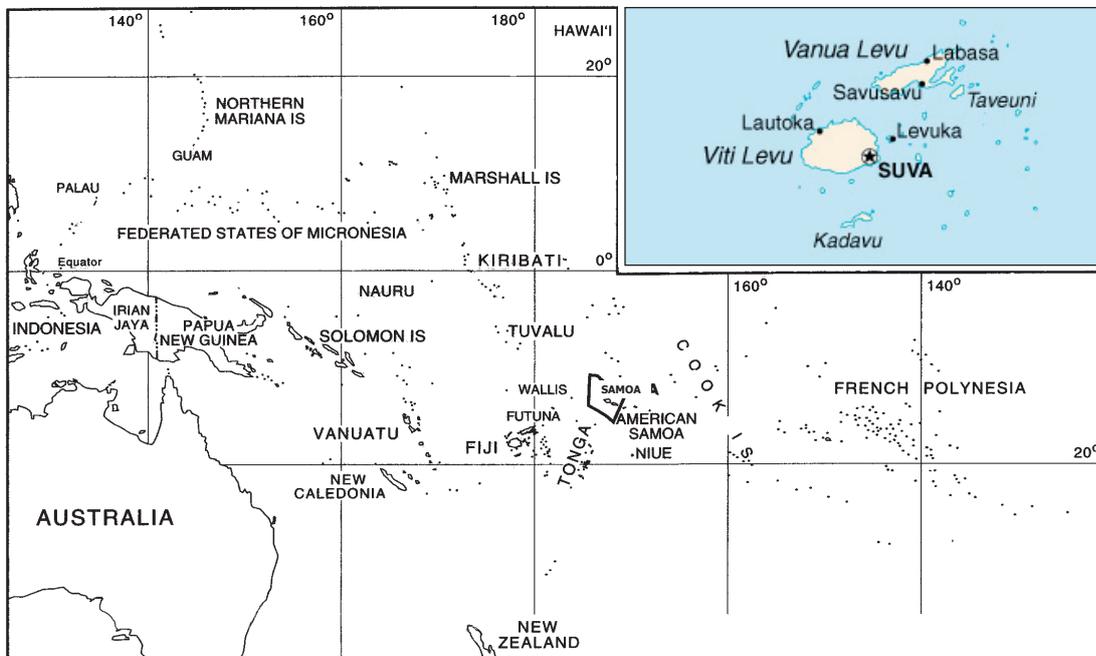


Suva





Suva, Fiji

Old and new landfills in Suva, environmental analyses, financial aspects, land use concerns.

Mr. Peni Gavidu, *Deputy Permanent Secretary for Local Government, Housing, Squatter Settlement and Environment SUVA, Fiji Islands*

Fiji's institutional and legal framework concerning urban services, urban management and their financing. Waste management and landfills, past and present; relationships between waste and urban development.

Mr. Enrico Strampelli, *First Secretary (Engineering) Delegation of the European Commission for the Pacific*

The environment programme for the greater Suva area: a donor perspective.

Chair: **Dr. Nola Kate Seymoar**, *Director, International Center of Sustainable Cities, Vancouver, Canada*

Ms. Rusieli Taukei, *Nurse, representative of the Civil Society*

Point of view of the inhabitants and their involvement in the decision processes. How do the local population benefit from this project?

Mr. Peter Heckel, *Project Manager, Hydroplan Ingenieur-Gesellschaft mbH*

Evaluation of the whole process. How were and are managed the three main priorities; waste and environmental and social risks; support of the plans by the community and what are the measures which give the best value for money?

Discussion on the Suva case. ■





Fiji's Institutional and Legal Framework and their application for Waste Management

Mr. Peni Gavidu

Deputy Permanent Secretary for Local Government,
Housing, Squatter Settlement and Environment
SUVA, Fiji Islands

Introduction

In addressing this very broad topic, the paper takes a brief look at the background information on the country in particular the number of islands that are inhabited to demonstrate the physical constraints to the establishment of local government and the provision of infrastructure services; and the rate of urbanisation to demonstrate that urbanisation problems and issues are a fact of life and need to be given the attention that they deserve.

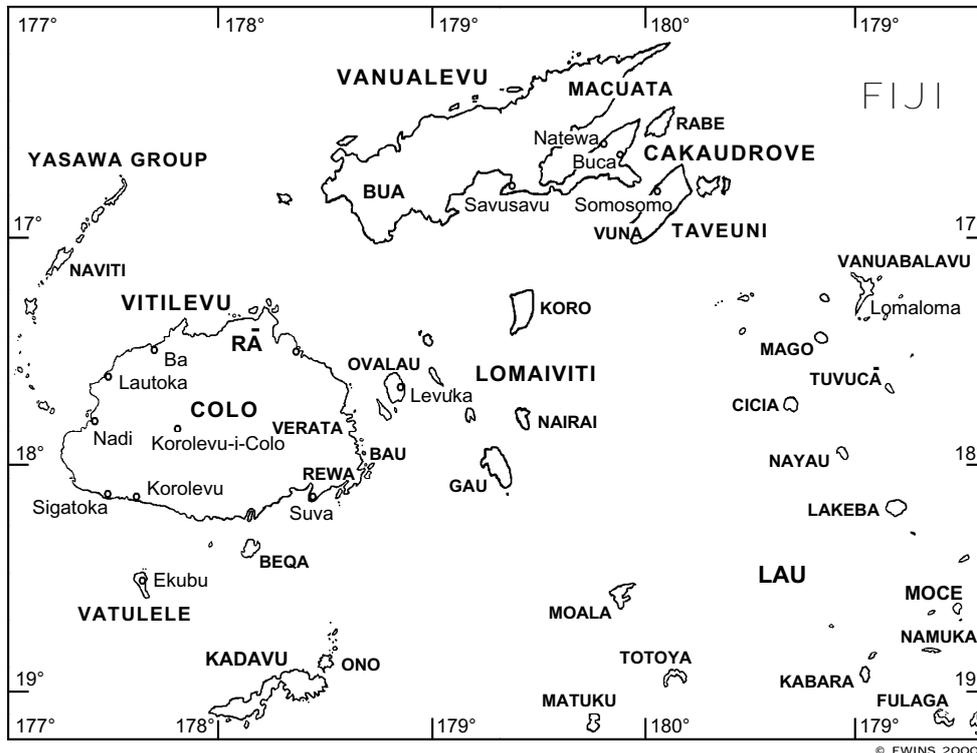
The paper identifies the key legislations that govern the development and management of the urban areas and looks at the constitution of municipal councils, their roles, functions and sources of finance. The role of the council as a planning authority is also discussed, as well as its role in terms of addressing environment issues, collection and disposing of garbage and management of waste.

The paper discusses the link between local government and central government and their respective roles in terms of addressing local government problems and issues. The paper looks at development indicators and achievements at the local level. While we have been quite successful in promoting and managing development at the local level, our achievement in the area of management of refuse dumps and waste management in general leaves a lot to be desired. The case study on Lami Rubbish Dump – the dump for the Greater Suva Area – definitely confirms this conclusion.

With proper administration, the comprehensive waste management programme for the Greater Suva Area that the Fiji Government is undertaking through the assistance of the European Union, should greatly assist in getting the residents of Greater Suva Area to improve their approach and to have the right attitude towards waste management. The Naboro Landfill Project will no doubt set a new standard for sanitary landfill and waste management in the country.



Background Information



The Fiji Islands consist of about 300 islands with about 100 islands which are permanently inhabited. The census is taken every 10 years and the population at the last census, in 1996 was 775,077 as compared to 715,375 at the previous census in 1986.

210 Fiji is now a relatively urbanised country with almost half of the population living in two cities, ten towns and their peripheral areas. The rapid rate of urbanisation is the most significant change in recent years. The urban population growth over the last census period (1986-1996) was 2.6% compared with 0.8% for the population as a whole.

The urban population was 47% of total population in 1996 compared to 38% in 1986. The change in emphasis from import substitution policy to export oriented policy has been greatly responsible for the rapid rate of urbanisation as most of the factories are

located in urban areas; for people by nature are very mobile but not haphazard but selective mobility and urbanisation is a reflection of this mobility.

If the above urbanisation rate had been continuing from 1996 until today then obviously well over 50% of the country population are now living in the urban area.

Legal Systems in the Urban Environment

The management and development of the urban environment have been carried out at the combined initiatives of central government and local government and the private sector through the medium of a number of legislations and policy instruments.

The legislations that govern the development and the management of urban areas, as well as the provision and maintenance of services, include the:

- Local Government Act;
- Town Planning Act;
- Subdivision of Land Act;
- Public Health Act;
- Business Licensing Act; and
- Litter Decree.

These legislations provide the Local Government with the authority to play a key role in managing the urban environment.

The Local Government Act provides for the declaration of a population centre as a city, town or district. On the initiative of local people, an area may be declared by the Minister to be a city, town or district. Each of these is classified as a municipality under the Act and they are governed under the provisions of the Local Government Act. The Act grants municipal councils with the power to promote the welfare and convenience of the people of the municipality and to preserve their amenities. The Councils can make by laws for these purposes. In general councils control matters such as health, sanitation, building and planning, business licensing, parks and markets within their respective municipalities. They are also responsible for the establishment and maintenance of public utility services within their municipalities.

