of waste management in the

⁸ Scrap metal, derelict vehicles, batteries and tyres have been put together because the study on all these waste items was done as one research and data is found in one report

western region of Fiji and on difficult solid waste. Difficult solid waste was referred to waste electrical and electronic equipment (WEEE).

2.6 National Chemical Profile⁹

A National Chemical Profile is a comprehensive assessment of the National infrastructure relating to legal, institutional, administrative and technical aspects of chemical management.

The Government of Fiji Islands has received funding from the Global Environment Facility (GEF) for enabling activities to assist the country in meeting its obligations under the Stockholm Convention on Persistent Organic Pollutants (POPs). This convention targets at reducing the amount of a particular group of chemicals.

Fiji is a party to this convention and this has provided the impetus for the preparation of the National Chemical Profile. This profile is prepared to assist Fiji in the development of a national plan for implementing the Convention. Two chemicals that this convention aims at reducing are dioxins and furans, which are emitted from improper incineration of medical waste and open burning.

Another discovery from this profile was the existence of stockpiles of chemical wastes in certain areas. Obsolete chemical stockpile has been identified as a problem that needs urgent attention. There are stockpiles of unwanted chemicals in secondary schools, tertiary education institutes, government laboratories, hospitals and agricultural research stations. Fiji currently has approximately 50 tonnes of chemicals that requires disposal. Some of these chemicals have not been used which highlights the fact that chemicals are being bought without any proper analysis. The chemical profile has proposed an improved chemical management infrastructure for Fiji, which will ensure that chemicals are properly managed from importation through to disposal.

3.0 Some of the other waste related research work

3.1 Baseline Awareness Survey on Waste

A waste awareness survey was carried out in Suva, Apia and out Tarawa as part of the Pacific Regional Waste Awareness and Education Program. The objective of this survey was to assess the level of awareness regarding solid waste issues, identify key waste issues and their casual factors, potential solutions to the problems, ascertain sources of understanding, and assess the level of resourcing available.

⁹ Graham Bruce (2004), National Profile of Chemical Management Infrastructure in Fiji Islands

3.2 Waste Characterization of the Lami Dump

This report contained the different types of wastes that are dumped at Lami dumpsite. The wastes are from the commercial sector, households etc. The survey was done to ascertain the energy values of the wastes available at Lami dump and identify whether it is feasible to set up a plant for the conversion of waste into energy.

3.3 Waste Survey in the Municipal Councils

This survey was carried out to identify the quantity of waste that the municipal councils collect and dispose at their dumpsite. Some of the problems faced by these councils were also highlighted such as lack of financial and human resources to manage wastes more efficiently.

3.4 Country Report on Municipal Solid Waste Management in Suva and Solid Waste Characterization Study and Management Plan for the Republic of Fiji

These reports quantified the solid waste present in Suva and the approximate solid waste present in Fiji as well. The wastes that are dumped were also characterized and then quantified.

3.5 Green Peace research work done on waste in the region

This is a non-government organization that has various reports on research work done in the area of waste in the country and in the Pacific region as well.

4.0 Key Issues

- There is a need to have better implementation of recommendations from waste studies done previously.
- There is need for further research on the application of Extended Producer Responsibility in Fiji. This will require a detailed economic analysis to justify the fact the EPR will work in Fiji and will not cause any negative impact on the economy.
- Further research is needed in the area of alternative means of dealing with wastes for example having biodegradable plastics, researching on the feasibility of having a shredder for compost or recycling of PET bottles etc.
- All the recommendations from the various studies needs to be reviewed to determine its applicability in Fiji's situation.

Key Issues Paper for Working Group Four

1.0 Summary

Waste is defined as something that is rejected because it is deemed to be worthless or unneeded. It is not economical to rely totally on incineration, rubbish dumps or landfilling to solve our waste problem. We need to reduce waste to a level that we can handle at a reasonable cost, without threat to public health and within the assimilation capability of the environment.

On average every person in the Fiji produces about 0.4 kg of waste per day. At the moment most of this waste is either sent to rubbish dumps (legal/illegal) or burnt. This is simply not sustainable and there are major environmental health consequences. Our dumps are fast filling and for some town councils the possibility of identifying another dumpsite is becoming close to impossible because of land issues.

Waste in municipal dumps can be reduced by 60% if Fiji embarks on a national programme of composting. 164 million plastic bags are being used in Fiji annually. Mechanisms will have to be put in place to drastically reduce this volume. Fiji being a small island nation cannot sustain the environment if the volume of plastic bags is so huge.

There are strong economic and environmental reasons for tackling the growing quantity of waste:

- poor product design and manufacturing processes add unnecessarily to industrial costs as well as creating extra household waste;
- disposing of waste causes serious pollution; and
- well targeted government intervention to reduce the rate of growth in waste

The focus of this paper is to highlight the key issues in waste minimization. A lot of studies have been done on specific types of waste, which is the basis of this paper. There is adequate information available on the quantity of different types of waste in Fiji. This information will be useful also in prioritizing the different waste minimization initiatives.

2.0 Current Situation

2.1 Composition of Waste in a Rubbish Dump¹⁰



Figure 1: Waste Composition in a Rubbish Dump

Approximately 60% of waste (figure 1) comprises of organic matter i.e kitchen waste, garden waste etc. If organic waste is separated and used for composting more than half of the waste will not have to be sent to the dumps, therefore the volume of waste will greatly reduce. Large volumes of organic waste are the major contributing factor to foul smell that exists at all the dumps. The results from this study indicate that efforts should be put towards minimizing organic waste drastically.

2.2 Waste Electric and Electronic Equipment (WEEE)

Recently, the problem associated with WEEE has been gaining interest among government, NGOs and customers. It contains a large quantity of hazardous substances and it can cause major environmental problems if not handled properly. It is widely acknowledged that a large proportion of various pollutants found in municipal waste stream come from WEE.

More and more post-consumer products and difficult sold waste (mainly imported products with an important hazard potential) can be found in the waste stream in Fiji. Considering their increasing quantities and their potential hazards, they require specific approaches to be dealt with.¹¹

¹⁰ This data is an average of the waste characterization study of the western dumps.

¹¹ University of the South Pacific (2004), *Solid Waste Management and Recycling in Fiji and Preliminary analysis of the situation in Western region of Fiji and the handling of some difficult solid waste*, JICA Report

Table 1: Summary of the results concerning the use and the end-of-life treatment of Electrical Appliances by households

		Lower Class	Middle Class	Upper Class
Weight of equipment in use (kg/person)		25	30	63
Weight of equipment discarded annually (kg/person/yr)		1.3	2.3	2.5
Disposal behavior (% of numbers of items)	Share of equipment given for re-use	28	32	42
	Share of equipment given for recycling	0	0	0
	Share of equipment given for disposal	72	68	58

Volume of waste from electrical appliances varies from 25-63kg/person in households. The level of consumption increases with improved life style. On an average 65% of all end-of-life electrical appliances is sent for disposal either in rubbish dumps or illegally abandoned on some vacant land.

