LENAKEL WASTE CHARACTERISATION REPORT

AUGUST 2014

For the LENAKEL MUNICIPAL COUNCIL & TAFEA PROVINCIAL GOVERNMENT

Lenakel Waste Characterisation Report 2014

EXCECUTIVE SUMMARY

A waste characterisation is an assessment of a population's waste. It is used to quantify how much waste and what kind of waste a population is generating for the purpose of planning for the future reduction, reuse, and recycling of that waste. This report is the result of the first Waste Characterisation Survey to be carried out by the Lenakel Municipal Council.

The characterisation of household and business waste took place in August of this year. Of a total of 165 recorded households, 40 were selected for the waste characterisation survey and 10 businesses were selected out of a total of 161 registered businesses. The waste characterisation was funded by the Lenakel Municipal Council, the Tafea Provincial Government and the Japanese International Cooperation Agreement (JICA). It was supported by Volunteer Services Abroad New Zealand (VSA) and Luganville and Vila Municipalities. The household and business characterisation was followed by a characterisation of waste from the market and public rubbish bins in September. At the time of writing, the Council does not collect household or businesses waste but does collect the market waste and empty the public rubbish bins.

The Results

The Household results show that on average each household is producing approximately 16 kg of waste every week. This equates to 839 kilos per household per year or 134 tonnes per year for the entire town. 76% of this waste is organic and 11% readily recyclable – this includes; cardboard, plastics PET 1 & HDPE 2, aluminium, tin and glass.

The Businesses results show that on average each business is producing approximately 24 kg of waste every week. This equates to 1.2 tonnes per business per year or 197 tonnes per year from the entire business community. 84% of this waste is organic and 9% readily recyclable.

Together, Lenakel's household and business population is generating a total of 331 tonnes of waste per year.

The Market results show that on average 567 kg of waste is generated from the central market every week. This equates to 29 tonnes of weight per year. 95% of this waste is organic and 4% readily recyclable.

The Public Rubbish Bins results show that on average 169kg of waste is collected each week. This equates to 8.8 tonnes per year. 72% of this waste is organic and 20% readily recyclable waste.

Together, the market generates and the public rubbish bins collect a total of 38 tonnes of waste per year.

Altogether, Lenakel Town is disposing of 369 tonnes of waste each year.

Recommendations

This report recommends a number of waste management initiatives for the Council with priority given to:

- The development of a **Waste Management Plan** for Tafea Province and Lenakel Municipality
- An application to donors for funding of a waste collection truck
- The placement of receptacles in town sectors for the collection of readily recyclable waste types
- Conduct awareness on issues with plastic bags, consider incentives to promote change
- Conduct awareness on hazardous and electrical and electronic waste
- Install a compost bin at the central market

Report prepared by: Elizabeth Brown, Waste Management and Landscape Adviser, on behalf of the Lenakel Municipal Council and the Tafea Provincial Government, with particular reference to Luganville Waste Characterisation Report 2013 prepared by Mary O'Reilly.

INTRODUCTION

In April of 2011, Vanuatu adopted its first National Waste Strategy 2011-2016 as a means to achieve National targets set out in the Pacific Regional Solid Waste Management Plan[1]. The overall goal of the National Strategy is:

> To create an environmentally sustainable Vanuatu, in which all types of generated wastes are collected, reused, recycled and treated by environmentally sound technologies suited to local conditions and waste going to landfill is minimised to the lowest possible amount.

In order to measure progress towards this Plan, it is important that detailed, accurate and up-to-date information regarding the composition of Lenakel Municipal waste is collected. The data collected and methodologies used will also be useful in relation to:

Waste Prevention and Minimisation - an important step in any programme to reduce waste is to determine what type and quantities of waste are being generated. This information enables waste types to be identified for reduction, reuse or recycling.

Waste Management Planning – accurate and up-to-date information on the waste being generated is essential for forward planning of waste management on a national, regional or local authority level.

Performance of Current Waste Collection Systems – data presented will indicate the capacity that the waste collection service will be required to meet in the future.

Development of New Waste Collection Systems – the data will identify the quantities of each waste stream to assist in the design of additional waste collection options.

Waste Campaigns – The improved data available will be useful to individual sectors in targeting areas for improved waste management.

[1] SPREP, 2010, *Pacific Regional Solid Waste Management Strategy 2010 - 2015,* Apia, Samoa

Introduction page taken from Luganville's Waste Characterisation Report 2013

STUDY AREA

LENAKEL TOWN

Lenakel Town is situated on the west coast of Tanna in the southern province of Tafea. The approximate geographical area of the town is 50 hectares. In July of this year, the Lenakel Municipal Council took a census of the number of households and household members within the Municipal boundary. The population is recorded at 839 of which 201 are boarding school students at Lenakel Presbyterian College. The population of the town experiences a significant influx of people on Mondays and Fridays, and particularly on Government pay days every fortnight. The social and economic centre of the town is the market place that is open on Mondays, Wednesdays and Fridays. The market on Wednesday is smaller than the Monday and Friday markets. Lenakel Bay is host to Tanna's only constructed cargo wharf. Between 1 and 2 ships visit the wharf per week to deliver and collect products and passengers.

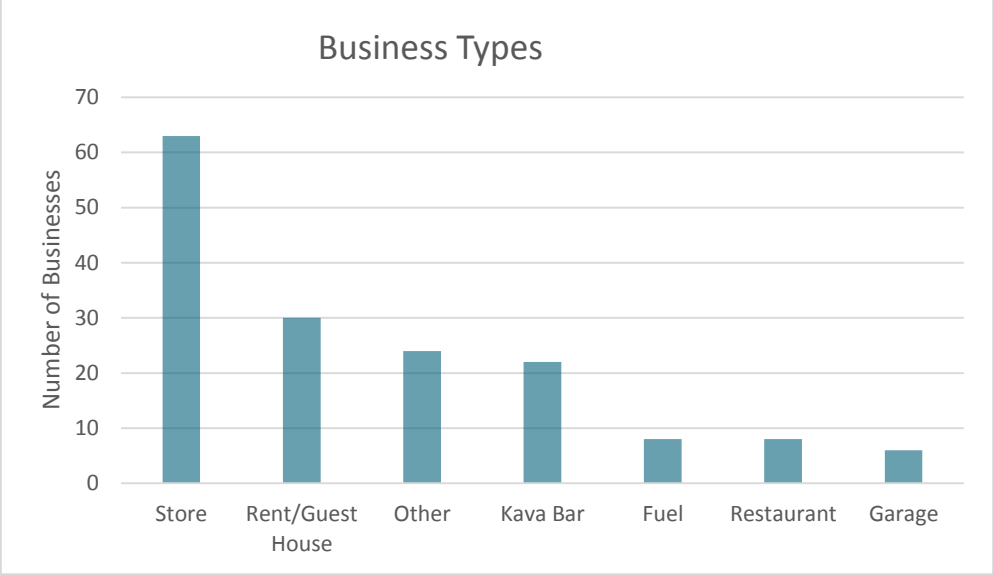
Household

A sample of 40 households were chosen from the 165 households within the Lenakel Town boundary. There are 12 sectors within the Lenakel Municipal zone and the number of households chosen from each sector was representative according to the total number of households per sector.

Business

From the 161 businesses registered in Lenakel a sample of 10 businesses were chosen for this study. The following graph shows the distribution of the main business types. The majority of the businesses are stores. This is followed by rent and/or guesthouses. The businesses were selected in order to be as representative as possible of the different business types currently operating in Lenakel.

Figure 1



LENAKEL MUNICIPAL ZONE

GEOGRAPHICAL MAP

KEY

- - - -	Lenakel Municipal Council Boundary
→	Road to the Council's Storage Site (outside the Municipal boundary)
1-12	Indicative locations of Lenakel Town's twelve sectors
M	Central Market
C	Lenakel Presbyterian College
S	Stadium
W	Wharf
H	Hospital (outside the Municipal boundary)

Top and Below: The central market in Lenakel

Top: Municipal Council staff empty a rubbish bin at the market into the back of a truck.
Below: The Council's storage site, organic waste is disposed of in the dry stream bed to the right

METHODOLOGY

HOUSEHOLD, BUSINESS, MARKET & PUBLIC RUBBISH BINS

In July 2014, two men were contracted by the Lenakel Municipal Council to conduct a census of Lenakel Town. These men recorded the family name of all the households and the number of members. In early August, these two men were contracted to revisit all the households and businesses with the Municipal boundary to make all residents and businesses aware of the Council's upcoming Waste Characterisation Survey.

There are 12 sectors in Lenakel Town. Households were randomly selected to participate in the survey. The number of households selected from each sector was representative of the number of houses in that sector; those sectors with more houses had more households selected for the survey. The businesses were selected by a Municipal staff member so as to be as representative as possible of the business types, and the number of those business types, in Lenakel.

On Monday 25th August, the Municipal staff hand delivered a plastic bag to every participating household and business. The staff explained during the handover the expectation that all waste generated by the household or business that day was to be put inside the plastic bag, excluding what food waste was required to feed their animals. Every household was assigned a number and each business a letter so as to identify where each bag of waste originated from. On the mornings of Tuesday 26th, Wednesday 27th, Thursday 28th, Friday 29th and Monday 1st September, waste from the previous day(s) was collected, in two or three loads, by the Municipal truck. The waste was then delivered to the Municipal Council building inside of which the characterisation took place. At the time of collection, staff and assisting students would hand over a new plastic bag for that days waste and answer any questions raised by the participating households and businesses.