To meet the costs of government, municipal councils are authorised to levy rates on lands within their boundaries and fees and charges for services rendered. The system of rating that is currently used is the rate on the unimproved capital value of a property even though recommendations on other systems of rating have been considered from time to time. They are also authorised to levy business licence fees on business within the municipalities. But they are not authorised to exact personal taxes.

The right to develop land is nationalised under the Town Planning Act, which provides for the definition of what constitutes development. The municipal councils are planning authorities under the Town Planning Act and Subdivision of Land Act and are responsible for forward planning and development control within their respective municipalities. Ten councils have the benefit of having approved planning schemes to guide physical developments that are taking place within their municipalities. The other two councils are controlling physical developments on the basis of draft plans. Physical development proposals, including building development works and subdivision and land development works, cannot be carried out unless they have been approved by the councils. There is a right of appeal to the Minister if a council decides to refuse a development application.

Under the Town Planning Act (Regulation) General Provisions' classification of uses, garbage dumps are classified as noxious industrial development. It means that great care must be taken in assessing the use of a parcel of land for this particular type of uses; the use of land for this type of development must always be very carefully considered. Part V of the Public Health Act provides for the provision of sanitary services. Section 50 provides that all schemes for the disposal of night soil, collection of garbage or other sanitary services within the district of any local authority should be submitted to the Central Board of Health for approval, and no such scheme shall be put into operation until the approval of the Board has been obtained.

According to Section 51 no person shall engage in the business of carrying or removing night soil or garbage except with a permit from the local authority (municipal council).

According to Section 52 the Board may, with the approval of the Minister for Health, make regulations, and the local authority (council) of any urban sanitary district may, with the consent



of the Board and the approval of the Minister make by-laws, for:

- The storage, collection and disposal of night soil and garbage or other offensive matter;
- Preventing the accumulation of dust, filth, ashes and refuse on premises and public places and the duties of owners, occupiers and other persons with regard thereto;
- Regulating or preventing the keeping of live or dead animals or poultry where the keeping of them is or is likely to be a nuisance or injurious to health; and
- Prescribing the fees to be paid by the owner or occupier of any house, building or premises for the removal of garbage, refuse, ashes etc, and providing for the recovery of such fees by distress or otherwise.

In practice the boundaries of an urban sanitary district always coincide with the boundaries of the municipality in question so that the municipal council is also the local authority for the urban sanitary district.

The Link between Central Government and Local Government

Through these legislation the activities of the Municipal Councils at the Local Government level are under the supervision of the Ministry of Local Government, Housing, Squatter Settlement and Environment which is responsible to a Cabinet Minister at central government level. As far as waste management and management of garbage dumps are concerned, the municipal councils are responsible to the Central Board of Health in the Ministry of Health which comes under the responsibility of the Minister for Health who is also a Cabinet Minister.

The Ministry of Local Government, Housing, Squatter Settlement and Environment is responsible for the formulation and implementation of housing, local government, town and country planning and environment policies.

Apart from the municipal councils, the Ministry is also responsible for the Housing Authority and Public Rental Board. These statutory bodies have been established by the Government to look after low cost housing. The Ministry is also responsible for the National Fire Authority.

Through this linkage, the Ministry is responsible for ensuring that the municipal councils are more accountable to their rate payers by closely monitoring their performance through their financial plans, budgets, investments, collection of rates, earning and expenditure, audit and accounting standards and statements, monthly meeting reports, annual reports and their exercise of duties and powers.

The Ministry is there to facilitate the proper development of the municipalities and to ensure that the municipal councils do comply with the provisions of the Local Government Act.

The Ministry has two other departments that are directly responsible for the environment and physical developments in and around urban centres and they are working very closely with the Councils in their particular areas of jurisdiction. They are the Department of Environment and the Department of Town and Country Planning.

The Department of Environment focuses its activities in the implementation of the National Environment Strategy and through this effort it has been working closely with municipal councils in the areas of environment impact assessment of developments, waste management and pollution, conservation and environment and information and education.

The Department has carried out a number of projects which Fiji is obligated to carry out as the result of its ratification of international environment conventions; and these include projects which would allow Fiji to meet its obligations under these international conventions.

The Department of Town and Country assists the councils in the planning and controlling of physical

developments within their municipalities. It provides planning advice to the councils and it assists them in the preparation, approval, and implementation of their town planning schemes. With approved town planning schemes, the councils become the approving authority for building development applications and other types of development that directly comply with the provisions of the approved town planning schemes. The Director is responsible through the Ministry to the Minister as far as town and country planning and subdivision of land is concerned.

Indicators and Achievements in Urban Management

The local government system with its linkages with Central Government has helped to bring about some order to the development and management of the urban environment. The building and land development approval system has been an avenue allowing the incremental growth of the urban centres to be looked at in a professional manner both from the point of view of the public and the private sectors. It has allowed the councils to address issues concerning sewerage, refuse and waste water disposal at the building and land development stage as well as the operational stage of development.

The use of planning schemes as the basis for forward planning and development control has allowed councils to work out their infrastructure provision programmes and has helped the individuals in their decision to invest in land development projects.

Despite these achievements there are a number of major problems that continue to be of great concern at the local and national level.

The accelerated growth of squatter settlements is posing a real problem and it is estimated that at least 12% of the urban population are

squatters. The health and pollution issues in squatter settlements have hardly been given appropriate attention.

Refuse disposal together with the management of garbage dumps is a national problem and requires a firm new commitment. Not a single municipal council has managed its refuse dump to an acceptable level.

Most refuse dumps are located either on river banks or foreshore. These sites may have been selected due to lack of awareness on environment issues and concerns. Industrial wastes, hazardous wastes, white goods, organic wastes and green wastes are all dumped together without any form of cover.

Case Study - Lami Rubbish Dump

We will take a closer look at the Lami Rubbish Dump to give us some idea of the current approach and position as far as management of dumps is concerned.

Lami Rubbish dump is the main dump for the Greater Suva Area which has a population which is approaching about 300,000. This dump has long reached its capacity and its continued use is posing a threat to the environment.

The dump was established in 1945 over a mangrove swamp. The initial area leased was 5.16 ha but the area concerned now is estimated to be around 12.15ha, mostly extending to and protruding out of the sea and river. About 50,000 tons of domestic waste, green waste, market waste, industrial waste and other mixed waste are dumped there annually.

The dump is being used to well beyond its capacity and waste and leachate from it are polluting the water in Suva harbour and adjacent river and when it is not properly attended to, its foul odour can be noticed quite a distance away in all directions.



neering. The total cost of the construction works is estimated to be around F\$13million. The Naboro Landfill site is a state land comprising 100 acres and is located about 16km from Suva City. Unlike other sites, that are being used for rubbish dump, it is located inland. A further 35acres of freehold land had been acquired at a cost of \$175,000.

We were very conscious of the right location when we picked this site.

Studies carried out have identified heavy metal pollution and bacteria contamination which affect water quality. The dump could not be properly managed because it was not meant to cater for a large population. The situation has been aggravated due to lack of spaces, funds and resources.

It was picked after a thorough assessment of the suitability of more than 10 sites that were identified for the purpose. This assessment took into account compliance with legal procedures and standards, environment impact assessment reports and the public reactions through the process of public consultations and objections. All the preparatory work to facilitate the construction of the Naboro Landfill has been done with due regard to procedures. This started with the carrying out of an Environmental Impact Assessment (EIA) study of the proposed use on the subject site and

The closure of Lami Dump is imperative and a management plan needs to be put in place to mitigate adverse environment impacts. The plan should make provision for the rehabilitation of the site. The cost of rehabilitating Lami Dump to an acceptable standard is estimated to be about F\$5million.

Naboro Landfill Project - A Solution

After year anticipation, the construction programme for the Naboro Landfill Project has finally commenced with the awarding of the construction contract to Downer Engi-



the finding that the site is suitable for the purpose of landfill project. The soil conditions and topography are favourable, and the presence of a large quantity of clay provides an appropriate foundation. The surface run off can be managed to protect the nearby creek. Other environmental conditions such as noise, odour, dust, vector and aesthetics can be taken care of through appropriate design and development measures.

A major problem common to all landfill site is that of leachate. This is the liquid by-product of micro-organisms activities within the landfill which percolates through the landfill mass. The EIA study focussed on the control of leachate at its generation and containment stages and the work for the landfill would involve the diversion of a stream that flows into the site, and the installation of leachate drains at the base and the downstream edge of the landfill to lead leachates to collection points.

The Naboro Landfill Project is part of a comprehensive waste management programme where the Fiji Government has received assistance from the European Union. The European Union has hired the consulting firm of Hydroplan to assist Fiji in carrying out this Waste Management programme which is based on four major objectives:

- Minimising waste;
- Maximising environmentally sound waste reuse and recycling;
- Promoting environmentally sound, waste disposal and treatment; and
- Extending waste service coverage.

Hydroplan was also awarded the contract for designing the construction works for the Naboro Landfill Project. The contract requires Hydroplan to do the following:

- Prepare detailed engineering design;
- Assist with the evaluation of tenders for the construction of the landfill and associated works and the sealing and rehabilitation of the existing dumps at Lami, Nausori and Navua; and

- Carrying out the supervision of the construction works.

The Naboro Landfill Project has been designed to operate to meet the Waste Management Programme key objectives so it will be operated as a fully integrated Waste Management facility which would include an engineered sanitary landfill and provision for waste separation, recycling and composting.