Table 2: Summary of the results concerning the use and the end-of-life treatment of Electrical Appliances from Six Organisations

	Type of Equipment	PC	Laptop	Workstations	Printer	Fax	Copier	Telephone
Weight (kg)		25	5	40	10	10	100	1
Lifetime (yr)		5	5	5	5	5	5	10
Cost of Disposal (F\$)		6	4	6	4	4	6	1
Number of items in use in 6 organizations	1 (govt)	315	350	60	300	89	222	18000
	2 (intergovt)	80	20	10	30	10	15	100
	3 (intergovt)	60	20	6	15	2	5	70
	4 (intergovt)	150	30	5	25	7	10	112
	5 (intergovt)	240	100	30	600	74	30	600
	6 (commerce)	550	10	30	600	30	30	600

The total annual quantity of Waste IT equipment from the 6 organizations is estimated to be 50 tons per year. The use of IT equipment will increase in years to come.

Currently in Fiji WEEE is usually stored for some time then:

- either re-used by others or;
- recycled internally (i.e reuse of some components for other purposes);
- or recycled by scrap metal recyclers (very limited);
- or taken to a rubbish dump for disposal;
- or abandoned on vacant land

The volume of WEE generation in Fiji will increase with the rapid change in technology and the increase in consumer demand for such goods.

2.3 Plastic Bags

According to a survey approximately **164 million plastic bags** are used in Fiji at a very low cost. Joes Farm Fresh, located in Flagstaff utilizes 480,000 plastic bags per year at a cost of 3 cents per bag. This gives a very clear indication that plastic bags are being used in Fiji on a very large scale. One of the reasons for the wide use of plastic bags is its low cost.

2.3.1 Plastic Bags and the Environment¹²

Plastic bags are suffocating the environment. In the survey of the litter on the beaches of the eastern side of the Suva Peninsula, plastic bags were seen as one of the major pollutants. **Currently plastic bags make 10% of the waste at Lami rubbish dump.**

Most members of the public surveyed indicated that plastic bags were a big problem or becoming a problem. The main reason given was because they aesthetically look bad scattered around due to bad disposal habits of the public. The study also revealed that large proportion of the public never bring their own bag shopping bag for shopping which is very evident that there is lack of awareness on the ways plastic bag consumption can be minimized. Most members surveyed reused plastic bags for carrying and storing things before it is disposed but eventually almost all plastic bags end us as waste.

The study determined that awareness of the impact of plastics on the environment, how to reduce the use of plastics and how to dispose them responsibly are the most important issues at present. The new technologies for solving the plastic bag problem are not economically feasible in Fiji.

2.4 Chemicals¹³

The National Chemical Profile for Fiji has revealed that there are huge volumes of stockpiles of chemicals in schools, tertiary institutes, hospitals, government laboratories and some industrial sites (table 3).

Table 3: Estimate of Obsolete and Waste Chemicals

Source and Type of Chemical	Stockpile Quantity
Agriculture – pesticides	> 17 tonnes
Agriculture – fertilizers and other wastes	> 6 tonnes

¹² Plastic Bag Survey – Department of Environment

¹³ Graham B (2004), National Chemical Profile for Fiji, Department of Environment

Health sector wastes	Approx. 20 tonnes
Government laboratory chemicals	Approx. 5 tonnes
Tertiary education – laboratory chemicals	Approx. 13 tonnes
School laboratory chemicals	Approx. 5 tonnes

There are no proper disposal facilities in Fiji for hazardous waste and thus there is a need to ensure that we do not have stockpiles of chemicals.

2.5 Scrap Metal, Derelict Vehicles, Batteries and Tyres¹⁴

❖ Derelict Vehicles

The report indicates that over the last decade in Fiji approximately 25,000 vehicles have become derelict. Companies like western wreckers receive derelict vehicles for reuse of parts but the body of the vehicle is stored in the yard as “junk”.

❖ Tyres

On an average about, 709,309 end-of-life tyres were produced per annum in the past six years. This corresponds to 15,318 tons of tyres. It should be noted that trucks (goods vehicles) make up more than 60% of the number and 80% of the weight of disposed tyres in a given year so special effort should be made to deal with them.

❖ Machinery

Machinery is all equipment that is used by industries, power generators, ovens, pumps elevators, excavators etc. On an average 38141 tons of machinery became derelict over the past 6 years (1999-2004). Scrap metals is able to recycle some metallic parts but otherwise these equipment are stored or illegally dumped.

❖ Batteries

Approximately 894 tons of lead-acid batteries came to end-of-life in 2003. 82% of this was collected for recycling. This is an excellent rate of return. Other environmental issues such as disposal of acid that is drained from the batteries are issues that has to be incorporated in the batteries recycling plan.

¹⁴ Institute of Applied Science (2004), *Assessment of Scrap Metals, Derelict Vehicles, Batteries and Tyres (SVBT) in Fiji*, Department of Environment

2.6 Health-Care Waste¹⁵

Wastes generated in health-care establishments may be hazardous or offensive and pose a health risk to patients, personnel in health-care establishments, workers of support services and the general public, if not handled and disposed of in a satisfactory manner. A waste survey estimated that in the Colonial War Memorial hospital generates approximately 500 kg/ day of waste and Lautoka Hospital generates approximately 70 kg/day of waste. The types of health-care wastes generated include infectious wastes, pathological wastes, sharps, pharmaceutical wastes, cytotoxic wastes, chemical wastes, pressurized containers and radioactive wastes.

In Fiji, the health risks from the mismanagement of health-care wastes are high because of unclear policies, guidelines and organizational structure, poor management practices, outdated and poor maintenance of facilities, lack of financial resources, lack of understanding of the degree of risks involved, and lack of training and capacity building of personnel involved in health-care waste management.

The major sources of health-care wastes in Fiji include hospitals, health centres, nursing stations, laboratories, clinics, research centres, blood banks, nursing homes, mortuaries and autopsy centres. Other sources include physician offices, dental clinics, cosmetic piercing and tattooing, funeral services, paramedic services and institutions for disabled persons.

Currently all health care waste are incinerated but none of the medical incinerators in Fiji meet the international standards of operation thus is a source of emission of toxic fume. The proposed policy and action plan by the Ministry of Health focuses on waste minimization and management to reduce the volume of waste going into the incinerator.

3.0 Key Issues

Detail review of the reports on waste has indicated that there is sufficient information available to make sound decisions on waste minimization. Simple awareness messages on waste minimization are not the solution. People have to be given concrete options on what to do with their waste. Any waste minimization initiative requires a lot of planning and evaluation to ensure that it is economically viable.