Waste Characterisation and Survey Process

Seven staff from the Lenakel Municipality and six secondary school students from Lenakel Presbyterian College, worked together to audit one week's waste. The total weight of each plastic bag or basket was weighed and recorded after which the contents were tipped out onto a table to be sorted in alignment with Luganville's 2013 Waste Characterisation[2] assessment sheet. Each waste type was then weighed. At the end of each day, or the following day, audited waste was loaded into the Municipal truck and taken to the Storage Site. The students were present for four full days during their school semester break and were paid a per diem for their services.

Two of the staff and two of the students used a questionnaire to conduct an oral survey of the selected households and businesses. The purpose of the survey was to gain insight into the population of Lenakel including; an indication of the demographic of households, levels of education, employment status and what people think about waste management. Most of the questions had a selection of 'tick box' answers from which the respondents could choose. Respondents were also invited to give any other comments.

Market Waste and Public Rubbish Bins

On Friday 5th of September, Municipal staff cleared the pile of waste at the market and took it to the storage site after which they emptied the public rubbish bins, the contents of which also go to the storage site. On Wednesday 10th of September, four staff from the Municipal Council audited the market waste pile at the back of the market and the five market rubbish bins. On Friday 12th of September, the newly accumulated pile of waste at the back of the market was audited. That afternoon, the waste inside the public rubbish bins was collected and some of it audited in the shed of the Municipal building. What was not completed on the Friday was completed on Monday 15th September.

[2] O'Reilly, M, 2013, *Luganville Waste Characterisation Report,* Luganville, Vanuatu

HOUSEHOLD - SURVEY RESULTS

The following information is a summary of the survey data that was completed by all of the 40 participating households.

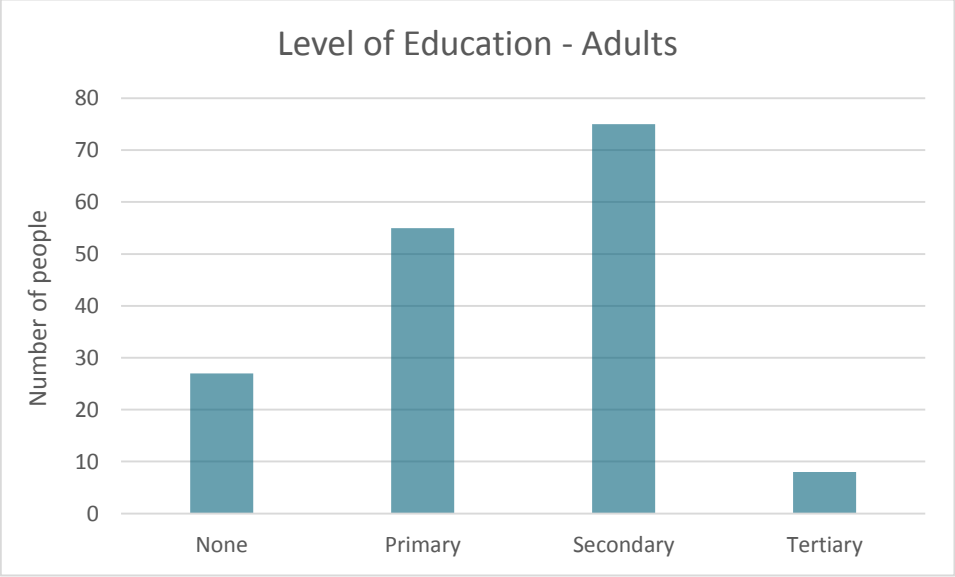
Household Size

With 255 people participating in the study across 40 households the average household size was 6.6 people. The smallest household had 3 people and the largest 15. There was a relatively even spread across the households with 47% set up as nuclear (parents and children) and 47% in extended family arrangements. The last 5% indicated 'other' household arrangements.

Education

Figure 2 below shows the highest level of education achieved by adults surveyed. Of the 165 adults surveyed, 16% have not received education, 33% have a primary level qualification, 45% a secondary education and 5% have attained a tertiary level education.

Figure 2



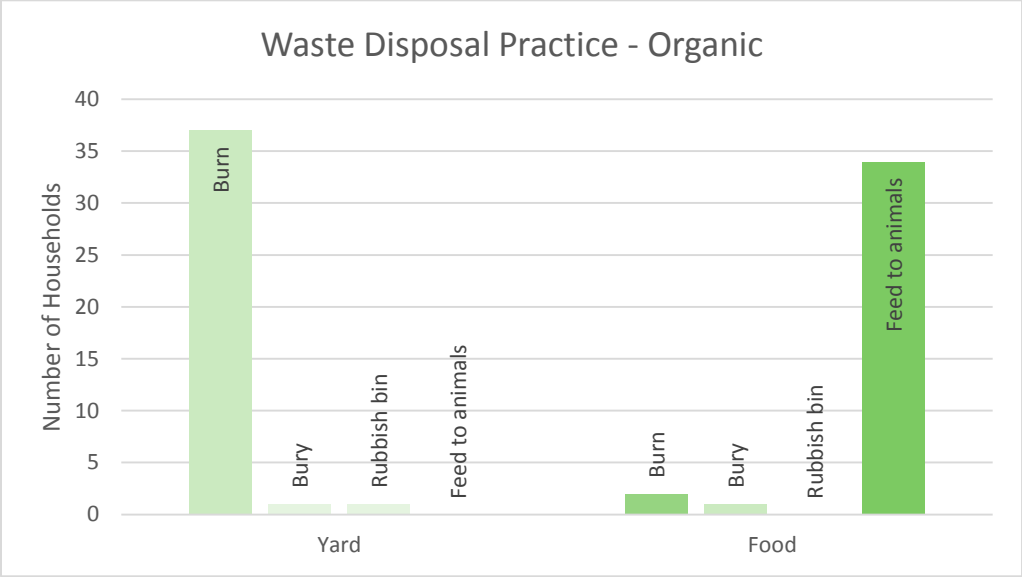
Income/Employment

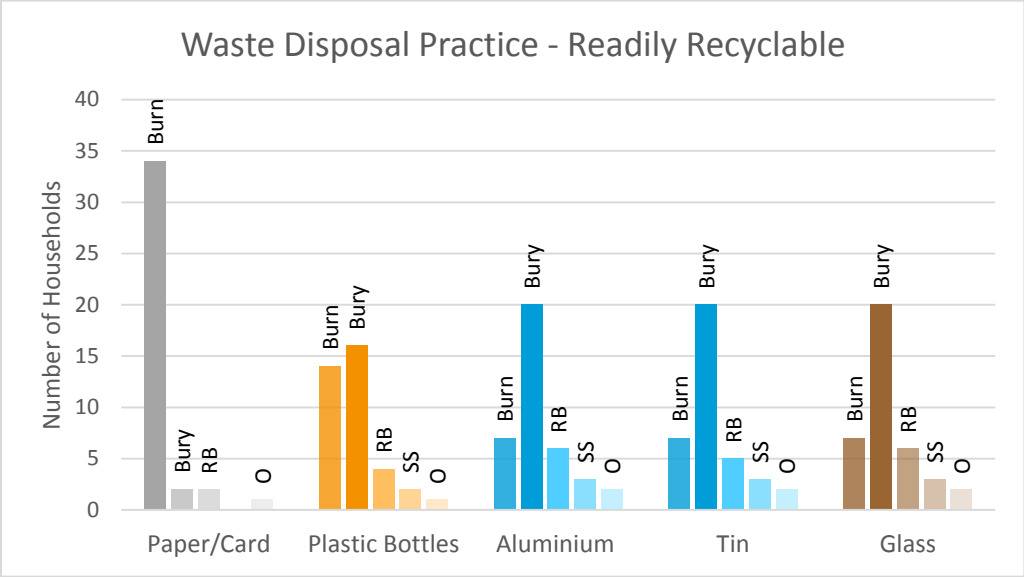
The survey showed that 7 out of the 40 households (18%) did not have one or more income earners. Of the 75 people who stated that they were employed, 12 did not specify what type of employment. The form of employment that greatly exceeded any other was store attendants at 37% of the surveyed working population. The second most common form of employment was in Government positions (9%) followed by employment at the hospital and or in the health sector (7%). There was a fairly even spread between 4% and 5% over other forms of employment; small contracts, tourism, office, church, driver, restaurant, bakery.

Waste Disposal Practices

The participating households were asked how they currently dispose of each type of waste. Figure 3 on the following page shows that the majority of households burn their yard waste (95%), and use their food waste to feed their chickens and pigs (92%).