Hydroplan has already undertaken a study of the current waste management methods and issues for Greater Suva Area as well as the legislations that are relevant to waste management. Hydroplan has submitted to the Fiji Government a proposal on concrete programmes to be pursued so that our overall waste management is geared towards these key objectives. This proposal is contained in the document: Naboro Landfill Under the Environment Programme 8th Edf Project 8 ACP, Fiji 03 Addendum I

The construction phase of the Naboro Landfill Project is expected to be completed in the middle of 2004. With Addendum I as guide, the Ministry for Local Government, Housing, Squatter Settlement and Environment has been making preparatory work for the proper operation of the Naboro Landfill Project in 2004 after the completion of its construction by initiating and coordinating activities concerning the Waste Management Programme for Greater Suva Area. The objectives of this programme are:

- Minimising of Waste;
- Maximising environmentally sound, waste reuse and recycling;
- Promoting environmentally sound waste disposal and treatment; and
- Extending waste service coverage.



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The Environment Programme for the Greater Suva Area: A Donor Perspective

Mr. Enrico Strampelli

First Secretary (Engineering)

Delegation of the European Commission for the Pacific

Introduction

The Environment Programme for the Greater Suva area includes three different components:

- the solid waste component;
- the public awareness component;
- the liquid waste component.

The solid waste component includes the construction of the new landfill in Naboro and the closure of existing landfills in the area.

The liquid waste component includes the new outfall of the Kinoya treatment plant.

The public awareness component is aimed at raising the public awareness principally on solid waste issues.

The European Development Fund

The project (8.5 million Euro) is financed, in grant, by the 8th European Development Fund (EDF). The EDF is a grant fund, managed by the European Commission, putting at disposal of the countries belonging to the ACP (Africa, Caribbean, Pacific)

group, a pre-defined amount of money, to be used in development projects and programme.

In the case of Fiji, the 8th EDF amounted to 17.85 million Euro. The 8th EDF, for the entire region, amounts to 366 million Euro.

The fund is governed by the Lome Convention (now Cotonou Convention). The Environment Programme is financed by the 8th EDF; other projects financed by the same 8th EDF in Fiji are the Rewa bridge and the Human Resources Development Programme.

The Fund works with a five years cycle; in order to have a project financed, the project itself should pertain to a sector included in the programme document: the National Indicative Programme. Every five years, the Government and the EC agree on a NIP, a programmatic document which describes the sectors (and the reasons for the choices made) in which the EDF aid will be concentrated. Environment was included in the Fiji NIP, signed in 1997.

The solid waste component of this particular project is housed in the Ministry of Local Government, Housing and Environment, which has been given by the Government the overall responsibility for the implementation.

The Environment Programme: A short history

I will focus my presentation, from now on, on the solid waste component of this project; the liquid waste component has a different history and it is managed by a different Government department.

The need to address the problem of the solid waste in Suva dates back for many years. The government approached the EC, in order to have the new landfill financed by the EDF, early 1997, after a long search for an appropriate site (here it has to be mentioned that the usual headaches that a research for an appropriate location for a landfill entails, are multiplied by a factor of 10 in the islands of the South Pacific, where the land issue is always source of many problems).

The EC decided, after a relatively short time, to agree in principle with the proposal, and Environment was included as sector of concentration in the NIP. An appraisal study was financed by the EDF, and started in November 1997. The final report was submitted on July 1998.

The study ruled out the possibility of incineration, on the ground that the air pollution control equipment would have been too expensive. It endorsed the choice of the site of the landfill, and it proposed the creation of an independent company, in charge of the collection and disposal of solid waste, including the management of the landfill.

A relatively long period of discussions followed, mainly internal to the EC. Doubts were raised about the real commitment of the Government to deal with the policy issues related to the project; the financial sustainability of the programme was discussed, especially considering that the tariffs to be applied to the customers were supposed to cover all the expenses of the system. The social reaction of the population living in the proximity of the new site was a worry, and the overall legislative framework of the intervention was questioned.

On the other side, it was reckoned that it was impossible to settle all the pending issues before committing the EC to the project, simply because the “do nothing” approach was not an option. The existing dumps were, and still are, an environmental disaster, and, once environment was introduced as focal sector in the NIP, there was the obligation, for the EC, to show the necessary support to address the solid waste problem of the Greater Suva area. It was thus decided (April 1999) to commit funds for a consultancy aimed at design and supervision of the new landfill and of the closure of existing dumps; the strategy was to prepare the necessary technical documents, and to use the necessary time to address with the Government the several pending issues.

The doubts raised by the discussion about the appraisal report influenced also the preparation of the TOR for the consultancy contract, which were anyway agreed in July 1999.

The EC regulations envisage, for service contract of amount bigger than 150.000 Euro, to agree a short list of consultant between the ACP country and the EC, and to launch a restricted tender procedure, by which the shortlisted consultants are provided with the TOR and the draft contract. They have to provide a technical proposal and a financial one, in two separate envelopes, and there is a minimum period of two months for preparing the offer. The tender was opened in December 1999, and the contract awarded in March 2000.

On 19 May 2000 a coup d'état was staged in Fiji, which entailed a de facto interruption of the programme. The already prepared Financing Proposal for the financing of the works and of the public awareness campaign was frozen, waiting for a stabilization of the political situation. The cooperation with Fiji was stopped.

The cooperation was resumed following the election of August 2001, and a Financing Agreement for the Environment Programme was signed in March 2002. With the new Financing

Agreement the Government undertakes to:

- clear all obstacles for the availability of land. Ease and subdue the concerns of the communities in the vicinity of the new landfill;
- adopt an appropriate method for waste collection and disposal;
- establish an appropriate structure of tariffs;
- allocate the appropriate personnel for the management of the programme.

In the mean time, the design activities were completed, and the contract for the works of the new landfill was signed in October 2002.

As one could see from the conditions included in the Financing Agreement, the position of the EC on respect to the institutional and financial sustainability of the project was somehow affected by the events. The EC agreed to start the programme even if the issues that were debated before the coup are substantially unsolved. This is due, in my opinion, to:

- the continuous environmental degradation caused by the existing dumps;
- the “relativity” effect brought by the coup.

The pending issues were not ignored: through an addendum to the contract of the design consultant, the same consultant prepared a report on the “soft component” of the project: he will illustrate it later on.

Where we stand now

From the donor point of view, the project objective is still far from being reached. It is true that, having signed the contract for the works, funds are committed, and thus our performance can be rated as good, for the time being. But, as explained before, the main issues affecting the sustainability of the project are still outstanding.



Resumption of EU Cooperation

Works contract,
Supervision
Contracts
Signed (funds
Committed by EU)

Policies
need
to be in place
(Government)

Structures
Need to be
Defined
&
Set (Government)

Sustainability

This implies that the EC will be obliged to closely monitor the project, and the action of the beneficiary Government, more than in other cases.

The works contract has been signed, and the performance period of 18 months should give enough time for addressing the overall framework. The conditionalities imposed to the beneficiary can be translated as follows:

- The entity in charge of the collection and disposal of the solid waste in the Greater Suva area must be financially sustainable. This means that an intervention on the existing set up is mandatory. This means to intervene in a sector in which the actors are many (State, municipalities, private sector), and in which existing interests are many as well.
- The legislation, at national and local level, must be modified in order to take into account the new reality. This means that a political agreement should be reached, provided there is agreement on the way ahead.
- The recycling and composting must be increased. The present infrastructural works are financed through a grant. The next ones (may be in five-seven years time) will have to be financed by the entity in charge of the Naboro landfill; the more garbage in, the more money has to be spent in infrastructures.
- The staff in the public service (at central and local level) has to be trained on the complexity of the solid waste issue in a quite populated area as the Suva one. Here we face also the problem that this is the first attempt, in the whole South Pacific, to address the solid waste issue in a real sustainable way, also from the environmental point of view.
- The project include a public awareness campaign, which is crucial to obtain social acceptance of the new tariffs, a reduction of the garbage production, ultimately a separate collection and disposal of waste.
- The existing dumps have to be closed and the site re-utilized.

As one can see, there is a long list of issues to be addressed (and I am certainly forgetting some of

them), in a situation of overall scarcity of human resources, typical of the island countries of the South Pacific.

Today: Why we are here

From our point of view, our presence here is also an attempt to start solving the problems mentioned above.

The project, and the people in charge of it, needs first to learn from similar experiences elsewhere, either in New Caledonia or in other realities.

Furthermore, we are aware that a complex situation like the one of the solid waste in the greater Suva area could also be dealt with partnership with other municipalities which have already passed through the same experience, in France or elsewhere. We hope that participating to this excellent seminar on sustainable urban services will give to us, working on this project, advises and knowledge which can be usefully applied to the case of Suva. ■

Sociological Dimension of Waste Management in the Greater Suva Area

Ms. Rusieli Taukei

Nurse

Introduction

The Greater Suva area has a total population of about 85,000 people spread over an area which includes residential, industrial and the central business areas. Together with nearby urban and peri-urban areas of Navua, Nasinu and Nausori, the Greater Suva area collectively produce about 50,000 tons of various types of wastes annually. These wastes are dumped in the now 57 year old Lami Dump which is operated by the Suva City Council Health Services Department.

In Fiji, most dumps are located either on riverbanks or foreshores and all types of wastes are dumped in these areas without any cover. This has been the trend in Lami and other municipalities of Lautoka, Nausori, Labasa, Sigatoka and Navua. Perhaps the lack of awareness on environmental impacts and concerns by those in authority then and our people led to the selection of those sites.