¹⁵ Draft Policy and Action Plan for Health Care Waste Management In Fiji, Ministry of Health

Draft National Solid Waste Management Strategy

Type of Waste and Quantity	Issues to be Considered
<p>Plastic Bags</p> <p><i>Quantity:</i> <i>approx 165 million/yr</i></p>	<p>Plastic bags are very readily available at an insignificant cost. The report on plastic bags provides some recommendations on how to minimize the use of plastic bags. One recommendation was to put a cost on plastic bags but this will have some socio-economical consequences. The industry should be involved to discuss the best approach to this.</p>
<p>Scrap Metals from Machinery</p> <p><i>Quantity:</i> <i>approx. 6357tons/yr</i></p>	<p>Lubricants should be removed from machines which has reached its end-of-life. There is a general lack of awareness in people on the options of recycling locally. Activities of recycling companies are not being given adequate recognition.</p>
<p>PET Bottles</p> <p><i>Quantity:</i> <i>approx. 44 million/ yr (for 2003)</i></p>	<p>Coca Cola Amatil Fiji Ltd is involved in collection and recycling of PET bottles to some extent. Initiatives such as these should be enhanced and made mandatory for the other companies. Department of Environment has initiated work to use economic instruments for controlling PET bottles.</p>
<p>Tyres</p> <p><i>Quantity:</i> <i>Approx. 709309/yr</i></p>	<p>Burning of tyres for minimizing waste volume needs to be stopped because of the toxic fumes that are emitted. There are proposals received by the Department of Environment for setting up to recycling plants. An economic feasibility study needs to be undertaken to ensure that this will be viable.</p>
<p>Batteries</p> <p><i>Quantity:</i> <i>approx. 894 tons/yr</i></p>	<p>Collection rate of 82% of lead acid batteries is excellent. The only concern is disposal of acid that is removed from the batteries before it is exported for recycling.</p>
<p>White Goods</p> <p><i>Quantity:</i> <i>Electrical Appliances:</i> <i>25-63kg/person</i></p> <p><i>IT equipment:</i> <i>50 tons/year</i></p>	<p>Handling of this waste is very complicated because of its nature. European data indicates that on average whitegoods are made of ferrous metal (53%), non-ferrous metal (6%), glass (2%), plastics (19%). There is no local capacity to deal with such wastes so there is a need to explore the most viable options that exists internationally.</p>
<p>Organic Waste</p> <p><i>Quantity:</i> <i>Approx 60% of the waste entering the rubbish dumps</i></p>	<p>Organic waste which is the largest volume of waste in Fiji's waste stream can be easily separated for use in compost. Fiji being an agricultural country would have a good market for compost. Though a lot of discussions has been done on this there has been no evaluation done on the type of compost systems that will be most viable for Fiji.</p>
<p>Derelict Vehicles</p> <p><i>Quantity:</i> <i>25,000 over the last decade</i></p>	<p>There are no policy in place that control the disposal of derelict vehicles. It is generally accepted that derelict vehicles are taken to the western wreckers car yard for the reuse of vehicle parts. These yards which are now full of car bodies have become an eye-sore.</p>
<p>Medical Waste</p>	<p>The draft policy and action plan for health care waste</p>

Draft National Solid Waste Management Strategy

<p><i>Quantity:</i> <i>CWM Hospital:</i> <i>approx 500 kg/day</i> <i>Lautoka Hospital:</i> <i>Approx 170 kg/day</i></p>	<p>management is a very comprehensive document which should be adopted by the Ministry of Health. There is a urgent need to minimize the waste that is at the moment incinerated.</p>
<p>Chemical stockpile</p> <p><i>Quantity:</i> <i>Approx 70 tons needs to be disposed</i></p>	<p>Existence of chemical stockpiles is a direct result of poor planning. The proposed chemical management infrastructure once implemented will control most of the chemical related problems</p> <p>*note that some obsolete agricultural chemicals have been removed as part of the Persistent Organic</p>

**Key Issues Paper for Waste Forum Working Group 5:
Improving Final Disposal, Monitoring, and Litter Control**

1.0 Executive Summary

Waste that cannot be avoided, re-used or recycled according to prevailing technical and economical conditions should be safely disposed. The Naboro landfill will be Fiji's first sanitary landfill. All other disposal sites are open dumps, which are in an appalling state. A rubbish dump management guideline needs to be established and must be made mandatory to follow.

The Rural Local Authorities (RLAs) are not able to provide adequate garbage disposal services to the rural dwellers. This in itself is a very sad state of affair as most of the people in the rural areas are throwing waste into the nearby natural water ways which is in most cases their only source of drinking water. There is a need to urgently address these problems as in the rural areas 'mini' dumps are emerging at an alarming rate. It is important to note that Fiji has a greater rural population compared to urban population.

As far as final disposal is concerned, the following options are currently used in Fiji: municipal rubbish dumps, waste incinerators¹⁶, open burning and illegal dumping. Out of these the later two has to be stopped and the first two needs to be greatly improved.

Litter control in Fiji is a major issue. Litter is no longer viewed as an aesthetic problem but rather as a broader environmental issue. An integrated approach to litter prevention is likely to be the most effective method of tackling the litter problem. Integrated approaches include education, regulatory, enforcement strategies, and financial incentives.

This paper looks at Fiji's current situation regarding final disposal, monitoring and litter control. The assistance from the municipal councils is greatly appreciated for providing all the relevant information.

2.0 Current Situation

2.1 Dumpsites Around the Country

The collected refuse is disposed off at various dump sites located around Fiji. Table 1 provides an overview of the dumps. Although some form of compaction, leveling, covering with soil and spraying with insecticide is carries out at all the sites, the actual sites can only be described as open dumps. The problems of smell, vermin, pollution and loss of aesthetics are common.

Seven of the twelve sites are located in mangrove areas. These areas are ecologically very sensitive and adjacent marine areas can get contaminated with leachates from the dump.

¹⁶ Incinerators are used in hospitals, schools and the quarantine department

A study carried out by the University of the South Pacific showed that concentrations of heavy sediments in the vicinity of the Lami dump are well above background concentrations. Other dumps are located in areas (either on reclaimed land/ adjacent to mangroves) where pollution of groundwater can occur very easily.

The location of the dumps at these sites is a result of poor planning decision which may have been influenced, in part, by land ownership issues and planning approval requirements.

2.1.1 Nadi

Currently there is no legal rubbish dump for Nadi. The Lautoka rubbish dump is being used by the Nadi town council. This could be the reason for the rise in illegal dumping cases in Nadi. Apart from garbage collection services, the council also provides services for garden refuse collection and disposal. This service is provided every 2 months and on an average 76 tonnes of garden waste is collected¹⁷. This is dumped at the Wailoaloa garden refuse disposal site, which has been approved for only garden refuse. This service is provided by council trucks and hired trucks as well and the green waste is taken to Nasau dump in Nadi which is only green waste. In 2003, the total garden waste taken to the dumpsite was 1410 truckloads.

The problems associated with the collection and disposal of waste is the non-availability of a dumpsite in Nadi. The council is currently heavily burdened in monetary terms due to cartage of waste to Lautoka. The council spends approximately \$1000 per month on dumping fees alone besides the transportation costs.

While the Nadi town council provides garbage collection service within its area, there is no such service in the peri-urban area as a result people resort to illegal dumping on beaches, along highways and roads which the council has to clean.

2.1.2 Lautoka

General Issues

The landfill in Lautoka is used by Lautoka City and Nadi Town for domestic, commercial and industrial wastes as well as waste contractors and the general public. The site is located at Lovu Lautoka about 2km away from Lautoka City. It is situated on flat reclaimed land and is about 10 ha in size. The landfill is adjacent to mangrove swamps and the sugar cane fields. Currently, only 1 ha of the landfill is being used and the remainder is covered in grass and shrubs. Lautoka City has recently contracted a company for better waste management. The main objective of this company is to separate the organic

¹⁷ Sinclair Knight Merz (2000), “Solid Waste Characterization Study and Management for the Republic of Fiji”, Country Report.

material from the waste and use it for composting. The product generated from composting will be sold in the market as soil supplement.