Figures 3 & 4





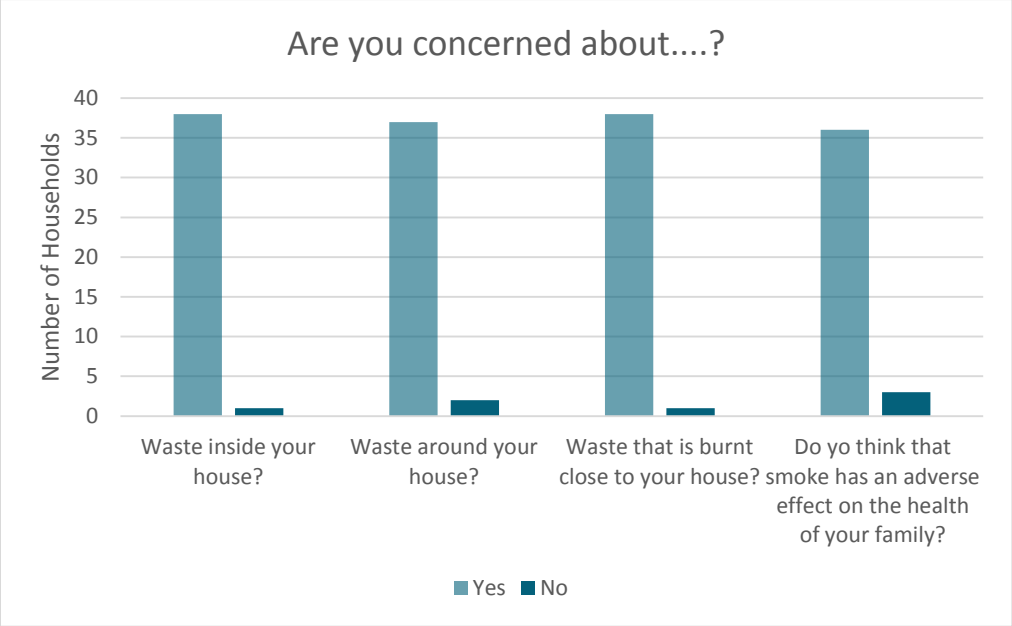
RB = Rubbish Bin SS = Storage Site O = Other

Figure 4 above shows the practice of disposal of readily recyclable materials. The most common practice for disposing of plastic bottles, glass, tin and aluminium is to bury it. The second most common practice is to burn it, particularly plastic bottles. Three households take their recyclable waste, excluding paper/card, to the storage site. One household said they kept their recyclable waste in their house. Another household said they just threw it wherever. For paper and cardboard, the most common disposal method is to burn it (87%).

Waste Management Awareness in Lenakel

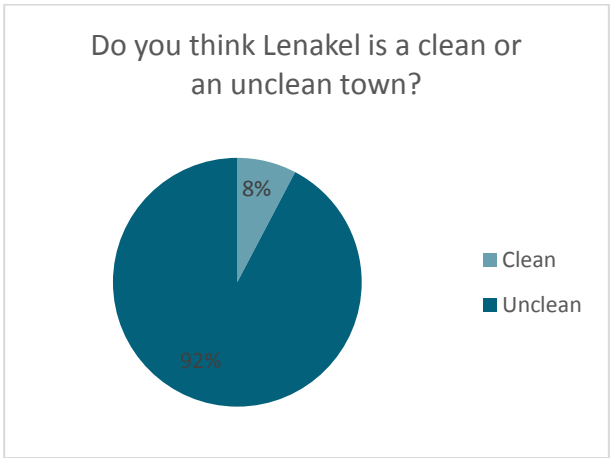
The oral questionnaire that was conducted in conjunction with the waste characterisation included a number of questions that were designed to ascertain whether or not people living in Lenakel are aware of and concerned about what happens to their waste. Figure 5 lists the four questions that were asked to understand concerns about waste management at a household level. The graph shows that there is a consistently high level of concern with regards to the management of household waste and an understanding of the link between smoke and health issues.

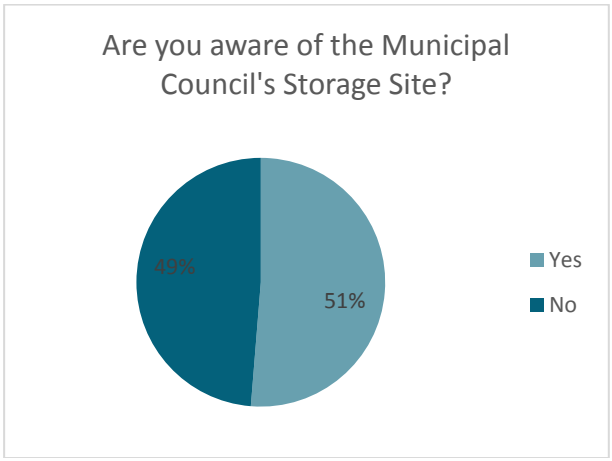
Figure 5



The questionnaire also included two questions that were designed to ascertain what people thought about waste management in Lenakel. Figures 6 and 7 illustrate the answers to these questions. The majority of respondents (92%) think that Lenakel town is unclean and approximately half (51%) are aware that the Municipal Council has a storage site.

Figures 6 and 7





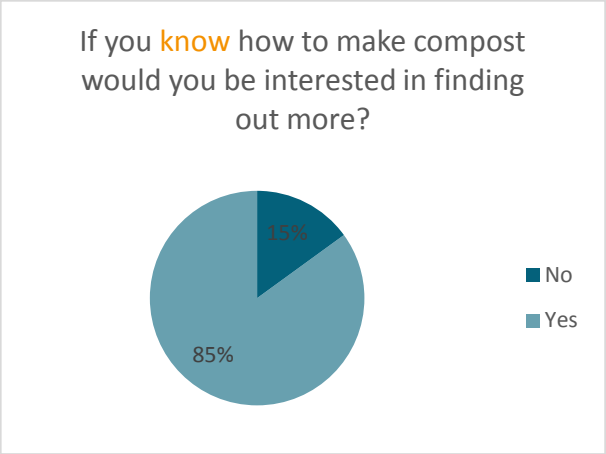
Willingness to Change

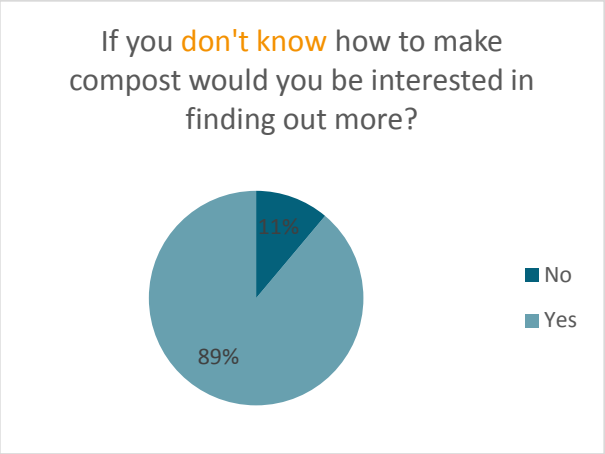
The householders were asked three questions about their current behaviour with regards to waste management and their willingness to change. The first question was whether or not they take reusable bags to do their shopping. Thirty of the respondents said they do (79%).

The householders were also asked if they knew how to make compost using their food and garden waste. Twenty, or 53%, said that they knew how to make it. The next question was whether or not they would like to attend a training to learn how to make compost. Interestingly, as figures 8 and 9 show below, 85% of those who said they *already knew* how to make compost would like to attend a training and 89% of those who said they don't know how to make it would also like to attend a training.

The interest shown by those who say they *already know* how to compost organic waste may indicate that there is a gap between the knowledge of making compost and the practical application of that knowledge, or, that people have limited resources to implement a composting system, or, the respondents were unsure if they knew what was meant by the composting of food and yard waste. Altogether, 94% of respondents are interested in learning about making compost, which is a very positive result for future waste management initiatives with organic waste.

Figures 8 and 9

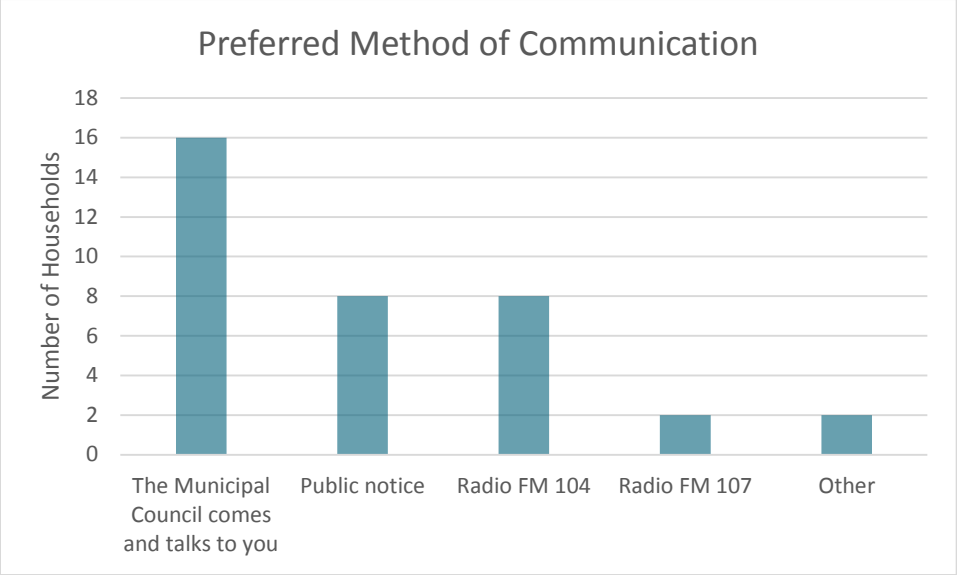




Communication

The householders were asked what the best method of communication would be when the Municipality wants to inform them of new waste management projects and initiatives. Figure 10 shows that there is a strong expectation that the Municipal Council will personally communicate waste management initiatives to those living in Lenakel. The second, equally popular options were the use of Radio FM 104 or public notices.