The Lami dump has now exceeded capacity and is merely increasing in height becoming a tower of refuse directly in the line of sight of ships entering the port of Suva. The overflowing waste and leaches from the full dump is polluting the water in Suva Harbour and the adjacent Lami River. The polluted water leaching from the dump possibly includes pesticides used daily to control

vermin. The banks of the dump are steep and are not stepped, covered or retained. This allows waste to escape into the Suva Harbour by the action of storms, tidal action, wind, and storm water runoff.

Public Acceptability

The proposed Naboro Landfill should be welcoming news and a sigh of relief for the people who are currently residing in the areas near the Lami, Navua and Nausori dumps for they have been exposed for some 50 years to the environmental pollutants in particular. It is understood that there may have been some initial resistance to the use of the new sight but the Government and responsible authorities have managed to settle the matter and work has already started on the new landfill. It is reported that the initial objection may have been due to the fact that people thought the new system was going to be like the current Lami dump.

The main priorities concerning waste management include the protection of the fragile environment such as groundwater, the coral and mangrove ecosystems which are resource bases for fisheries and tourism and which are also the means of livelihood for many of our people. The new Naboro landfill therefore should promote an



environment-friendly waste management system that will protect not only the lives and health of our people, but fisheries and tourism as well.

The acceptability of the new waste management system will be greatly enhanced by effectively educating and carrying out awareness programs for our people as there is still a moderate level of awareness of waste management issues in the general public. Littering and illegal dumping of waste is still a significant problem indicating the lack of awareness of waste management practices and some authorities have suggested that the immediate solution would be the effective implementation of the Fiji Litter Act and not public education because people are fully aware of what they should or should not do. However, an important factor for waste management is the awareness and understanding of the people who should know about the different types of wastes and the impacts on their environment and subsequently their health. Measures to enhance the awareness and knowledge of the people need to be carried out at all levels for better understanding and cooperation.

■ If the people possess a good understanding and knowledge about good waste management, they will greatly assist in playing an educative, facilitative, advocacy and a catalyst role in their own communities, schools and families. The instruments that will increase the effectiveness of education and awareness include the media, the Ministry of Education in its curriculum development and strengthening of the teaching of waste management particularly in primary schools, the health promotion and public health programs of the Ministry of Health, the reinforcement of the Litter Law by the Ministry of Environment and Local Government and the major role that non-governmental organizations can play in this regard. The lack of education and access to information and knowledge for the people is a social factor that needs to be addressed all the time.

The public will support any good waste management system as long as they understand

and know what it is all about. Systems such as waste source separation, polluter-pays principle, home composting and deposit schemes for aluminium cans and plastic bag wastes are all excellent means, but do we have the resources in terms of money and human resources for effective implementation and sustainability? There is definitely a need to improve the system after all wastes are produced from the homes, industries, hospitals and elsewhere before they reach the disposal areas.

Employment

The new Naboro landfill should create a lot of job opportunities for the people since it consists of various aspects of management and disposal of all types of wastes. The current dumping system requires perhaps a much lesser number of workers to carry out the job as compared to the new waste management system. However, the closure of the current dumps in Nausori, Navua and Lami may affect the employment of some workers because of the distance of the new site from where they live particularly for those who live and have to travel from Nausori.

The current dump site has obviously put off potential residents and potential developers who would create employment opportunities for people in the area and others.

Environmental Aspects

The environmental pollution from the current dumps impacts greatly on the health and livelihood of the many people, who not only live around them, but also those who fish and collect shellfish from the water, those who collect crabs from the mangrove swamps, those who swim in these waters and those who scavenge the dumps regularly. The physical, chemical and biological changes at dump sites pose a threat to the

neighbouring ecosystems such as the mangrove swamps.

Gaseous emissions of chemical or biological origin occurring in the dumps heavily pollute the air resulting in offensive smells and eye irritation. Uncontrollable burning in the dumps also result in air pollution of nearby areas. Noise disturbance to people living in surrounding areas may be caused by the operation of heavy equipment and machinery such as bulldozers, as well as the cries of scavenging birds.

An additional serious environmental and public health impact is related to the breeding of vermin such as flies, mosquitoes, cockroaches and rats.

A recent study conducted by Environmental Health students of the Fiji School of Medicine revealed that the bad odor emitted from the Lami dump has caused a lot of problems to the nearby residents and schools over the years. The 50 high school students who were interviewed reported that on many days, the odor is so strong that they lose concentration in class and 15% of them reported suffering from headaches, nausea and abdominal pain.

The same study revealed that residents of nearby Nadonumai and Delainavesi reported frequent headaches and respiratory problems such as difficulty in breathing. There have been public outcries from these residents over the years but no one seems to be hearing them. The morbidity reports obtained from the Lami Health Center revealed that the common health problems affecting the people of Nadonumai and Delainavesi include skin infections, diarrhoea, acute respiratory infections in young children and viral infections. The nurses reported that poor basic sanitation is also a major contributing factor to these problems. Furthermore, Nadonumai and Delainavesi residents who were interviewed reported that there are a lot of flies and rats in the area, which they believe are coming from the dumps. On being asked if leaving the area has ever crossed their minds, the residents stated that they have lived there for 10 –30 years and

that they cannot leave due to many reasons. They just want the dump to be relocated elsewhere.

Scavenging is also a real problem in dump sites. A scavenger who was interviewed said that he did not care if the dump would affect his health as long as his basic needs are met. He relies on the dump for his survival.

The new waste management system should greatly benefit the residents of Lami and Kinoya in the Greater Suva area as well as those within the vicinity of the Nausori and Navua dumps, who presently suffer the most from the adverse environmental impacts of the dumps and the inadequate installations of the Kinoya Sewage Treatment Plant. Reports state that almost the whole of Kinoya as well as a good part of Lami comprise low income residential areas, with a large number of their residents belonging to the group of the urban poor. The new waste management system therefore should be directly enjoyed by, among others, the underprivileged groups of the population. These include women and children in particular, who live, work, go to school, play, swim and generally spend most of their day within the vicinity of the dumps. Furthermore, those who fish or collect shellfish along the coastal areas of Lami, Navua and the Rewa River which is downstream from the Nausori dump will also greatly benefit from the closure of the current dumps. The beneficiaries will also include the buyers and consumers of the fish and shellfish.

The practice of scavenging, which has increased significantly since 1987, will no longer be a problem when the new system at the Naboro landfill comes into operation and the old dumps are closed.

After the closure of the existing dumps, it is anticipated that more developments will take place in these areas and landowners will benefit from it. The upgrading of the urban environment in Lami, Navua and Nausori by means of reducing air, water and soil pollution as a result of the new



waste management system will greatly improve the standard of living for all residents of these towns who comprise approximately 30% of Fiji's population. The upgrading of the environment will also result in economic benefits to people within, or even outside the affected areas in terms of tourism, commercial fishing and real estate developments. ■



Waste Management in the Greater Suva Region, Fiji

Mr. Peter Heckel

Project Manager, Hydroplan Ingenieur-Gesellschaft mbH

Abstract

Fiji located in the Southern Pacific consists of more than 800 islands and islets. The capital city Suva is located on the largest Island Viti Levu (10,429 sq. km). The Greater Suva Region has a present population of about 311,000. Solid waste collection services are provided for approximately 72% of the population living in this region. The total waste generated in 2001 is about 83,000 tons per annum.

The present solid waste management for the Greater Suva Region consists mainly of collection and some minimal recycling services. Waste is improperly disposed of through open dumping and burning.

The used practices for processing and disposing of municipal solid waste are creating serious threats to local environmental quality and health.

The adage “out of sight - out of mind” is no longer applicable as the direct and indirect implications of the solid waste problem are constantly being realised.

After a long time of inactivity the Fiji government, with support from the EU, has started to tackle the immediate problems:

- Construction of a proper sanitary landfill.
- Establishment of institutions for waste management.
- Rehabilitation of existing dumps.
- Basic legal framework with priority by-laws.
- Education and public awareness programs.
- Waste data base.
- Community involvement.
- Composting.
- Privatization.

The waste strategy will focus on realistically achievable targets, which can be sustained for meeting the present needs without compromising those of future generations. This will be the first step on a long journey to proper integrated sustainable waste management (ISWM).

The main priorities are:

- To deal with wastes that pose the biggest environmental and social risks.
- To focus on what realistically can be achieved.
- To make sure that plans are supported by the community
- To take measures which give the best value for money.

Future programs will include:

- Developments of markets for recycled product wastes.
- Waste minimisation programs including hazardous waste.
- Charging waste generators for the true environmental cost.
- Polluter pays principle.

A major target will be to change the way people think about their environment. Once this challenge has been accomplished only then the envisaged targets can be achieved together with a certain mix of enforcement.

On a wider long-term scale the following action programs will be carried out:

- Institutional set-up and provision of a sound legislative basis for waste management, with clear transparent roles for central and local government.

- Information and communication with all key players such as Government, waste generators, waste industry, business, community and voluntary groups.
- Waste reduction and efficient use of materials.
- Development of environmental standards and guidelines.

The overall core of integrated sustainable waste management goals will reduce the damage to the environment, lowering social costs and risks, and increasing economic benefit by more efficient use of materials.