Environmental Concerns

There is no segregation of waste at the landfill and basically all types of wastes are accepted. The waste that is brought to the landfill is compacted daily and is covered with soil. To keep flies away and to minimize odor the landfill is daily sprayed. Nevertheless, odor is a major problem at the landfill.

The environmental status of the dumps is not up to required standards. It is very evident that there is a lot of wastewater runoff into the mangrove swamp. Since there is no control on the type of waste that enters the dump it is very highly likely that certain chemicals also get dumped at the site which also enters the waterways.

2.1.3 Sigatoka

General Issues

The dump is located near the sand dunes, along the Queens Highway, about 2 km from town on state land. The total area available for dumping is 1 ha of which 0.2 ha is in use.

Environmental Concerns

Below are some problems regarding the dump:

- sandy soil and its inadequacy that hinder the implementation of controlled disposal
- site too windy and refuse are easily blown over the area and road thus creating an unsightly scene
- creates a good breeding ground for rodents, flies and mosquitoes
- depreciation of the recreational value
- no control over the type of wastes that enters the dump
- lack of space for expansion (as expansion would cause the dumpsite¹⁸ to overlap with the sand dunes which is a tourist attraction)
- smoke from the burning waste at the dumpsite becomes a road menace for drivers, as the dumpsite is located along the highway.

2.1.4 Ba General Issues

The Ba dumpsite is located in Maruru. It is situated in a hilly area in a pine forest approximately 7km away from the town center, outside the urban boundaries. Sugar cane plantation and farms surround the dumpsite. The dump is situated in a forested lowland about 5 km from town on state land. About 5 ha of land is available for dumping of which 1 ha is being used. It is located away from residential areas so does not pose any

¹⁸ Waste Survey, Department of Environment 2004

health problems. It is inland and away from natural waterways thus has very little environmental impact

Environmental Concerns

Like all the other dumps garbage is covered and to a certain extent compacted. There is no lining on the pit surface to prevent waste water seeping into the ground water. Therefore the only type of pollution is leachate into the groundwater.

2.1.5 Tavua

General Issues

The rubbish dump is located in an open cut area of the Emperor Gold Mines, Vatukoula. 2 ha of land is available for dumping of which 1 ha is being used. The site is mostly surrounded by sugar cane fields. The site is generally rocky but has been filled in with clay filters. Currently the dump is used by Vatukoula and the Tavua town rate payers. Illegal dumping of garbage in the town area is a major problem for Tavua. In most of the cases the offenders are not from the Town area.

Environmental Concerns

There are no major environmental problems associated with the dump. There are ample trenches on site which is where rubbish is buried. The bottom of the pit has a clay lining to avoid seepage of any contaminated water into the ground. The dump is maintained by Emperor Gold Mines.

Dumping at the Lami dump (LD) site started in 1945. LD is controlled and operated by the health department of the Suva City Council. It is located just outside the perimeter of the Suva City and caters for domestic, commercial and industrial waste. The dump is located next to the Tamavua – I – Wai River on flat land, adjacent to mangrove swamps. There is no segregation of waste at the landfill and all types of waste are accepted.

Lami dump will be closed once the Naboro landfill is in operation. At the moment the dump has reached its full capacity and has become a serious threat to the environmental and peoples health.

2.1.7 Navua⁴

General Issues

The dump is situated on a reclaimed land located about 2km away from the Navua town at Wainidugogu. There is no waste segregation practiced at the dumpsite and an average of 5 tonnes of waste are dumped at this site per week.

Environmental Concern

- As the dumpsite is located adjacent to mangrove swamps, it is evident that there is a lot of wastewater running into adjacent waterways.

2.1.8 Naboro Landfill

In 1997, the Government identified the Naboro site as a suitable landfill site and undertook preliminary studies which confirmed its suitability. About the same time the European Union agreed to fund the construction of the new landfill to best international standards.

The over-riding requirement at Naboro is to ensure that it is managed from Day 1 to 'Best Practice Landfill Management Standards'; the ancestral landowners themselves have confirmed the importance of this – at a workshop in Suva in August 2003.

The landfill will be developed in five stages, the first stage of the landfill site itself which has been constructed to receive waste is over 3 ha in area and this has been lined with three layers of clay so that all the pollution causing leachate does not leak out, rather it will be collected and treated. It is expected that the first stage will be filled in 5-7 years and the Naboro site will be an active landfill for approximately 50 years. In addition to the landfill site, an office, a weighbridge and garage has been constructed, as well as a multi-purpose area to be used for special waste storage, recycling or other requirements of the operator. The incoming operator will install the leachate waste treatment ponds.

Government is determined to ensure that operation of the Naboro Landfill is to a very high standard, such that the example of Lami Dump is not repeated at Naboro. Since Naboro is the first such landfill in Fiji, there is an absence of the required expertise and government wishes to ensure that an operator with professional expertise can be appointed.

3.0 Common Issues on Solid Waste (SW) Collection Systems

In all the municipal councils, SW collection and disposal is contracted to private firms. The private firms use either grill – fitted lorries, or simple and modern compactor trucks. Collection of garbage is commonly done three times a week while, green waste are generally collected once a month.

3.1 Garbage Collection Rate

The collection of taxes associated to solid waste collection and disposal differs between cities / towns and Rural Local authorities (applicable for those rural local authorities which do provide collection services).

All the municipal council charge the garbage collection rate in the general rate collection (the city or town rate) system without informing the ratepayer except for Nasinu Town Council, which informs the ratepayer of the separate fee for the collection of the garbage.

Rural Local Authorities on the other hand do not usually collect garbage. However in Sigatoka waste collection is done, money is collected through committees for the non-ratepayers for example the squatter area. In Suva, waste is collected by the Rural Local Authority for non-town areas; for example, in Wailea collection is done on humanitarian grounds. The rural local authorities of Navua and Rakiraki provide collection for the town area only.

3.2 Types of Rubbish Collected

The most common types of rubbish collected from both the rural area and the municipal boundaries are:

- Household wastes
- Green wastes
- Commercial waste
- Industrial waste

3.3 Waste Characterization

None of the Municipal Councils practice waste separation.

3.4 Use of the Rubbish Dump/ Type of Security

Following are the main types of security present at the dumpsites:

- ❖ Dump attendants or security guards: to ensure that general public and scavengers do not abuse the dump site by
- ❖ Fence: to prevent entry of stray animals

3.5 Problems Encountered During Rubbish Collection for Final Disposal

Some of the most common types of problems encountered during rubbish collection are

- Stray animals
- Improper bags and bins
- Garbage collectors are abused by the public

3.6 Incineration and Open Burning

Incinerators and open burning have adverse effects on the human health and the environment.

Open burning of waste is practiced in rural areas on a large scale as in most cases it is the only option for disposal.