Figure 10



Extra Comments

When asked if respondents had any further comments, these responses were given:

The Council should:

- Make households aware of waste management initiatives
- Have a waste collection truck
- Organise a day to pick up all the rubbish in town

Summary

The survey shows that the households surveyed:

- Have a reasonable level of understanding about the basics of waste management.
- Are concerned about what to do with household waste.
- Show a high level of interest in learning about composting organic waste.
- Expect that the Lenakel Municipal Council will personally communicate with households about any waste management initiatives.
- 20% of households had extra comments relating to waste management initiatives that they think the Council should undertake.

Staff from Lenakel Municipal Council explain the waste collection process to a household representative.

The main road south out of Lenakel. The southern extent of the survey area and the Lenakel Municipal Boundary is indicated by the dashed red line.

Weighing small and or light amounts of sorted household waste and recording the details.

Students from Lenakel Presbyterian College and staff from Lenakel Municipal Council weigh and record the total weight of a bag of household waste.

HOUSEHOLD – WASTE CHARACTERISATION RESULTS

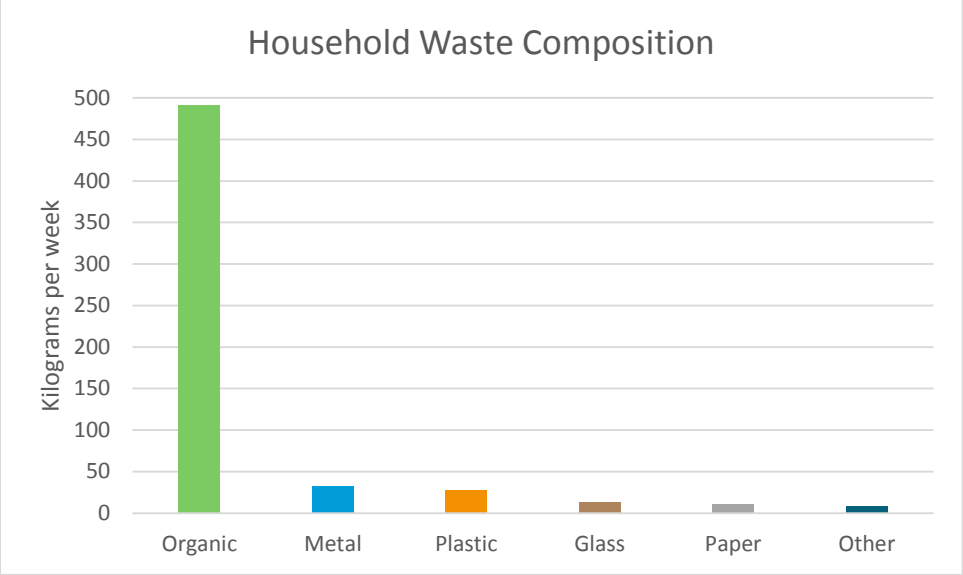
Waste Generation

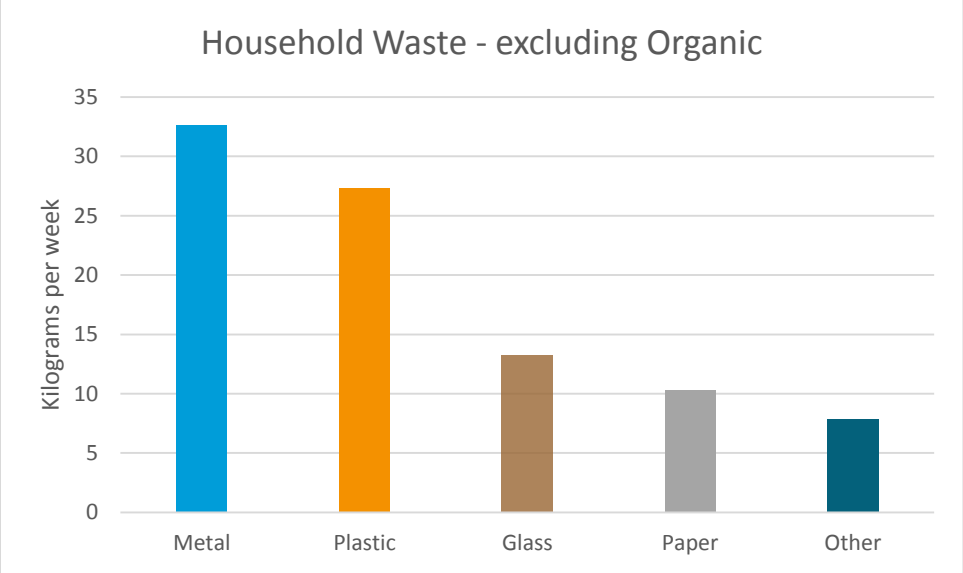
Over the seven day collection period the 40 households (255 people) produced a total of 583 kilograms of waste. This equates to approximately 2.5 kg per person per week.

Household Waste Composition

Figure 11 below shows the composition of all the waste generated by the participating households. The majority of the waste is organic - 84% or 491 kilograms. Figure 12 shows in more detail the quantity (by weight) of waste types – excluding the significantly larger organic waste type.

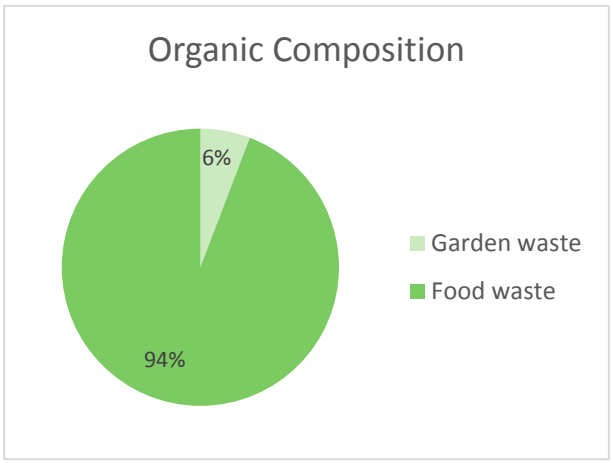
Figures 11 & 12

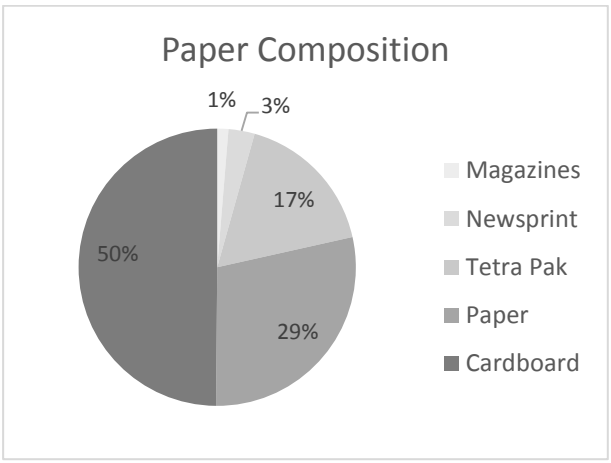


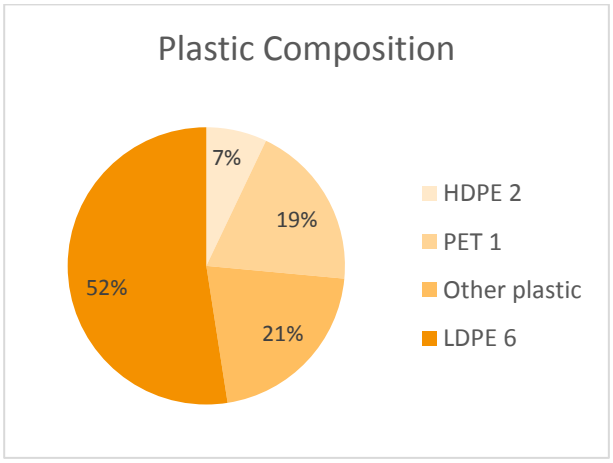


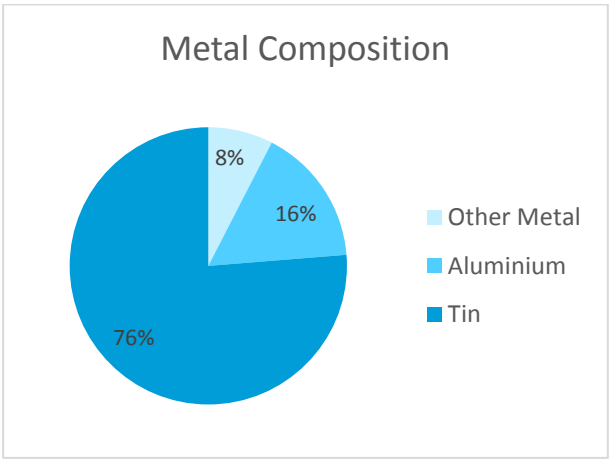
Figures 13 – 17 show the composition of the different waste types. The majority of the organic waste collected was food (94%). The majority of paper waste was cardboard (50%). Over half of plastic waste was LDPE 6 or soft plastic. The majority of metal waste was tins with a total of 25 kilograms collected. Only 257 grams of hazardous waste was recorded. Figure 18 shows in kilograms how much of each readily recyclable waste type was collected.