Fiji Country Data

| | |
|-----------------|--|
| Total Land Area | 18,272 km ² |
| | 332 Islands (100 inhabited) |
| Population | Approx. 800,000 (2000 estimate) |
| Capital | Suva |
| Main Exports | Sugar, garments, gold fish and timber |
| GDP per capita | Approx. USD 1,720 (2000) |

Current Waste Problems

A waste baseline survey revealed that general awareness in Suva is relatively high. The most common sources of waste information are radio and

television. Waste disposal has become a serious problem and some people feel the situation is going from bad to worse as a result of littering in particular with papers, plastics, tins and cans.

The most serious waste problems identified by a waste baseline survey requiring immediate attention are as follows:

- Littering and illegal dumping.
- Inadequate services and facilities especially Lami dump.
- Adverse social effects of uncontrolled waste disposal.
- Stray animals and dogs.
- Environmental effects of specific pollutants.

The public sees the solutions to these problems in order of importance as:

- Awareness, education and training.
- Improved Service and facilities.
- Legislation and enforcement.
- Waste minimization initiatives, and
- Community participation.

Collection services within the urban and semi-urban areas are relatively efficient. For example waste is collected daily at the kerb in the Suva business area and 2 to 3 times in the other areas. Only in the rural areas of Suva, Nausori and Navua waste collection service is infrequent or not existing at all causing illegal dumping or nuisances.



All generated waste of the region is transported to Lami dump, the only dump presently operating in the region. The dump gives an excellent negative example for “how waste facilities should not be managed”. The people of Lami town are living under these miserable conditions for over 20 years: The main wind direction is from Southwest and it spreads all emissions into the nearby communities. The stench can be incredibly strong leaving traces everywhere. There exists a real danger invisible to the eye towards the well-being of the population of Lami through wind blown viruses and bacteria, pollution of groundwater

and the sea through leachate, transmission of disease by vectors, etc. Lami town council and the affected community have done numerous attempts to correct the situation. Hope has finally arrived when the new Naboro landfill will go into operation about middle of 2004 and Lami dump will be closed and covered.

Greenwaste is presently collected within Suva City Council boundaries bi-weekly. This creates odour problems due to intermediate storage requirements at the kerbside.



Waste burning of household garbage and rubbish is a serious but least understood issue. Everyday fires at backyards are burning. The smoke and ash created contain toxic pollutants, such as dioxins and furans. These toxic pollutants can travel long distances and contaminate air, soil,

water, and food. Especially infants and young children are vulnerable to dioxins exposure.

One of the first new by-laws will specify control measures eliminating outdoor residential burning of all household waste.



Proposed Solid Waste Management System

Background

Fiji's overall development policy focuses on sustainable economic and social aspects based on the increase of its external competitiveness, on the progressive diversification of its economic base and on improved access to productive employment including for underprivileged groups.

The Fiji government endorsed in 1993 the National Environmental Strategy, which recognised two main priorities for solid waste management:

**“Refuse disposal and management of garbage dumps is a national dilemma” and,
“Fiji has no hazardous waste site or managed infrastructure”**

It needed some time to formulate these two priorities into actual project concepts. The financial support provided by the European Union was crucial for tackling the immediate waste problems and lay the foundations for an integrated sustainable waste management.

Under the 8th European Development Fund the following components are foreseen for solid waste:

- Construction of Stage 1/ Phase I of the new sanitary landfill at Naboro, including site facilities.
- Closure of existing dumps at Lami, Nausori and Navua.
- Public Awareness campaign.

On October 2002 the construction of Naboro landfill stage1/ phase I had started. The landfill will start operation about middle of 2004 and the existing dumps will be closed afterwards.

The Greater Suva Region



Waste Characteristics and Quantities

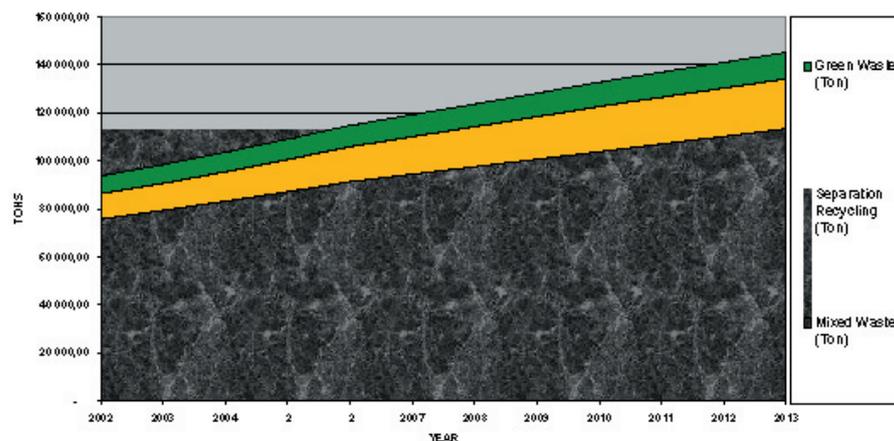
Fiji is in terms of waste generation rates and income a middle-income country. However, waste composition is a typical mixture of both low and middle-income countries. Moisture content and waste density are high.

In the tables below key data and generated waste quantities are presented.

Key data of Greater suva Region

| Description | 2004 | 2013 |
|---------------------------------|-----------------------------|-------------------|
| Estimated population | 321,050 cap | 364,556 cap |
| Served population | 240,498 cap (75%) | 325,261 cap (89%) |
| Total area | Approx. 194 km ² | |
| Total waste generated per annum | 10,981 ton | |
| - Greenwaste | 8,048 ton | |
| - Municipal Waste | 82,216 ton | 112,178 ton |
| Total | 90,264 ton | 123,159 ton |
| - Biodegradable waste | 36,747 ton | 50,138 ton |
| - Recyclable material | 12,314 ton | 20,682 ton |
| Unit waste generation rate | 1.03 kg/cap/d | 1.04kg/cap/d |

GENERATED WASTE QUANTITIES IN TONS (2002 - 2013)



Proposed Waste System Elements

The present solid waste management consists of collection and dumping with small recycling activities. The current system cannot be transformed rapidly but has to consider all involved stakeholders and aspects according to the model of integrated sustainable waste management.

Step 1: All collected municipal solid waste will undergo manual separation of parts of the waste for storage and recycling at the transfer station at Naboro Landfill. The remainder will be placed into the landfill.

Green waste will be shredded and used for mulching and as alternative daily cover at the landfill.

Step 2: After carrying out of awareness campaigns source separation will be introduced, recycling programs started and home composting encouraged. Industries will accelerate their internal recycling programs. All these activities will reduce the amount of waste placed into the costly space of the landfill.

Simultaneously pilot tests will be carried out for the best method of treating biodegradable waste, for home composting and recycling schemes, etc.

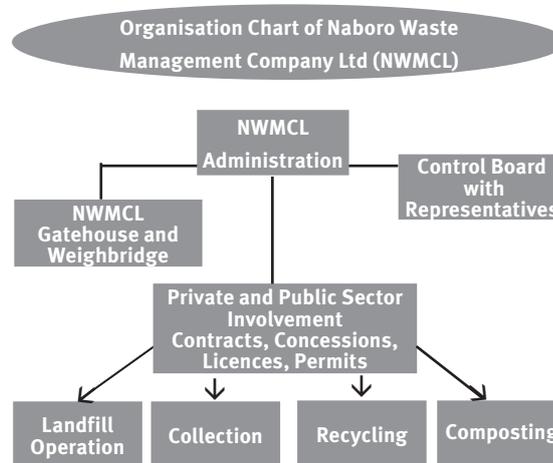
For success of this program strong political support at all levels, promotional effort and awareness building, flexibility and reliable and cost effective administration is required.

Proposed Institutional Setup

A sustainable waste management system should be run like a business and not like a public administration for securing long-term economical success without public subsidies. A private enterprise named Naboro Waste Management Company Ltd (NWMCL) will be formed with

shareholders of involved local governments according to their size but none of them exceeding 49%. A joint committee consisting of member councils and consulting members from the ministries is currently setting-up the new company.

All land associated with the Naboro landfill site must be owned by the public sector. This is important not only for having credit assets but mainly to provide for potential environmental pollution risks. Environmental pollution resulting from landfill operations will be a public responsibility.



Waste Minimisation

The generated waste quantities clearly indicate that despite of all recycling efforts the quantities of mixed waste going into the landfill is rising. Only through waste minimisation this situation can be reversed. A waste minimisation program will be based on an assessment of the current situation:

- There are no reliable long-term weighbridge records available. An assessment of generated

solid waste quantities and a breakdown of waste types and potentially recyclable materials cannot be made.

- Presently only used oil, paper, glass bottles and scrap metal is recycled. Quantities and end markets are not precisely known.
- Barriers to business opportunities are not yet identified such as growth barriers, subsidies, means to enhance growth.
- Priorities for policy action are not identified. For example by-laws for used oil.
- The existing recycling business has limited availability of capital. Long-term sustainable operation is only possible through high-value products, stable prices, and end markets. Financial incentives from the Fiji government are necessary.

The Role of the Private Sector

Private companies have seized the commercial opportunities in sectors where the public sector could not deliver: such as waste collection, recycling, cleaning services, etc., This trend for greater privatization will continue.

The ISWM strategy and planning intends to integrate also micro and small enterprises (MSE's) and community based organisations (CBO's) for greater sustainability.