Incineration is an option practiced mostly for medical wastes. At CWM hospital, the largest hospital in Fiji, all infectious wastes and sharps are burnt in the incinerator. Some of the major findings are as follows:¹⁹

- There is no record being kept by the incinerator operator on the amount and types of the wastes being incinerated and as a result, there is a possibility that some of the infectious wastes are not treated here.
- The incinerator is extremely under-capacity as it has to also receive wastes from other hospitals and health centres in the Division.
- The incinerator has a single chamber and fueled by diesel. A diesel injection points are located within the primary combustion chamber to burn the wastes and another fuel injection point is located above the chamber, presumably for complete combustion of the gases. **The wastes are fed into the chamber manually and the ashes are also manually emptied.** This method is highly risky to the workers as they are exposed to contamination of not only infectious contaminants but also hazardous chemicals in the ashes. The workers are not aware of the danger and risks they are exposed.
- The incinerator is relatively old and this has definitely affected the combustion efficiency. This could be seen with the emission of smoke and in many cases the smokes are black, an indication of poor combustion process.
- The location and safety level of the incinerator is **EXTREMELY** risky and unacceptable. Both the diesel fuel tank and the incinerator have no security fence and both could be accessed easily by unauthorised personnel. Chances of unforeseen circumstances including disaster of diesel-tank explosion and tampering of the incinerator are very high.
- Incinerator and diesel tanks are located next to the hospital laundry and they are also within a few metres to the childrens ward and this condition is highly dangerous and risky. There is an urgent need for the hospital management to provide the tightest security fence around the fuel tanks and also the incinerator. In the longer term the incinerator should be relocated to other safer place, preferably outside the hospital compound.
- There are smaller incinerators located in smaller hospitals and also health centres but most of them are too old. The location of these incinerators is also unacceptable as they could pose direct health and safety risks to the general public.
- In smaller establishments such as the nursing stations, the health-care wastes are burnt in metal drums, concrete drums and open pits. Some establishments bury their wastes within the compound. All these practices are not properly regulated and no minimal safety procedures are provided. One open-pit where the wastes are burnt is located on the higher ground and this practice could cause contamination of ground water.

¹⁹ Draft Policy and Action Plan for Health Care Waste Management In Fiji

- The ashes from the incinerator and possibly sharps and other infectious untreated wastes are disposed of at the dump site. A visit to Suva dump revealed the following findings:
- It is an open dump with very minimal control on the types of wastes being disposed.
- All wastes including the incinerator ash and other health-care wastes are dumped together with the municipal wastes. A dedicated dumping site allocated for the ashes and health-care waste has never being used.

The problems with the incinerator at CWM is similar to all other medical waste incinerators in Fiji. The quarantine department also has an incinerator located at the Nadi International Airport which is not being maintained properly thus having mechanical problems.

4.0 Litter Control

The Litter decree empowers the municipal councils to charge offenders who litter by the on-spot fine of \$40.00. It is very clear from the state of our towns and cities that this decree is not effective.

4.1 Loopholes in the Litter Decree and Reasons for Ineffective Implementation

Currently the Litter Decree is being reviewed by the Department of Environment.

The Municipal Councils have identified certain loopholes in the Litter Decree. It was appropriate for them to identify these loopholes, as they are the authorities that have the powers to implement and monitor this decree. Other reasons for its ineffective implementation was also highlighted:

- Lack of financial and human resources
 - No powers of arrest
 - Unable to charge the offenders traveling in vehicles
 - Fines are too low thus, the decree is not effective
 - False information provided by the offenders
- Improper channel being followed in the process of arrest of offenders therefore they are acquitted easily.

4.2 Scattering of Garbage on the collection day

Rubbish is scattered around on the collection day and according to the Municipal Councils and the Rural Local Authorities this is mainly due to:

- Use of proper rubbish bins with tightly fitting lids
- Stray animals
- Not enough awareness for the general public on how to keep the garbage out for collection.

4.3 Monitoring

The Health Inspectors are in charge of implementing, monitoring and enforcing the Litter Decree and the Public Health Act. These are the two laws, which have relevance to waste and need monitoring.

Survey has shown that the number of health inspectors to the population size is extremely small (table 2)

Table 2: Ratio of Inspector to population size

Town/City Council	Ratio
Suva	1: 25000
Lami	1:20,000
Sigatoka	1:10,000
Nadi	1:8000
Lautoka	1:20,000
Ba	1:15,000
Tavua	1:5,000
Nausori	1:10,000

Thus, it becomes very difficult for the health inspectors to carry out the inspections effectively, as apart from monitoring they have other variant roles to play as well.

4.4 Roles of Health Inspectors

Generally, the roles of the health inspectors in the Municipal Councils and in Rural Local Authority are as follows:

- Enforcement of the Public Health Act
- Carry out health education in Schools and in the communities
- Organizing clean up campaigns and awareness programs
- Development Control
- Enforcement / Prosecution

5.0 Key Issues

Issues of concern have been highlighted in the various sections of this paper. Below is a summary of the key issues.

5.1 Final Disposal

5.1.1 Lack of Financial and Human Resources

To improve final disposal the municipal councils need more financial resources and human resources. Some of the needs highlighted were:

- better transportation from the collection point to the dumpsites as some dumpsites are located at a distance from the towns or cities.
- existing dumps to be made more secure (fenced and site attendant) to prevent the problem of animals and scavengers entering the dumpsites
- need for compactor trucks to enable municipal councils to compact the waste before covering with soil.

In Rural Local Authorities, more health inspectors need to be employed to enhance education and awareness on waste management. The current financial capacity does not allow Rural Local Authorities to undertake effective work on waste management

5.1.2 Absence of Waste Management Systems

None of the dumpsites have a management system to abide by. There is a need for a standard guideline on rubbish dump management to be established so that waste management at the dumpsite becomes easier.

5.1.3 Absence of Waste Separation at the Dumpsite

Currently waste separation or characterization is not being practiced at the dumpsites. Due to this, the dumpsites are filling up at a fast rate and the need to expand the dumpsite area keeps arising. If only organic waste is separated to be used in compost, the volume of waste going into dumps will reduce by 60%.

5.1.4 Public Attitude

Under the Public Health Act, proper garbage bins of specific specifications are required to be put at the roadside for collection of garbage. However, people tend to put the garbage in plastic bags which are easily destroyed by stray animals leading the garbage being scattered all over the place.

People tend to put out any and every kind of rubbish for collection and in improper bins which could be due to lack of awareness. They are also not cooperative and generally have a negative attitude towards the workers of the Municipal Councils who do the rubbish collection.

5.1.5 Incinerators

None of the incinerators meet the standards required for efficient combustion of waste. Waste of all kind is incinerated at the hospital and by the quarantine department. All the incinerators were installed without any consultation to determine its suitability. Fiji lacks the technical expertise regarding incinerators and operators are normally not well informed.

5.1.6 Open burning and Illegal Dumping

Open burning is an option utilized for waste disposal mainly outside the collection area of the town/city councils. It is practiced at the dumpsites as well. The fume emitted from this are an health concern as some toxic fumes are known carcinogens, for example Dioxin and Furans.

Waste that are not accepted at the dumpsite, are disposed unlawfully by the public. Certain wastes are also dumped off at the roadsides and backyard and even in the coastal areas.

5.2 Litter Control

5.2.1 Loopholes in the Litter Decree

The loopholes in the litter decree make litter control difficult. These loopholes have been identified in section 4.1. The Department of Environment in consultation with the municipal councils is reviewing the litter decree.

5.2.2 Lack of Awareness, Enforcement and Monitoring of the Litter Decree

Another factor affecting litter control is the lack of enforcement and monitoring of the litter decree. This is usually because councils do not have sufficient officers for monitoring and there is ignorance and lack of awareness of this decree by the public and to a certain extent by the authorities as well.