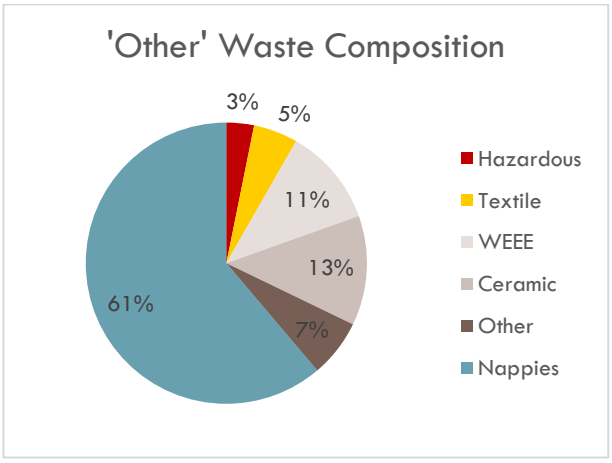
Figures 13 -18

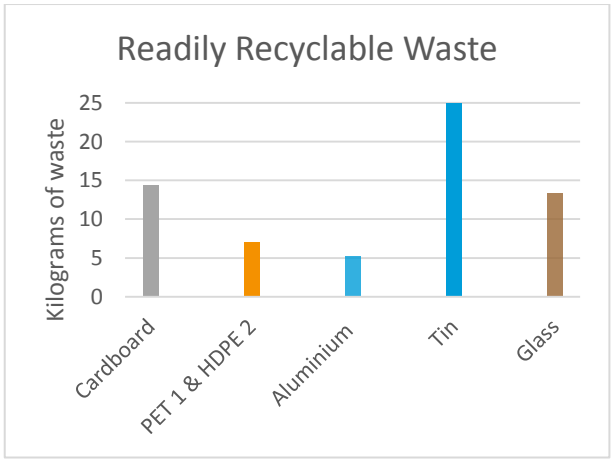












HOUSEHOLD - DISCUSSION/ANALYSIS

Organic Waste

This study showed that the majority of waste generated by households was organic and in particular, food waste. Of the 491 kilograms of organic waste collected over the seven day period, 463 kilograms or 94% was food waste, only 6% yard waste. Approximately 2 tonnes of organic waste is being generated each week by the 165 households within the Lenakel Municipal boundary.

According to the survey, 34 out of 37 households (92%) feed their food waste to their animals (chickens, pigs and dogs). This is a sustainable waste management practice which can be encouraged, particularly in the absence of a composting system. Assuming the population of Lenakel will increase and become more urbanized however, it is likely that the percentage of food waste that is fed to animals will decrease as the land area for keeping animals becomes scarce and those families who have members employed can afford to buy meat on a regular basis.

In comparison to the amount of food waste collected, there was very little yard waste, only 28 kilograms. In the survey, 37 out of 39 households indicated that they burn their yard waste (95%). It may be that burning yard waste is such a common practice in daily life here that the idea of trying to fit a pile of leaves into a plastic bag, or some other basket, didn't make much practical sense, and so very little was collected during the characterisation.

When households were asked whether they would be interested in learning how to make compost, there was a very positive result with 94% willing to find out more. Producing compost is a worthwhile activity on an island where almost everyone has their own garden and grows their own food, and this lifestyle reality may be the reason for the high level of interest. Nasi Tuan, a local NGO that works in Middlebush, central Tanna, conducted composting workshops in that area in 2012. After the course however, they did not see the uptake of composting by communities. They concluded that, the ash fall from Yasur volcano constantly enriches the soil so that even with a short fallow period, the fertility of the ground is such that it is still possible to grow large and good quality fruit and vegetables and therefore there is less incentive for communities to compost. In comparison to Middlebush however, Lenakel is hot, dry, and dusty, with a concentration of concrete block buildings and a road network that have contributed to the loss and compaction of the top soil layer. Enriching the soil of Lenakel through composting therefore may have a more permanent uptake.

The focus for the coming year with regards to household organic waste should be:

Home composting training

Readily Recyclable Waste

Altogether, 65 kilograms of readily recyclable waste types were collected from households over the week. For the purpose of this report, these waste types include; cardboard, plastics PET 1 and HPDE 2, tin, aluminium and glass. They made up 11% of the total waste. These waste types have the potential to be separated out and set aside for future potential recycling – this would most likely involve shipping them to Vila. Assuming that the population, urbanization and employment rate of Lenakel will continue to increase, it can be assumed that the volume of these waste types will also increase.

While the generation of these readily recyclable waste types are yet quite low, the best management of them may be to locate a series of receptacles for their disposal in each town sector. For example: a group of four

receptacles; one for plastics PET 1 and HDPE 2, one for aluminium, one for tin, and one for glass. These receptacles could be emptied by the Council on a fortnightly or monthly basis depending on waste levels. The Municipal Council will need to source financial support from a donor for the purchase of a truck with which they can begin this waste collection service to town sectors. In order that it be a sustainable collection service, it is recommended that there is a 'user pays' element to this service.

As most of the households surveyed do not own a truck (82%) and there is a very limited number of buses that operate in Lenakel, it is not realistic to expect that households transport their waste any further than their area of residence.

It is not considered a priority to collect cardboard as the Council does not have a storage shed in which this could be kept dry, and given that the Council does not own the storage site, it doesn't seem feasible long term to construct a storage shed there.

Below is further analysis and observations relevant to each readily recyclable waste type:

Cardboard
In total, 10 kilograms or 1.8% of paper was collected from households of which 5 kilograms was cardboard. Only 314 grams of newsprint was recorded which is not surprising given that there are currently no newspapers for sale on Tanna. Much of the 'paper' collected was toilet paper as opposed to office paper. This result reflects many aspects of life in Lenakel: that only one store sells tissues, which are much more expensive than a roll of toilet paper; the daily life of the population is largely lived outside - there is little requirement to write anything down; and the preference for oral communication. It is likely that the result is also influenced by the practice of burning of paper waste - 87% of the households surveyed said that they burn their paper waste.

Plastic (1 and 2)
7 kilograms of plastics PET 1 and HDPE 2 were collected.

Aluminium
In total, 5 kilograms of aluminium was collected.

Tin
25 kilograms of tin was collected. There may be opportunity for small businesses to produce simple products for local sale like sinkers for fishing.

Glass
In Lenakel, the main glass products are beer bottles. The author has observed perhaps three to four large piles of Tusker beer bottles stacked in household yards, and there may be many smaller piles in other locations. One business, works on behalf of Vanuatu Brewing Company to 'take back' Tusker glass bottles, giving out 10 vatu for each bottle in payment. The Council may want to oversee the collection of these bottles in the future.

The focus for the coming year with regards to readily recyclable waste should be:

Apply for funding for a waste collection truck, Placement of receptacles in town sectors for the collection of readily recyclable waste types, Research opportunities to ship readily recyclable waste to Vila

Plastic Bags

LDPE or soft plastics, including plastic shopping bags and food wrappers, are very difficult to recycle as they have very high rates of contamination from food and liquids. At 52% of the plastic waste generated by households, it is a significant waste management issue that is best addressed at the source – the importers and providers of plastic bags. Initiatives relating to the management of this waste type can be found in the Business Discussion / Analysis on page 31.

Hazardous Waste and Waste Electrical and Electronic Equipment (WEEE)

In this characterisation of household waste, 257 grams of hazardous waste and 914 grams of WEEE was recorded. Hazardous waste is the most dangerous type of waste because it contains toxins that, even in small amounts, have very adverse effects on the environment. The hazardous waste collected was primarily made up of batteries and engine oil. WEEE also often contains hazardous chemicals.

It is assumed that the urbanisation of Lenakel will increase and that these types of waste will likewise increase as more people have access to electricity. At this time therefore it is important to raise awareness of hazardous and WEEE waste and to inform households of what to do with it. It may be that collection points or days once or twice a year would be an appropriate place to start. The safe storage of this waste at the Storage Site will need to be addressed.

The focus for the coming year with regards to hazardous and electrical and electronic waste should be:

Awareness of Hazardous waste and WEEE, Collection days,
Safe disposal area at the Storage Site

Education and Awareness

Any initiatives that may be implemented as a result of this report, or later when the Waste Management Plan is developed, will need to be supported by education and awareness campaigns. For households, these awareness campaigns should involve staff or representatives from the council personally informing households or town sectors of waste management initiatives. The information provided will help to ensure the smooth implementation and continued operation of waste initiatives. In addition it will assist in educating the community to reduce waste in every aspect of their lives, through increased awareness of environmental issues, provoking a response to change their behaviour, and providing access to the knowledge and skills to do so.

LIMITATIONS

A number of factors need to be taken into consideration whilst reading this report:

- The participants were asked to place all of their waste into the plastic bags provided except that which they needed to feed their chickens and pigs. Therefore, it is likely that more organic waste is generated than what was recorded.
- As with all waste characterisations, there is a risk that some participants will use this 'free' collection as an opportunity to have a clear out of rubbish that is lying around. This is inevitable and may change the results slightly, but when these waste quantities are extrapolated out for the entire town it should not significantly affect the results.
- At times during the characterisation, it was unclear as to what type of plastic some containers were because of the absence of any identification mark. It may be that there was slightly more HPDE 2 plastic than recorded as some of the harder plastic items with no label were noted as 'other plastic'.