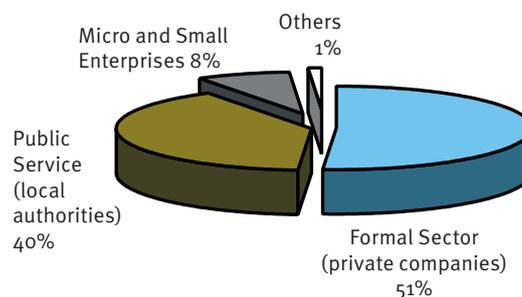
MSE privatisation will give more moderately priced alternatives to the public service sector and the formal private sector.

The advantages gained for integrating MSE's and CBO's will be:

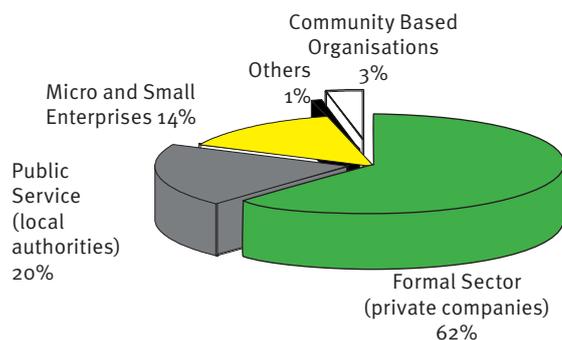
- Providing more satisfying "individual" services.
- Flexible tariffs, which can be adjusted annually according to the level of the costs of the service.

In the following figures a comparison of the keyplayers active in ISWM at present and as assumed in 2013 is presented.

The Solid Waste Cake (2000)



The Solid Waste Cake (2013)



The change into more privatisation has to go gradually. Employees working in the public sector with civil status are difficult to fire. They have to go into retirement or move to be absorbed by the private sector. The informal sector is almost non-existing although there is a relatively large percentage of recyclables in the waste.

The Greater Suva regional urban infrastructure has an extensive network of sealed roads, which are easy accessible and favour kerb-side collection. Centralised composting, incineration and also state-of-the-art landfilling have high capital and operation costs.

For making the whole process more sustainable the MSE and CBO sectors could perform well mainly in the following activities:

- Recovery and recycling
- Green waste collection and shredding
- Industrial and commercial cleaning
- Litter control, public space maintenance, street sweeping

- Beach cleaning
- Operation of second hand stores
- Operation of reuse and repair stores

The private sector will be encouraged to maximize labour for social and political reasons.

In order to achieve all these objectives a two step approach will be followed. Under step 1 an inventory of all micro and small enterprises and analysis of their activities will be made. Step 2 will give the MSE and CBO sector legitimate status and recognition such as franchise, concession or contract for services or permits and licences.

MSE's are responsive to local needs and are cooperative. There will be more complex management tasks for the local authority to handle, however, this is easily offset by the many advantages. The investment needs are relatively small. The local government should provide money for capital purchases and should give tax incentives. One of the program's priorities is optimising and legitimising the existing micro and small enterprise sector.

The Central Government is helping MSE's through the Small-and Miro-Enterprise Development Act passed in January 2002, establishment of a new national centre, and a small business capacity scheme.

232 An Economically Viable Solution

A volume-based scheme was selected to be the most suitable system at the present time. For introduction of this system strong political support at all levels and public education and awareness building is required.

Collection and disposal methods are interrelated with cost. The following options were studied for the collection system:

- Waste bins procured by waste generators or provided free of charge.
- Used or new waste trucks.

- Waste separated or unseparated.
- Centralised or decentralised structure.

The cheapest option consists of waste bins provided by waste generators, used waste trucks, waste unseparated and a centralised structure. This option is the best choice for the start-up phase.

The Dynamic Prime Cost (DPC) for this option are:

34.23 FJD per ton (0% interest p.a)

DPC = Net present value of all expenses (FJD)

35.82 FJD per ton (6% interest p.a)

Net present value (quantity) of(ton)

number of performance units

37.01 FJD per ton (10% interest p.a)

For the Greater Suva Region a waste management system must be chosen which is working, economical and not to radical in changing established methods. The existing solid waste infrastructure will be used as much as feasible and adapted to the new system.

With a GDP per capita of approx USD 1,720 (2000) highly sophisticated solid waste treatment solutions in the order of about 208 FJD/ton has been excluded for the short and medium term. The ability and willingness to pay for improved services is about 0.6% of the GDP per capita or FJD 70 per ton of waste, or about FJD 130 for a household of 5 persons per year.

Present fees range from FJD 13 per household per year (rural areas) to about FJD 44 per ton in the Suva City Council area. Average total costs are approximately FJD 30 per ton for the project area. For a more modernized waste collection system and for the longer distances to Naboro landfill FJD 43 per ton were assumed for the collection portion.

The presently upper limit of ability and willingness to pay is about FJD 70 per ton, which leaves about FJD 27 for landfill operation.

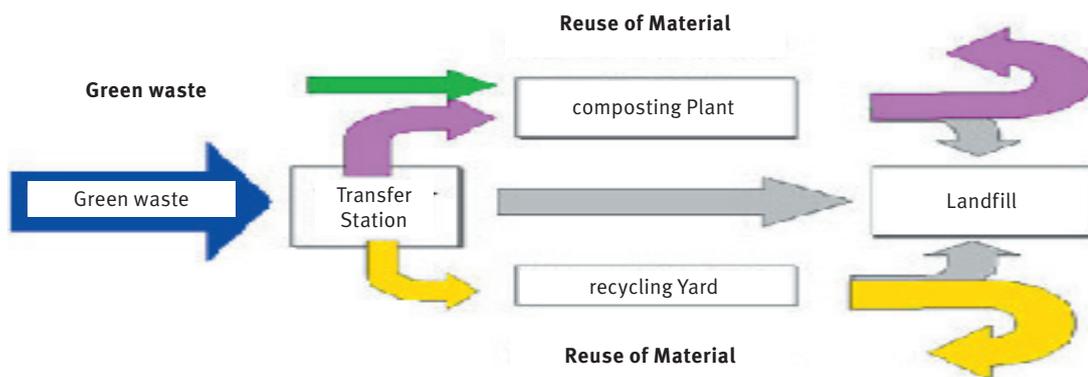
For the site facilities and the landfill there are two implementation stages:

Stage 1: All collected municipal solid waste (MSW) is transported to Naboro transfer station and after basic screening placed into the landfill. Some of the screenings are recycled or stored for further treatment or reuse. Greenwaste

is collected separately, shredded and used for mulching, daily cover, etc.

Stage 2: Set-up of pilot plants for central composting, separation at the households, home-composting, increased recycling rates, etc.

Schematic Presentation of Stage 2



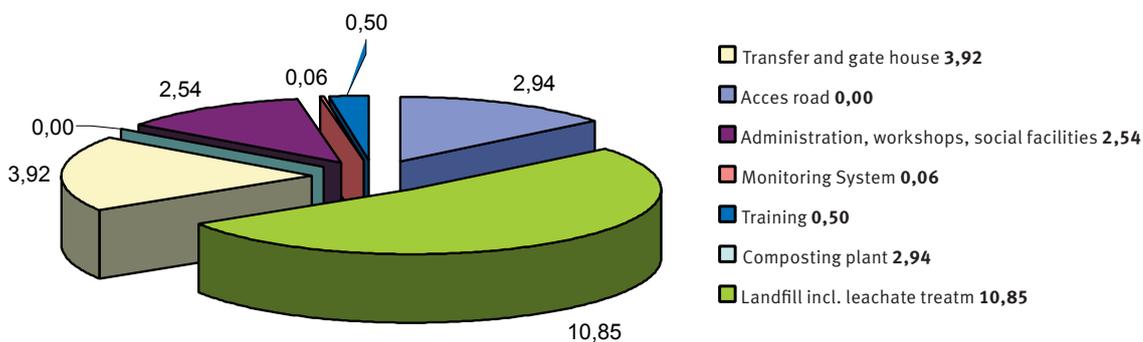
For Stage 2 there are several technologies feasible for treatment of the biodegradable waste portion:

- Window composting.
- In-vessel composting.
- Anaerobic digestion.

After the results of pilot tests and market studies are available the most suitable technology will be used.

Dynamic Prime Cost of landfill in FJD per ton of waste received except green waste:

DPC at 6.0% p.a. interest, FJD per ton



Proposed Collection and Disposal Fees in FJD

| Period | Collection Portion | Disposal Portion | Total |
|-------------|--------------------|------------------|-------|
| 2004 - 2008 | 43* | 20 | 64 |
| 2009 - 2013 | 43* | 25 | 68 |
| after 2013 | 43* | 27 | 70 |

* Waste unseparated and collected by used waste trucks

Proposed Annual Fees for a Household of 5 persons

| | |
|-------------|---------|
| 2004 - 2008 | FJD 117 |
| 2009 - 2013 | FJD 126 |
| After 2013 | FJD 130 |

These figures are within the ability to pay margin of FJD 130. A gradual price increase is appropriate for getting maximum acceptance by the population.

Fees for industrial and commercial waste are about the same as for domestic waste. The administration of the system must be reliable and cost effective. Bills for solid waste charges will be interlinked with the current billing system of Fiji Electricity Authority. A commission of approximately 3% has been foreseen for this task.

The waste management system will cover operating costs with the revenue collected. However, full cost recovering fees right from the beginning would be too large a burden for the public.

A subsidy from the municipalities paid from property tax revenue could be envisaged for a period of 5 – 10 years. Another solution is to lower property tax accordingly.

Financial internal rate of the landfill component of about 5% confirms the moderate profitability typical for utilities with social purposes.