5.3 Monitoring

5.3.1 Low Ratio of Health Inspectors to the Population

In certain cases, there is only 1 Health Inspector to about a population of 25,000 people. It becomes very difficult to monitor offenses of Littering by the public under the Litter Decree and other offences under the Public Health Act.

Key Issues Paper Working Group Six

1.0 Summary²⁰

The environment and economy are inseparable elements. A country's economy can be made into an instrument to deal with the betterment of the environment. For the society to maintain a sustainable economic society, one must change the current economic social system to integrate consideration for environmental preservation.

Today's environmental problems stem from normal socio-economic activity and an increased pressure on the environment caused by the society's daily lifestyle. The problems are spreading on a global scale, causing concern about the long-term impact on future generations. Economic instruments enable everyone to share the burden evenly.

The resources that the society uses from the environment for the development of its economy is not free as is the general line of thought. It is important that with the use of each resource, price for its replacement or its disposal be included. Furthermore, policy measures are required to heighten awareness of how economic activities impact the environment, and to ensure that this impact is carefully considered when economic activities are conducted. In order to enable such views to be reflected in the decision-making process, against the backdrop of the countless number of daily economic activities, it becomes necessary to use economic instruments that take advantage of the market mechanism. Regulatory measures alone are not sufficient.

More concretely, around the world there are methods such as taxation, surcharges, emission permit trade, and deposit-refund systems that are already being carried out, reflecting an awareness of the need for consideration for the environment in the price of goods and services - the basic underlying principle of a market economy. Economic instruments internalize the cost and preserve the effect of the consideration needed to preserve the environment. They are considered effective instruments to change society as a whole into a sustainable one. It is necessary to take advantage of the effects of such instruments by combining them with the Basic Environment Law and Basic Environment Plan.

²⁰ Yurie Kawabata (2004), The economic instruments for waste and recycle treatment in Japan- The introduction of Japanese case-

2.0 Current Situation

2.1 Situation in Fiji:

At present Fiji does not have any taxation system in place to account for the disposal of any goods. There are goods, which end up as waste, and finance is needed for their proper disposal. The excise duties that are in place currently do not account for the disposal of the items.

There are certain items, in the country, which have been identified as needing some form of economic incentive or pricing to incorporate their disposal costs. These items are: derelict vehicles, tyres and batteries, construction and demolition waste, white/ electrical goods, plastic bags, snack packets, tin cans, green waste and PET bottles.

Table 1 Below Shows Some Items and Current Excise Duties Placed On Them²¹

Category of Waste	Incentive/ Economic Pricing
1. Derelict Vehicles	New Vehicles attract 27% duty plus VAT Old vehicles attract 27% or specific rates of duty.
2. Tyres and Batteries	Small primary cell batteries attract 3% duty. Larger motor vehicle batteries attract 27% duty plus VAT.
3. Construction and Demolition Waste	No disincentive or legislation is in place to control or manage demolition waste.
4. White/ Electrical Goods	Generally, all electrical/ white goods attract 27% duty.
5. Plastic Bags	Attracts 27% VAT or \$0.54 per kg whichever is greater.
6. Snack Packets	attracts 27% plus VAT
7. Tin Cans	Small tin cans 35% duty. Large sized can attracts 27% duty plus VAT
8. Green Waste	No incentives/ disincentives
9. PET	attracts 27% plus VAT

2.2 International Situation

2.2.1 An Example of Incentives in Waste Management in Donegal in Australia²²

“A primary way to incentives waste reduction is to introduce variable charging for waste presented for collection, or Pay as You Throw (PAYT) schemes. Two basic Pay as You Throw Schemes exist, the tag a bag system, by which

²¹ Ulu Tuimasi, Ministry of Finance

²² <http://www.voice.buz.org/waste/donegal.html>, date accessed: 01/10/04

residents pay for each bag set out for the charge by the weight or volume system, where residents pay higher fees for larger or more bins or the weight of rubbish in their bin.

Currently in Donegal, householders are charged directly by collectors by either a tag a bag system or annual payment. Hence potential already exists to introduce incentives for recycling and composting of materials and it is recommended that the council investigate the potential to expand the variable charging system throughout Donegal as Flat based charges do little to promote waste reduction. PAYT schemes, as with all regulatory measures, are most effective when introduced after adequate infrastructure is in place to provide communities with a real alternative. Of course, the costs for curbside collection for recyclables should be significantly lower than that for rubbish collection. As the population of Donegal is predominately rural, it should be noted that international experience has shown that communities with PAYT waste fees are particularly successful in getting residents to take their recyclables to drop off centers when curbside is not available.

Landfill bans are also another impetus for communities to develop alternative ways of dealing with certain materials. It is recommended that the council considers banning certain materials which are easily recycled, such as the organic fraction, and those materials for which markets currently exist, with a view to expanding the types of material banned at a later date.”

2.2.2 Example in New Zealand²³

Waste Levies and Economic Instruments

The Local Government Act 1974 requires territorial authorities to allocate the costs incurred in the implementation of their waste management plans in such a way that effectively and appropriately and appropriately promotes the objectives of the plan. Territorial authorities may allocate costs through the use of economic incentives and disincentives that promote waste minimization. The Act also enables councils to use financial tools such as levies, to increase disposal charges and thereby create an incentive for waste minimization.

Examples of the use of economic incentive/disincentives include:

- Subsidizing the cost of recycling services and facilities (for example green waste composting facilities);
- Collection charges based on the weight of refuse or volume of collection container;

²³ http://urscorp.co.nz/projects/waste/waste_08.htm, date accessed: 01/10/04

- Using levies to increase disposal charges to both pay for waste minimization activities and create an incentive for waste reduction;
- Bans on the disposal of some types of waste (for example, green waste);

2.2.3 Example in Small Island Developing States²⁴

“The private sector has become actively involved in recycling biodegradable and non-biodegradable materials in some Small Island Developing States for example Kribati. Economic incentives to reduce particular wastes, such as a deposit refund system for cans and bottle, are in use virtually in all regions.”

3.0 Organizations and Ministries Contacted

The following organizations and ministries have been contacted to inquire about the existence of any form of economic incentives or disincentives in place:

- Ministry of Finance and National Planning
- Consumer Council of Fiji
- Scrap Metals Fiji Ltd
- Fiji Islands Trade and Investments Bureau
- Ministry of Commerce, Business Development and Investment
- Waste Recyclers
- Fiji Islands Revenue and Customs Authority
- Pacific Batteries

Apart from Ministry of Finance none of the other organizations or ministries were able to highlight any taxes or duties currently in place to manage wastes. This is due to the non-existence of any such taxes or duties.

3.0 Key Issues²⁵

- The non-existence of any form of economic incentive/ disincentive for the management of waste is a main key issue. The existing incentives/ disincentives in place for certain goods need to be reviewed by the relevant government ministries and local governments.
- There are no incentives provided for alternate means of waste management for example incentives on recycling by the government. Though a large quantity of waste is generated which can be recycled, the

²⁴ <http://islands.unep.ch/d99-6a2.htm>, date accessed: 01/10/04

²⁵ Prasad Shailendra (2004), Efficient Pricing/ Economic Incentives

quantity is not sufficient to set up recycling plants in the country. Incentives are needed for the collection and export of recyclable wastes.