BUSINESS – SURVEY RESULTS

The following information is a summary of the oral survey data that was completed by 9 of the 10 participating businesses. The businesses were selected in order to be as representative as possible of the different business types currently operating in the town: 1 kava bar, 1 guesthouse, 1 restaurant, 1 fuel station, 2 garages and 4 stores.

Staff numbers

A total of 33 full time staff and 17 part time staff are employed across the 9 businesses that completed the survey. Two businesses indicated they have only one staff member. Two stores indicated they have 10 staff members which was the highest number of employees of the businesses surveyed.

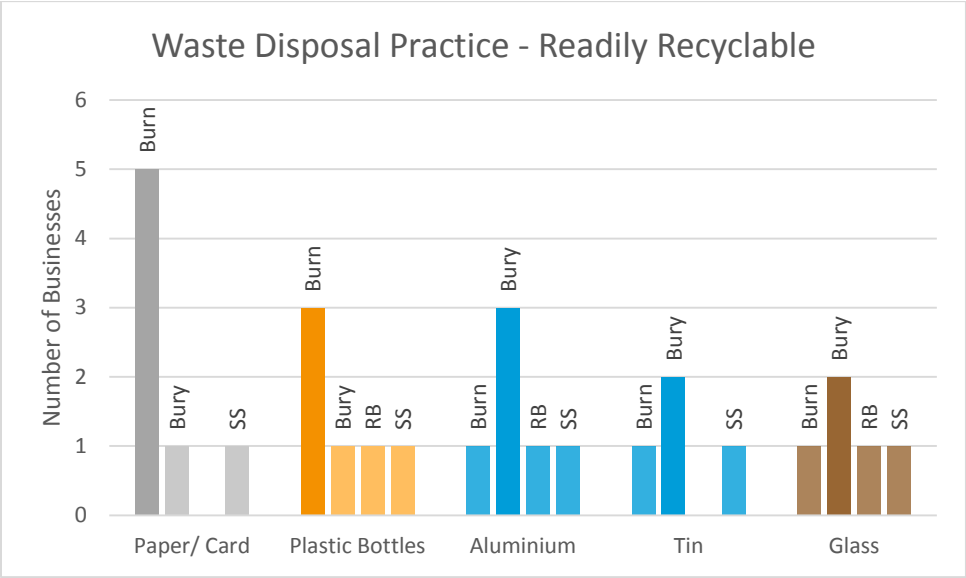
Current waste types

Each business was asked to list what wastes they currently generate and their responses reflect the actual results found in the waste characterization.

Waste Disposal Practices

The participating businesses were asked how they currently dispose of each type of waste. Figure 19 below shows that, like the households surveyed, the majority of businesses burn their yard waste and use their food waste to feed chickens and pigs. The one participating Kava Bar said that they leave the makas (ground and squeezed kava root) for the rats to eat as they believe that to burn the makas would spoil the kava.

Figures 19 and 20



RB = Rubbish Bin SS = Storage Site O = Other

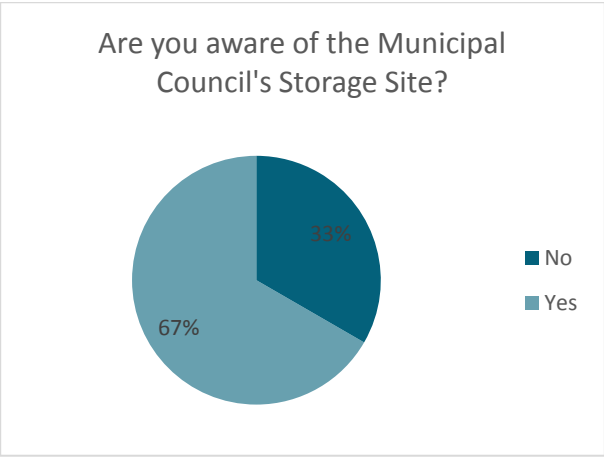
Figure 20 above shows the practice of disposal of recyclable materials. For each waste type, a preferred method of disposal is evident after which there is an even spread across secondary disposal methods. The most common practice for disposing of aluminium, tin and glass is to bury it. Unlike the household survey, in which the preferred method for disposing of plastic bottles was to bury them, half of the businesses indicated that they prefer to burn their plastic bottles. As per the household survey, the majority of paper and cardboard waste is burned.

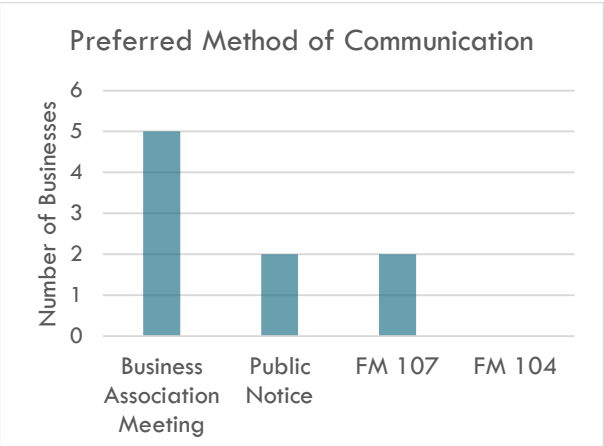
Three businesses; 2 garages and 1 store, indicated that they take their waste to the Municipal Council's storage site. One of those garages and the store said that they take their waste once every two weeks to the storage site. The second garage said that they take their waste once a month.

Waste Awareness

Figure 21 shows that 6 of the 9 businesses knew of the Municipal Council's storage site.

Figures 21 and 22





Communication

Each business was asked what the best method of communication would be when the Municipality wants to inform them of new waste management projects and initiatives. Figure 22 on the previous page shows that the majority of respondents thought that the Business Association Meeting was the best way for the Municipal to communicate with them. Two businesses thought that a Public Notice would be best, and another two businesses suggested FM 107. None of the businesses indicated FM 104 as a method for communication, in contrast to the household respondents where it was considered more favourable than FM 107.

Extra Comments

When asked if respondents had any further comments, these responses were given:

The Council should:

- Conduct more awareness campaigns so that people understand the importance of waste management
- Clean up the streets in Lenakel by collecting the rubbish on the ground
- Collect business waste –the business that made the comment said they would be prepared to pay for the service.

Summary

The survey shows that the businesses surveyed:

- Have a reasonable level of understanding about the basics of waste management.
- Are concerned about what to do with business waste.
- Have an expectation that the Council will communicate waste management initiatives at Business Association meetings.

Top: A student helper collects a full bag of business waste and hands over a new plastic bag.
Below: The collection of business waste from one store

BUSINESS - WASTE CHARACTERISATION RESULTS

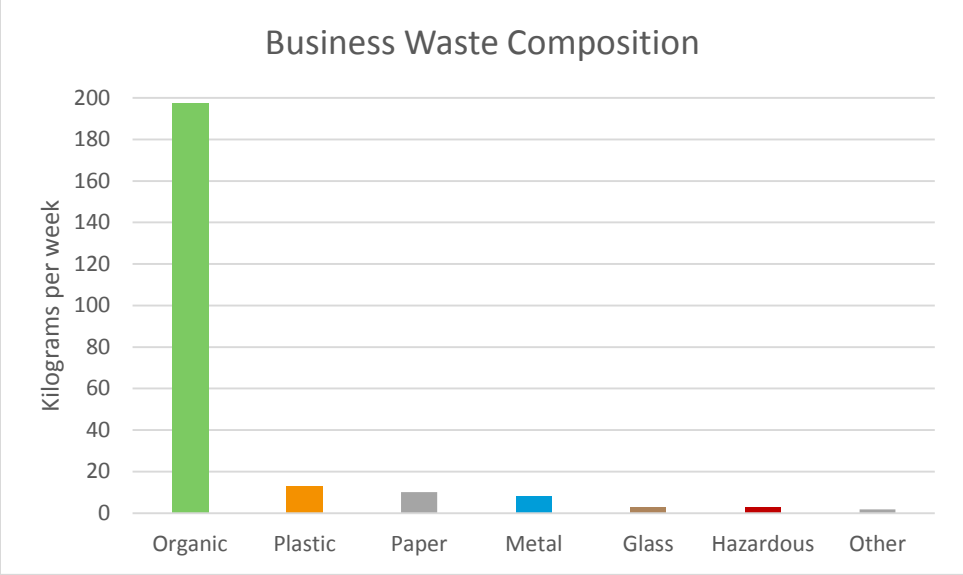
Waste Generation

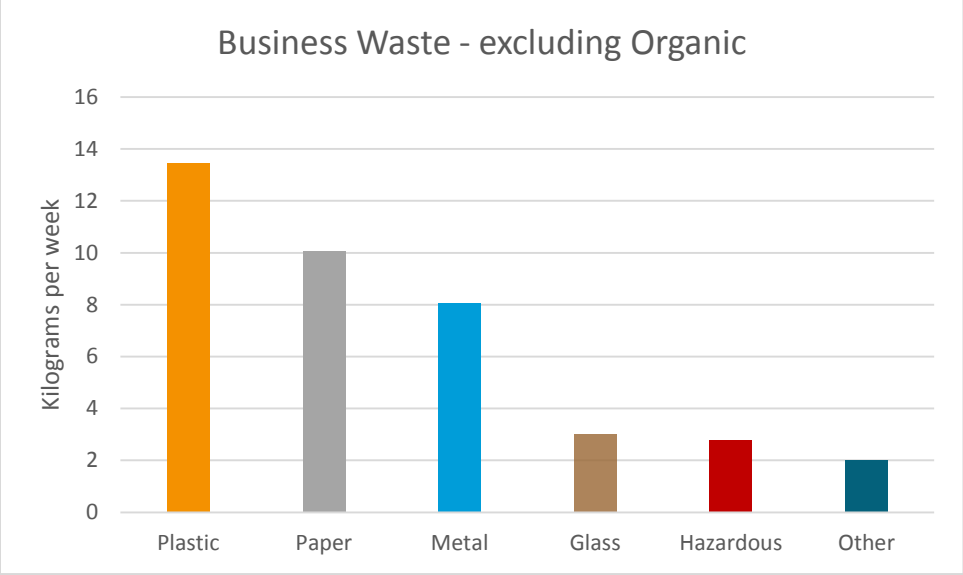
Over the seven day collection period the 10 business employing 33 people produced a total of 236 kilograms of waste. This equates to approximately 24 kilograms per business per week or 3.4 kilograms per business per day.