Suva City Council

Revenue and Expenses for Collecting and Dumping of Solid Waste in 2001

Note: 1) All Cost in FJD

2) Exchange rate October 2002 = 1 USD about 2.17 FJD

| Revenue | |
|--------------------------------------|-----------------------|
| from Dumping fees | 238,779.05 |
| Expenses | |
| Labour Cost | 461,224.92 |
| Direct Cost | 154,956.15 |
| Other Cost | 753,972.49 |
| Total Expenses | 1,370,153.56 |
| Total Deficit | |
| (to be paid by property tax revenue) | (1,131,374.51) |

The Road to Success

- Establish data base for
 - Waste sources, composition, quantities. Install weighbridge.
 - Activities in formal and informal waste management.
 - Infrastructure (densities, roads, spaces, buildings, etc), gis.
 - Attitude and behaviour of community.
- Access existing waste management system (Technical, environmental, financial-economic, social and cultural, institutional and organizational, policy and legal).
- Prepare waste management action plan and implement in small sustainable steps.
- Involve all persons with interest in waste issues. Treat them as valuable partners.
- Create comprehensive policy framework for waste management.
- Search for suitable sites for landfill, transfer stations, dropoff centres, etc. And start land acquisition process.
- Raise awareness, inform and educate all stakeholders.
- Start capacity building in all responsible government departments, councils etc. ■

Geneviève Dubois-Taine

This case is very interesting because it brings out the question of the coordination between political will, grants and expectations for the future. So one question : how can a European grant be managed locally without a political will? Does the European Union Fund help local authorities “climb” the steps? You try to go further but there is no political will and what Peter Heckel explained just right now is what must be done, what has to be done and I am sure that when you award grants in such a political situation, you know why you do it. Private enterprises would not have participated to this landfill, so the European Commission gave grants because private enterprises are not in the conditions to invest there. So, what do you expect through these grants and specially in this particular political situation?

Enrico Strampelli

Solid waste is first of all, as far as we see it, a public matter. The situation in Fiji as we have seen is extremely peculiar. Basically, what has been done in the last 50 years is just to pile up the rubbish there. Basically, the idea is that with our grant the Fiji government will be able to finance a new structure that will replace the old structure and to address the issues that have to be addressed according to the presentations that we have heard, by the stakeholders themselves. How do we enforce this? The conditions are in the financing agreement. We have told the government: “look, we give you the money to do this, we monitor the implementation of this, but you have to do this, this and that.” If they do not do it, we will think about it and we will decide what to do with our next cooperation program. This is all we can do.

What I was trying to explain is that we were somehow approached by the government to assist

them in a situation that is an emergency. This problem should have been dealt with by ECHO, our Emergency Office, more than the DECP. So, once the decision is taken to go ahead with financing infrastructure components - and again the decision is taken also because the events of Fiji brought in a kind of relativity effect - then what we can do is to enforce with the means that we have the application of the financing remedy we sent. I mean this is a grant, not an income-generating project.

Peni Gavidu

When the European Union provided the grant, it hired a consulting firm, “Hydroplan”, to assist the Fiji government in carrying out this waste management program, and Peter Heckel works for Hydroplan. They have already submitted to the government of Fiji a document called “addendum 1”. The document identifies all the waste management programs that we need to pursue in order to meet the key objectives which are: minimizing waste; maximizing environmentally sound waste reuse and recycling; promoting environmentally sound waste disposal and treatment; and extending waste service coverage.

We are trying to follow these objectives closely. It is a new direction; what is being done at the moment needs to be changed; and it needs the collective effort of all the stakeholders; they have to come together for us to pursue these programs. They are there in black and white. The challenge at the moment is that we need to convince the people that this is the way forward. We know what to do, and the standards to be met. We need to convince the stakeholders and one or two of them seem to be guarding their roles in respect of waste management jealously; for example, the Suva City Council plays the leading role in waste management at the moment.



With these new programs, Suva City Council is not displaying the kind of commitment that we expect from them. We are finding it difficult to obtain information on tariffs from them. In order for tariffs to be increased we need the approval of the Central Board of Health, the membership of which is drawn from different organizations, some of which have nothing to do with waste management and may not be as sympathetic to the problems and issues of waste management. We need to convince people from other organizations and professions and all stakeholders and this is what we are doing at the moment before the Naboro Landfill project comes into operation sometime in the middle of 2004, after its construction works are completed.

Alf Simpson

I am not too sure about this particular one and the issue of waste management in Fiji. Trying to address the issue in the capital Suva has been going on for a long, long time, maybe over 30 years. Once upon a time, there was, in the colonial era, there was this rubbish dump, called the “Lami rubbish dump” which was operated quite efficiently. Of course, Suva was a different size, and they had access to proper material to cover the rubbish, they used to take the sediment from the harbour, suck it in by dredge, and they used to use it for cover. But over these last few years, we have ended up with a system, which is mismanaged, ill-managed, abused and they have used all kind of excuses.

The problem we’ve got here is that we blame the people. The people are citizens who create waste; they pay taxes and city rates and they expect somebody to collect their waste and dispose of it in a proper way. And here, we have them caught between the government, and a City Council and it has gone on for many, many years. , Even when I was in government many years ago, we blamed one against the other, we said this was a City Council issues, then it was a government issue and so it went backwards and forwards, backwards and forwards... And then there was the difficulty in finding a new site. The landowners of potential new

sites and everybody else could see and say “this is where the Suva rubbish dump is, are you going to come and duplicate this in my area, this is my land , do you want us to accept this kind of system?” It was a major difficulty in convincing everybody because they said, “we do not want this”, “we do not want the same thing in our backyard”. This is the fundamental problem here.

Regarding the European Union project, I presume that the best chance that this may have, is that it may be run like a business. If you can run it like a business, maybe you’ve got a chance but if you are going to have a local government and a national government involved in this, who knows nothing about running such a business, then it is doomed to fail. There is no political will to run this because there is no national priority for this.

But I do not think that the problem is with the people. People demand services, they pay for it and they expect somebody to do it. The person who was supposed to do it for the last 30 years has not delivered. It is a big problem.

Enrico Strampelli

One of the conditions of the financing agreement is that the new company must be financially sustainable. As you know, the ownership of the company, let’s say if the company must be public or private, this has been under discussions since many years and many governments in Fiji. The government that was actually brought down by the coup in 2001 wanted a public ownership of the dump and Brussels at that time was not in agreement with that. Of course, then the coup came, so we said we will see later. We did not start discussing that but there is a kind of political decision that I personally think - there is people in my house who do not share my opinion - that does not belong to us. What belongs to us is to insist and apply all the possible pressure in order to ensure that the Naboro Waste Management Company Limited is financially sound and safe and will be able to set aside the resources to enlarge and extend the landfill that will be financed by the grant. The grant is just the first step, the rest must be in their hands.

Geneviève Dubois-Taine

But how do you help to go further, because it is written in the agreement, but it is not because it is written that it will be done. How and who manages this improvement of the institutional systems?

Enrico Strampelli

First, and foremost, this project belongs to the Fiji people. The Fiji people is represented by the Fiji government. This project does not belong to us and this is valid for all of our cooperation, including for the European Union Water Supply projects in Samoa.

Second, our presence here: we are conscious that there are problems. The other projects that we have in Fiji, one of them is the bridge, for which there are not these big problems, it is just a bridge, you build a bridge, you can discuss about the institutional issues, the bridge is going to be maintained but the scale, the magnitude of the problems is far less than the one we face here. Of course, we are cautious of this and of course we are going to do what we can. We are discussing with the government at the moment, with the Ministry of Environment, to hire a project manager for this project, not a project manager for monitoring the construction works. We want somebody who will be in charge of the project for all its aspects, from the government side and we can finance it.

Tu'u'u Ieti Taule'alo

First, I want to congratulate the Fiji for getting this grant from the EU for this project. 8.5 million Euros is quite a considerable amount of money.

We are in a similar situation as that of Fiji. We have a dump in the mangrove area we showed you earlier, but we moved away from that some years ago and we have a landfill, which was developed by us with very limited budget, very limited resources, but we are still developing the best we can. One thing though that helped us to develop this landfill site and maybe here, this is just sharing our experience with you, that is public awareness.

Five years ago, people were telling us “changing public attitudes will take generations, if not more”. Well, I can say that we have been able to change attitudes in our own communities in relation to waste within considerable less time than generations. I think this is due to the fact that people see waste as a big problem, and that we have been able to communicate the issues involved to our communities. It has been very successful to the point now that we've got solid waste collection all around the country, on both islands, and we have developed landfill sites on both islands, and, of course, we would like to get lot of money for it, lots of resources, but nevertheless it is working and people see that we are moving a little bit forward each time.

One thing I would like to share with you, and that is getting from your report, your presentation, is the amount of organic waste you have. Is that 60-64%? We have similar waste content, it is about 68% organic, that is green, and about 10% for paper. What we are doing at the moment, and you might be interested in this is, and build it into your own program, we are doing a try, we are building now, an organic digester. That is not new, but it is new in the sense it is the first small scale digester for small islands. They've done this in Jakarta, the Philippines, but they are huge scale projects. This is a small one that takes something like 35 tons a day and you may be interested in that. We do not know yet what will happen, the idea is to try and trap the methane gas. Our own interest in that is dual, a/ we will be able to treat a lot of this waste, which is about 80% of our waste and b/ people in Samoa cook with firewood, so they're getting the catchments area and cutting that wood for cooking. We are hoping that we can develop this gas and try and sell it cheaply to our community. It is one of those type of projects where there is a partnership between the public and the private sectors. It is a pilot initiative, it should take about 18 months, not including construction, so let's keep in touch.