- There is no limitation on the amount of waste that is collected by the municipal councils at the moment. Having a limit on the amount of waste to be collected and charging a levy on the extra amount will act as a disincentive.
- Products that are imported either singularly packaged or multi packaged at present attract the same amount of import duty. Multi-packaged products eventually lead to greater amount of waste and higher import duties on such items will act as a disincentive.
- Plastic Bags presently are being used by the public regardless of the amount. These add on to the problem of waste management. Having a levy on plastic bags will force the consumers to reusable bags.
- New businesses currently do not have any tax concessions. Businesses are coming in and compounding the waste problem. Tax concessions need to be offered to new businesses and enable them to come up with sound environment management practices proposals.
- The acts and legislations relevant to waste at present are not enforced effectively. Some of the penalties are not adequate to act as a deterrent. Small breaches are mostly not investigated. All breaches need to be investigated and the fines need to be relative to the volume and type of waste. The penalties must complement the offences.

Key Issues Paper for Group 7:
Infrastructure, Services and Collection Systems

1.0 Summary

It can be said that solid waste management is the main environmental issue for Fiji. Unfortunately the facilities for the management and disposal of waste have not been developed in parallel with Fiji's increasing economic and industrial growth. While the waste stream has increased in volume and complexity because of the change in consumer patterns, the waste management systems have not developed accordingly.

There needs to be a thorough evaluation of the existing facilities, and ways in which their efficiency can be improved, need to be identified. The current system of waste collection has painted a negative picture in the public mind and new collection systems will remain difficult to find unless management is improved.

Rapid industrialization and urbanization has not been accompanied by the necessary infrastructure, services and collection system changes that are necessary for efficient waste management. The volume and complexity of the waste stream has increased and can no longer be managed by the existing institutions and management practices. This report will review Fiji's existing infrastructure, services and collection system and will identify key issues of concern for which appropriate action plans will have to be developed.

2.0 Current Situation

2.1 Storage and Collection

The collection of solid wastes for disposal is the responsibility of local authorities that provide collection services of up to three times per week to residential areas. Covered compactor trucks are used by some authorities whilst others use open trucks. Waste at the household level is stored for collection in various ways:

- Garbage bags
- Plastic shopping bags
- Plastic or metal garbage bins with lids
- Tins and containers improvised as garbage bins, often with no covers
- Roadside heaps

Independent contractors such as Williams and Goslings, Waste Care (Fiji) Ltd, Waste Management (Fiji) Ltd operate waste collection services, used by many commercial enterprises and industries, which generate high volume wastes.

Many bulk items such as derelict vehicles (extremely difficult, it costs to fix), household appliances and furniture are sometimes abandoned in backyards or in unoccupied blocks of land. There are very limited quantitative records of the nature and amounts of solid waste generated.

2.2 Disposal of Municipal Waste

The collected refuse is disposed of at various dumpsites located around Fiji. Table 1 gives an overview of the characteristics of the dumps. Although some form of compaction, leveling, covering with soil and spraying with insecticide is carried out at all the sites, the actual sites can only be described as open dumps. The problems of smell, vermin, pollution and loss of aesthetics are common.

Seven of the twelve sites are located in mangrove areas. These areas are ecologically very sensitive and adjacent marine areas can get contaminated with leachates from the dump. A study carried out by the University of the South Pacific showed that concentrations of heavy sediments in the vicinity of the Lami dump are well above background concentrations. Other dumps are located in areas where pollution of groundwater can occur very easily.

The location of the dumps at these sites is a result of poor planning decision which may have been influenced, in part, by land ownership issues and planning approval requirements.

2.3 Disposal of Difficult Solid Waste

2.3.1 Tyres

Currently tyres in Fiji coming to an end-of-life are:

- retreaded
- used as material for reclamation
- openly burnt to decrease volume
- used as fuel to burn trees and in some small scale boilers (e.g to prepare feed for pigs) or
- disposed of in rubbish dumps or in the sea

Over the past 6 years on average about 709,309 end of life tyres were produced per annum which corresponds to about 15,318 tons of tyres. Tyres can be shredded for landfill as well

2.3.2 Batteries

Some of the end-of-life lead acid batteries are collected by several recycling companies (mainly Scrap Metals Fiji Ltd and Waste Recyclers (Fiji) Ltd) and by the local manufactures. The local manufacture of lead-acid batteries encourages the collection of batteries by giving the customers a discount on new purchasers. The estimated quantity of of end-of-life lead acid batteries in Fiji over the past 6 years is 264,278.

About 732 tons of lead-acid batteries were collected in 2003. Considering 894 tons of batteries coming to end of life (figures are unlikely: more like 550 tonnes are collected and exported), in can be said that 82% of batteries were recycled.

Batteries are not the problem, it is the acid contained in them. Waste Recyclers Fiji Limited is currently investigating a neutralizing facility for acid.

2.3.3 Whitegoods

Handling of this waste is very complicated because of its nature. European data indicates that on average whitegoods are made of ferrous metal (53%), non-ferrous metal (6%), glass (2%), and plastics (19%). There is no local capacity to deal with such wastes so there is a need to explore the most viable options that exists internationally. Currently in Fiji Electrical Appliances wastes are generated at the rate of 25-63kg/person and waste IT equipment is generated at 50 tons/year

Currently Waste Recyclers Fiji Ltd can take old stoves and washing machines made of metal, plastic, insulation in refrigerators is difficult. However, if a cost is evident they can be exported.

2.4 Private Waste Contractors

Williams & Goslings Ltd offers a waste collection service in Lautoka, Nadi, Denarau, Vuda and Ba using two sizes of skip bins (3.7m³ and 1.5 m³). They are used by hotels, offices, island resort, sports clubs, and villages outside the city or town boundaries that do not have municipal collection, the airport, and industries such as soap factory and Post and Telecommunications.

Glass bottles, especially the beer bottles are collected by special bottle lorries from the residence of public and the public is paid a particular sum of money for the number of bottles they refund.

Much of what goes into skip bins is recyclable if it can be isolated and it can be isolated. Waste Recyclers Fiji Ltd is currently investigating system of collection of glass bottles to storage (export).

2.5 Solid Wastes from Industrial Activities

Considerable amounts of solid wastes are produced by industries and disposed of at municipal dumps. Significant industries that have alternative arrangements are sugar mills, saw mills and the gold mine.

There is scrap metal recycling for most metals, including copper, aluminium, brass, zinc, lead, stainless steel, also batteries (part of the battery), air conditioners and radiators. There are three scrap metal businesses operating in Lautoka: Scrap Metal (Fiji) Ltd, Waste Recyclers Ltd and IA Traders. Ferrous metals are collected but stored at present as the market price of steel is too low to make export for recycling viable.

There is paper and cardboard recycling carried out – collection by Waste Recyclers Ltd, transport to Suva for baling and shipping to Australia.

All the Municipal councils except for Levuka hire out contractor trucks from private companies. Levuka Town Council use their own compactor truck.

2.5 Waste Collection in Rural Areas

There are no garbage disposal service provided for the people in the rural areas. The methods used to dispose garbage are:

- ❖ dumping into rivers or creeks
- ❖ dumping on vacant pieces of land
- ❖ burning and
- ❖ burying.

All the above methods have great negative environmental consequences. This does not only have environmental effects but it also causes a lot of health problems like dengue fever. Though there is provision in the Public Health Act regarding garbage disposal in rural areas, nothing is being done.