Waste Composition

Figure 23 below shows the composition of all the waste generated by participating businesses. The majority of the waste is organic, a total of 197 kilograms or 84% of the total waste generated. Figure 24 shows in more detail the quantity by weight of waste types – excluding the larger organic waste type.

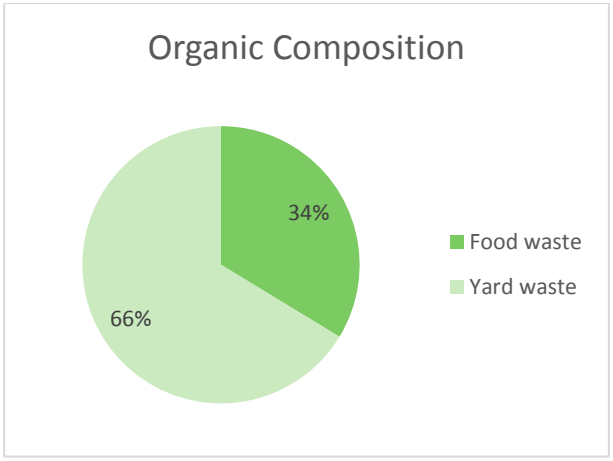
Figures 23 & 24.

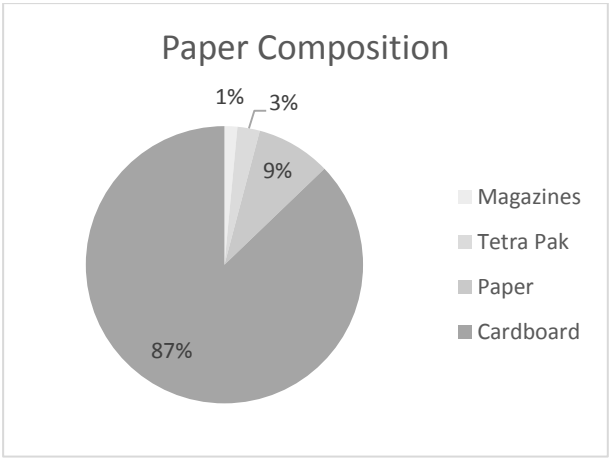


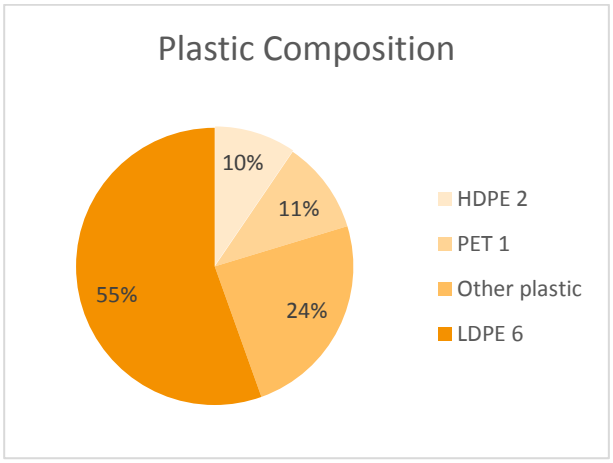


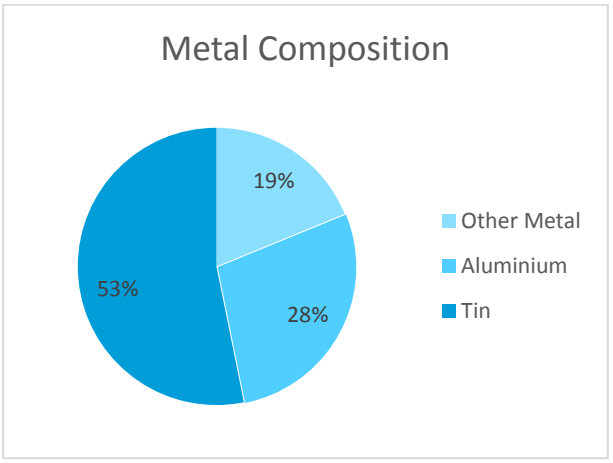
Figures 25 – 29 show the composition of the different waste types. The majority of the organic waste collected was yard waste (66%) and almost all of the paper waste cardboard (87%). Over half of plastic waste was LDPE 6 or soft plastic. This is a problematic waste stream as it is difficult to recycle and is often contaminated. The majority of metal waste was tins with a total of 4.3 kilograms collected. The majority of other waste was hazardous of which 2.8 kilograms was collected. Figure 30 shows in kilograms how much of each readily recyclable waste type was collected.

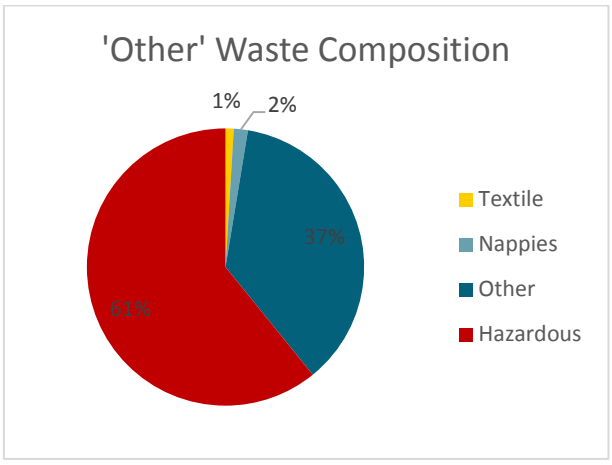
Figures 25 - 30

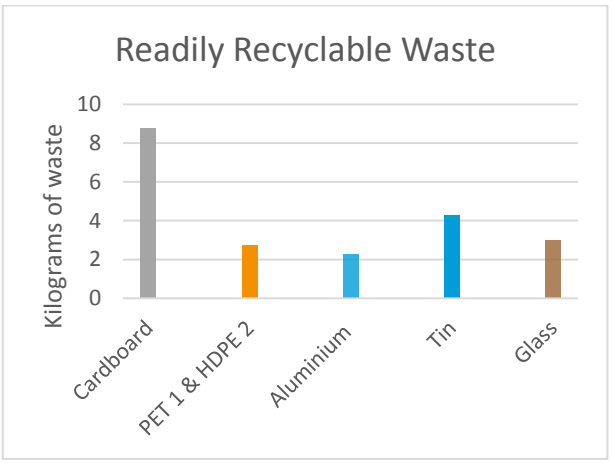












BUSINESS - DISCUSSION/ANALYSIS

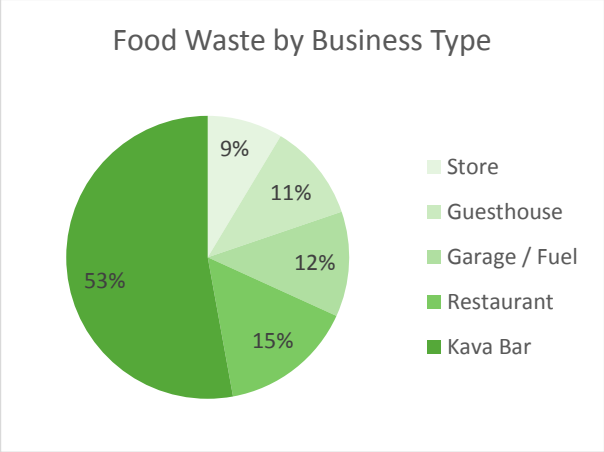
Organic Waste

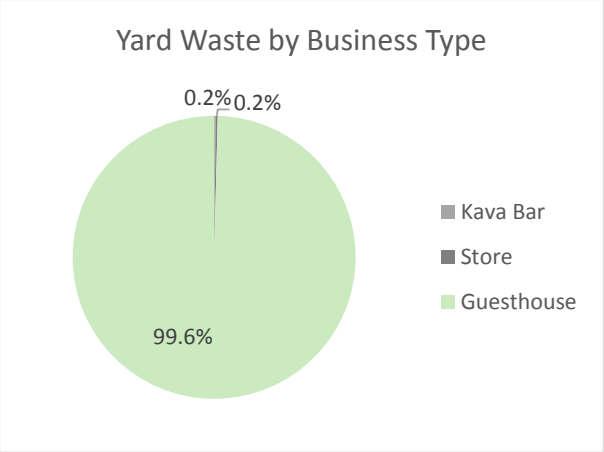
This study showed that the majority of waste generated by businesses was organic and in particular, yard waste. Of the 197 kilograms of organic waste collected over the seven day period, 131 kilograms or 66% was yard waste. As the percentage of businesses selected for the survey was only a small representative of the total number of businesses in Lenakel – 10 out of 161 registered businesses, the following graphs have been included to better understand which businesses types are contributing what kind of waste.