Lye Lin Heng

I have a number of questions. The first one is about the cost of this project, of maintaining this



project. Once this project has been built, this new landfill, how do you maintain its operation? From the figures that were given, it is maintained through property tax. Are you considering other options? The property tax is only a small portion, so the rest of it is heavily subsidized, isn't it? Are you thinking about another form of collection so that the polluter pays for example? That might be one option.

Secondly, how do you deal with hazardous waste? Because my understanding is that landfills are not adequate treatment for hazardous waste? Are you considering an incinerator, perhaps a small one? There must be hazardous waste in Fiji, no? Thirdly, in relation to recycling. I guess that your new project will be taking into account procedures for waste separation, etc... and I am glad to know that you mentioned the involvement of the informal sector because from the proceedings in Bangkok and Hong Kong, in the Bangkok experience, involvement of the informal sector is very important because there is a small industry there and people will be displaced if you do not involve them. And if we can take lessons from the Bangkok experience, there was a project that was highlighted, where the children are encouraged to bring in waste for recycling and an account is opened for them at the local bank, and every time they bring in something, they get a credit in their little bank accounts. That was just one example that we can learn from.

Peter Heckel

First, on the tariffs. As we said before, the "user pays" principle will be introduced, so that everybody pays for the waste which is actually produced. And to do that, we have to introduce garbage bins. Many households do already have garbage bins. However, it is proposed to introduce two standard volume garbage bins: one for "dry" waste and one for mainly organic "wet" waste, such as kitchen waste. Through this measure solid waste separation at the household level can be achieved and transport cost minimized.

A new solid waste tariff will be introduced. Solid waste charges will be added to the electricity bill.

This is the most promising method as electricity bills are almost 100% paid by customers. The electricity authority will receive a certain administrative service charge in the order of about 3%. During the start-up phase some financial help from funds raised from property tax will be required. After this solid waste tariffs will be gradually increased. Extensive public awareness programmes will soon be started. As you have seen from the figures, the system is sustainable. People are willing to pay for improved services.

As for the second question, hazardous waste presents a big problem. I think nobody at the moment knows how to solve the hazardous waste problem. A considerable amount of hazardous waste is already stockpiled in Fiji. Hazardous waste is a problem in all of the countries of the Pacific. Presently there are no funds earmarked for this and no expertise available for managing hazardous waste. The only realistic option is intermediate storage in safe containers and shipment to New Zealand or Australia for treatment and final disposal. This is maybe the only realistic option available. Of course avoidance of hazardous waste has to be encouraged in the first place. Programmes are now under development for example recycling of domestic and commercial waste such as batteries, fluorescent light tubes, paints, thinners, etc. We need the co-operation of the people. I believe that for proper management of hazardous waste only a regional solution is the best option. Fiji has not yet signed the Basle Convention. Fiji has to become first a member before hazardous waste can be shipped to Australia and New Zealand.

There is an incinerator working at the Colonial War Memorial hospital in Suva. Burning medical waste commingled with plastics and other materials safely, temperatures of at least 1,100 degrees are required to destroy dioxins and furans. Dioxins and furans present the greatest health hazards. That is why I mentioned before that our second by-law to be introduced prohibits burning of solid waste. I am not talking about organic waste such as garden waste. However,

usually people burn plastics and other materials together. The installed incinerator at the Colonial War Memorial hospital is burning waste at about 550 degrees which is by far too low. It is proposed to build a new incinerator at the new landfill site, specified for temperatures above 1,100 degrees. There are no stringent air quality standards for Fiji in place at this time. Control of air emissions is expensive, and may cost up to 75% of the total investments, which are huge amounts for any developing country.

Unfortunately, generated quantities of medical waste to be incinerated are relatively small. Efficient incinerator sizes start only from a certain minimum capacity. It makes sense therefore to burn medical waste of whole Fiji and neighbouring countries in order to increase waste amounts. Perhaps we could strike a deal, for example with Kiribati, Vanuatu, Tonga or Samoa, to ship their medical waste to Fiji for incineration. Kiribati for example wants to install incinerators on each of their small islands, which makes not much sense. Air pollution is not so critical because of the considerable dilution. Much more critical is the disposal of highly polluted ashes. This is a big problem facing all countries in the Pacific that have to be solved in a bigger way.

In Fiji alone we have about 120 000 cars running producing large quantities of waste tires and waste oil. In average there is one tire change per year or more per vehicle, because most of the tires are second-hand from Japan. This results in incredibly large volumes of tires per year. What can be done with these tires? The Japanese government wants to impose soon a tax on the recycling of vehicles of about 130 USD. Especially in Fiji, but also in other countries, a lot of second-hand cars are imported from Japan. Japanese car dealers have several advantages: they export vehicles, do not pay tax, and get the solid waste problem solved at the same time. And this not only concerns cars. Imagine all the exports of goods coming into our little islands. There is an inflow of goods and consequently generation of solid waste all the time. However, little waste

or recycled material is leaving the islands. We are still lucky in Fiji where we still have a relatively large land space for disposal, but imagine countries like Kiribati or Tuvalu. There is practically no area available to dispose of waste. What are they going to do with their waste?

It would be interesting for example to manage the waste for the countries in the South-Pacific region and transport waste and by-products by ship. For example waste from Kiribati could be shipped to Fiji for treatment and the organic portion returned as valuable compost for soil conditioning. Kiribati is in desperate need of organic soil. At the moment this is only a dream but could work out in future. The main problem is to arouse the interest of private companies because the “cake” is so small. They are not interested to “eat” it. However, a larger solid waste market could increase their interest. Private companies could effectively run the whole regional solid waste management based on contracts or concessions.

Lye Lin Heng

On the question of tires, is it not possible to have them retreaded, I thought that was one thing that used to be done until, at least in Singapore, we became too affluent, we did not want retreaded tires. But that is one option.

Secondly, I think the idea you mentioned, of Fijis or another Pacific island serving as a center for waste disposal and management is a very good one, and I think that the suggestion from Samoa to look into methanization, because with composting, or through methanization you use the sludge for agriculture, for improving the top soil...

Peter Heckel

Coming to your first question. Most of the tires in Fiji are imported from Japan and are retreaded. There are actually very few cars in Fiji running with brand new tires. There is a big taxi fleet in Suva and a lot of commercial vehicles. Most of the retreaded tires are worn out after approximately three months. As far as I know there is no company



in Fiji retreating tires at the moment. We have to find another solution to make use of waste tires. We approached a cement factory in Lami, a small town close to Suva. The factory imports coal and fuel from Australia to burn in their kiln. If the tires could be used as a substitute fuel, this would be a win-win solution. In European countries such as France and Germany, tires are used as substitute fuel for cement manufacturing. However, constantly large quantities of tires are required. The recycling market requires large waste material quantities and generally is not interested in small solid waste quantities. Without proper markets and the required volumes, regardless if it is paper, glass or other materials, recycling operations are not sustainable.

Geneviève Dubois-Taine

One conclusion to that discussion between Dr Lye and you and your team is that solutions at the local level are not at the right scale, and the Pacific islands have to find how to solve some of their problems at another scale, at that of a federation of islands, or something like that. I think it is a very important conclusion, because in all of our seminars we have these problems of scales, boundaries and so on... and about the right scales to solve the problems. I wanted to pinpoint that this topic of right scale to solve problems is a very important topic.

Bernadette Papilio - Halagahu

Concerning Wallis, where we are at a lower level of development, we already know this problem of waste. It is true that the politicians, and this is rather common in all this region, do not give priority to waste. All this to come back to what I was saying yesterday about the fact that even though we live in cities, most of the Oceania people still keep a rural way of thinking.

In Wallis we have an expert directing our environment service and he has asked other experts over who have done a study and put up a financing file. This has helped, just like the management of this file, not only to sensitise the politicians but also to make them take

the decisions they must take. Maybe this is turning the scheme the other way around, but in parallel this environment service has launched sensitisation campaigns not only in the schools but also through all the media, through village meetings, sensitisation of the chieftainships...

And to go along with what has just been said, in fact the PROE is already thinking about a way to treat all the solid waste from the region and today, for two years now, a pilot project is been run in Guam. I think the regionalisation of the project is already under way.

Mr. Strampelli, I also want to tell you that you have slightly shocked me, as representative of the European Union, when you said “it’s not our problem”. I think that in times of globalisation concerning sustainable development, it’s true that it is not your problem but, in a certain way, these problems come from urbanisation. And urbanisation is an imported problem here. So help us, make this problem your problem and help us solve it. This is real cooperation.

Enrico Strampelli

I should have specified. My point of view is that there is no sustainability in any development project without ownership. When I say, “this is not our problem”, I mean that the problem of ownership is not ours and should not be ours. The ownership of the project is of the people who live there, represented democratically, hopefully, by the government that represents them. It is not our problem of “fonctionnaires” of the European Commission or of citizens of Europe, it is a problem of ownership. Without ownership, there is no sustainability. We can finance for 30 years somebody running the solid waste management in Suva. Is it the right option? I do not think so. This is what I meant when I said “it is not our problem”. I hope it was clear.

The second thing just on the regional aspect, we have heard this many times. Theoretically very good. The idea is very good but it is very difficult to put into practice. This is my observation on this. ■