There has been no study done to in the rural areas to determine the type and quantity of waste generated. There is very little initiatives by the government in assisting the rural communities for better waste management.

2.6 Naboro Landfill

In 1997, the Government identified the Naboro site as a suitable landfill site and undertook preliminary studies which confirmed its suitability. About the same time the European Union agreed to fund the construction of the new landfill to best international standards.

The over-riding requirement at Naboro is to ensure that it is managed from Day 1 to 'Best Practice Landfill Management Standards'; the ancestral landowners

themselves have confirmed the importance of this – at a workshop in Suva in August 2003.

The landfill will be developed in five stages, the first stage of the landfill site itself which has been constructed to receive waste is over 3 ha in area and this has been lined with three layers of clay so that all the pollution causing leachate does not leak out, rather it will be collected and treated. It is expected that the first stage will be filled in 5-7 years and the Naboro site will be an active landfill for approximately 50 years. In addition to the landfill site, an office, a weighbridge and garage has been constructed, as well as a multi-purpose area to be used for special waste storage, recycling or other requirements of the operator. The incoming operator will install the leachate waste treatment ponds.

Government is determined to ensure that operation of the Naboro Landfill is to a very high standard, such that the example of Lami Dump is not repeated at Naboro. Since Naboro is the first such landfill in Fiji, there is an absence of the required expertise and government wishes to ensure that an operator with professional expertise can be appointed.

The Naboro Landfill Project at the Ministry of Local Government considered for a long time and consulted widely as to how to best ensure that the Kalokolevu community could become meaningful participants in the project. Government is also very keen for the community to become involved in the project as business partners and will assist where possible in opportunities for associated businesses at Naboro for the Kalokolevu community.

2.7 Extent of Recycling

There is a limited amount of recycling of materials, which would otherwise enter the waste stream:

- A number of drink manufactures (soft drinks, beer, etc) are involved in ventures whereby glass bottles are bought back for reuse.
- Waste recyclers (Fiji) Ltd collect used papers from offices and educational establishments for export to Australia for recycling. Selected types of paper are collected
- Scrap Metals (Fiji) Ltd has been set up recently to collect and export aluminum cans and possibly other types of non ferrous metals for recycling
- Abandoned cars are taken by western wreckers for re-useable parts

The above recycling operations are not adequately developed to cover all areas of Fiji, and even in areas where their services are available. Given the right type of conditions, including support from government, there is considerable scope for effective recycling ventures to be established. These items can be exported for recycling by the those companies with the facilities.

2.8 Incinerators

For the purpose of this paper, an incinerator refers any structure used to burn waste. In Fiji, incinerators are found at hospitals, quarantine department, government printers and schools. For the first four places the structure has a burner, furnace and chimney with some fixtures and fittings to control the burning. In schools however, incinerators are normally made of a 44 gallon aluminum drum. (Do not need to burn)

A recent study conducted by the Department of Environment has confirmed that the medical waste incinerators do not meet any international guidelines. By products of incinerators are toxic fumes, which are known carcinogens.

2.9 Community Waste Management Initiatives

The International Waters Project or IWP at the Department of Environment is working 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 organizations 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 [19], 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 is also assisting the Government in the development of the liquid and solid waste management strategy.

At national level IWP is working 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.

3.0 Key Issues

The key issues related to infrastructure, services and collection systems are:

- The rural local authorities and Ministry of Regional Development and Fijian Affairs need to be strengthened so that garbage collection services

can be extended to the rural areas as well. It has to be noted that 60% of Fiji's population live in the rural areas and do not get any garbage collection services.

- There is no separation of waste at source which leads to contamination of recyclables
- All rubbish dumps are an environmental and health hazard
- A regional landfill is needed for the western division.
- Incineration at schools is extremely dangerous and needs to be stopped (not just schools but Parliament house and many government departments and the Ports Authority as well)
- Waste minimization is not practiced in Fiji adequately thus puts an overload on the existing infrastructure, collection and disposal system
- Community level activities need to be enhanced and supported by the rural local authorities and Ministry of Regional Development and Fijian Affairs.

Fiji National Solid Waste Strategy 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

- 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

This revised format is amenable to critique and suggestions and should only be put into the final draft of NSWMS with the approval of stakeholders.

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

Objectives

1. Collate and consolidate current available national data on all waste streams and identify gaps and means to collect required data by June 2006
2. Identify appropriate waste minimization options for solid waste by June 2007
3. Strengthen and add-value to efforts by individuals and the private sector to recycle and reprocess recyclables for overseas markets by December 2006
4. Assist municipal councils and local rural authorities to enhance their solid waste collection systems by 2009
5. Explore the means to better manage solid waste in rural areas by June 2007
6. Upgrade current dump sites in urban centres by 2009

Objective 1: Collate and consolidate current available national data on all waste streams and identify gaps and means to collect required data by June 2006.

- 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 2007.

- Identify waste minimization measures that applicable to urban and rural dwellers, so as industries for ubiquitous²⁶ 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 2006

- 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 policies 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 2007

- 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 in *bullets i and ii*
- 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 dump sites 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

Objectives:

1. To identify all major gaps, overlaps and conflicts and collate recommendations from legislative reviews on waste legislation carried out so far in Fiji by June 2006 and develop effective policies to ensure that these gaps, overlaps and conflicts are addressed on issues related to waste.
2. Clarify the roles of Government ministries and departments with respect to the NSWS by the end of 2005

Objective 1: To identify all major gaps and recommendations from legislative reviews on waste legislation carried out so far in Fiji by June 2006 and develop effective policies and hence identify any new gaps and overlaps in and between legislations related to waste.

Objective 1

- 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 NSWS by the end of 2005

- 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 NSWS which includes communities

Objectives:

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 2007
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 2006 (*to be implemented with pilots*)
3. To implement targeted research as part of pilot projects on waste minimization (*bullet 2, objective 2, Direct Measures*), extended producer responsibility (EPR), User pay system and the recommended areas identified in Direct Measures (*bullet 2, objective 1*) by December 2009
4. To raise public awareness about the NSWS and solid waste management issues in general through out the lifetime of the strategy in particular involving communities and encouraging co-management at community level. (2005-2009)
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 (2005-2009).
6. To carry out research and identify appropriate technology in waste minimization for the country.

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 2007

- 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 (*bullets i & ii, 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 2006 (*to be implemented with pilots*)

- Develop a community training guide on better solid waste management and hold pilot training for villages identified in (*bullets i & ii, objective 5, Direct Measures*)

- Revise the community training guide based on feed-back 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 (*bullet 2, objective 2, Direct Measures*), extended producer responsibility (EPR) and the recommended areas identified in Direct Measures (*bullet 2, 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 (*bullet i, 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 NSWS and solid waste management issues in general through out the lifetime of this strategy (2005-2009)

- Develop and implement an integrated communication plan for NSWS
 - (a) Raise public awareness about NSWS 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 (*bullet iii, objective 2, Direct Measures*) on annual basis
- Incorporate lessons learnt in the following year or immediately depending on each specific situation

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.

Objectives:

1. To put in place economic incentives and disincentive mechanisms that supports recycling activities by December 2009
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

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 (*bullet 1, objective 3, Capacity Building and Awareness Raising*) and other relevant studies such as the one referred to in *bullet 1* of 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