Figure 31 shows that just over half the food waste (35 kilograms) was collected from the one participating kava bar. This is because the makas from the kava root is usually wet, making it heavy. Approximately 7 kg of makas is generated by this business each day. As described in the survey results, this business said that they leave the makas for the rats to eat as they believe that to burn the makas would spoil the kava.

Figure 32 shows that almost all of the yard waste, 130 kilograms, was collected from the one participating guesthouse. Whether or not this business generates this quantity of yard waste every week, or whether it was initiated by the characterisation and the opportunity for free waste disposal is unclear. It may be concluded however that Guesthouses do generate large amounts of yard waste because of the need to maintain the appearance of the grounds and garden for their guests.

Figures 31 and 32





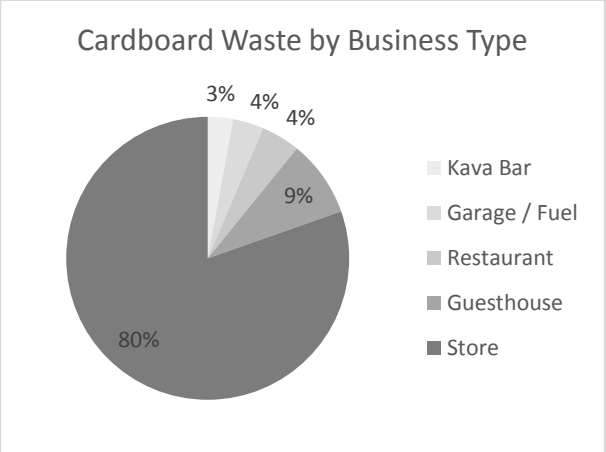
The business type with the most potential for composting their organic waste is Guesthouses. The Council could ask all the Guesthouses within the Lenakel Municipal Zone and those close by, if they would be interested in attending a compost training course. The composting of makas from kava bars may be more difficult because of potential conflict with custom beliefs, and that makas is a wet substance that would need to be balanced with dry waste in order to produce compost.

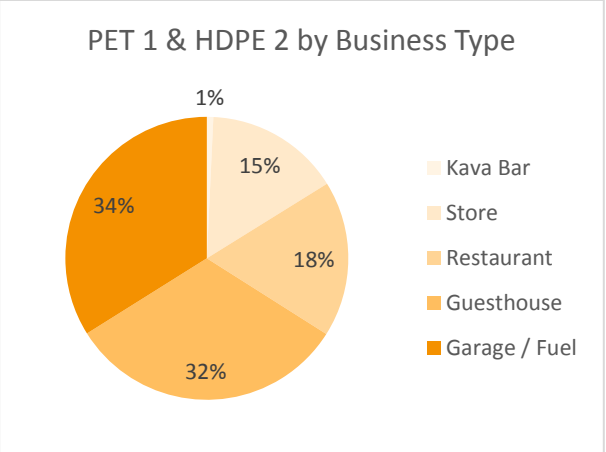
Readily Recyclable Waste

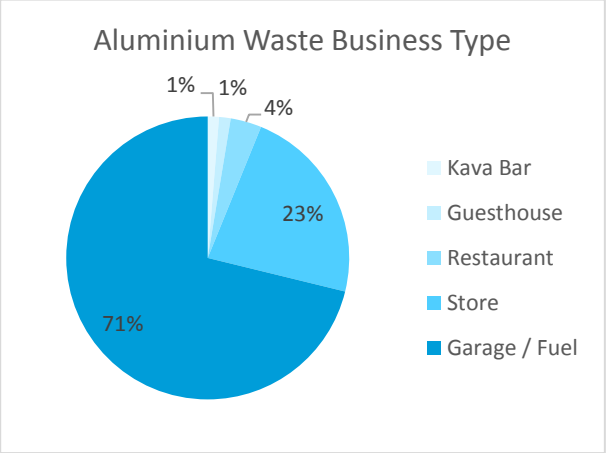
Of the 236 kilograms of waste generated by the businesses, 21 kilograms or 9% was readily recyclable waste. For the purpose of this report, these waste types include; cardboard, plastics PET 1 and HPDE 2, tin, aluminium and glass. These waste types have the potential to be separated out and set aside for future potential recycling – this would most likely involve shipping them to Vila. The Municipal Council will need to source financial support for a truck with which a waste collection service can be offered to businesses.

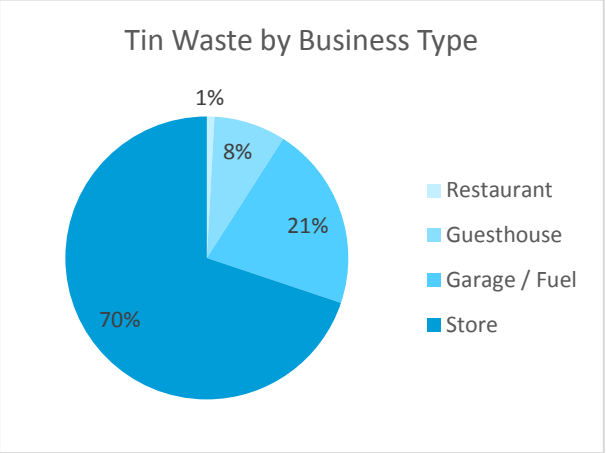
As a relatively small proportion of registered businesses in Lenakel were selected for the waste characterisation, the following graphs have been included to better understand which businesses types are generating what kind of readily recyclable waste.

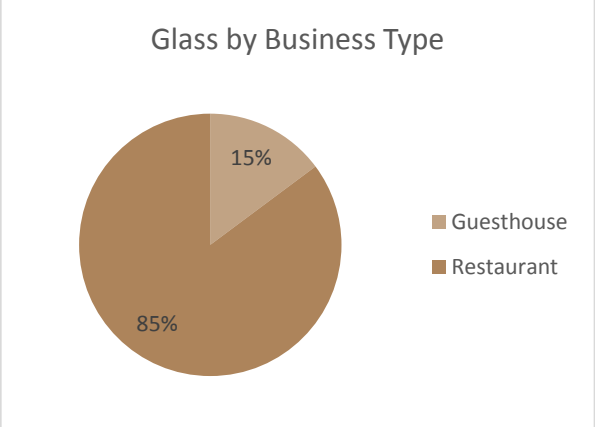
Figures 33 - 37











Below is further analysis and observations relevant to each readily recyclable waste type:

Cardboard

Cardboard made up 87% of the paper waste collected, with a total weight of 9 kilograms. The absence of office paper reflects the limited number of office businesses within the Lenakel Municipal Council's boundary. A number of office based businesses are located just outside the northern boundary in a building complex known as the Tafea Coop. Had this area been included in the characterisation, it may have resulted in a higher proportion of office paper. It is also likely that if Lenakel Presbyterian College's waste was audited, there would be a significantly higher proportion of paper waste.

As can be seen from figure 33 on the previous page, stores generated the most cardboard of the businesses surveyed. Each of the other business types contributed only a little. As the Council does not have access to a dry storage shed for cardboard waste, the collection of cardboard is not considered a priority at this point in time. It may however be of use in the various composting initiatives that the Council may undertake, in which case collection should begin in conjunction with composting initiatives.

Plastic (1 & 2)

Figure 34 shows that the business types that generated the most PET 1 & HDPE 2 waste were first, the garages and fuel station (34%) followed by the guesthouse (32%). The disposal of plastic oil containers by garages were the main items that contributed to this result.

Aluminium

Figure 35 shows that the business type that generated the most aluminium were the garages and fuel station, from which a total of 1.6 kilograms was collected. 1.3 kilograms was collected on one day, all of which was beer cans. This consumption of alcohol may reflect the culture of the workplace and also the gender of the staff - as garages are usually male dominated and it is more culturally acceptable for men to drink alcohol than women. The second highest generator of aluminium waste was stores.

Aluminium drinking cans are the second most noticeable waste type that is dumped on the roadsides of Lenakel, after plastic bags and food wrappers. Aluminium cans are 100% recyclable and a 'clean' waste stream meaning that once the contents have been finished, there is usually nothing left inside that may become a source of contamination. The placement of receptacles, for the collection of aluminium cans, at specific locations – particularly outside garages and stores, would help to reduce the disposal of the cans of which most businesses said they bury. Businesses could pay a small amount to purchase the receptacle (to contribute to the cost of making them) but are then entitled to a free collection service. It is anticipated that this initiative would help to improve the unclean appearance of Lenakel - 92% of households surveyed think that Lenakel town is unclean.

Tin

Figure 36 shows that stores generated the most tin waste; a total of 3 kilograms was collected.

Glass

Only two businesses generated glass waste; the guesthouse and the restaurant.

The focus for the coming year with regards to readily recyclable waste should be:

Placement of receptacles for the collection of aluminium cans, Collection options for readily recyclable wastes; plastics PET 1 and HDPE 2, Glass and Tin

Plastic Bags

LDPE or soft plastics, including plastic shopping bags and food wrappers, are very difficult to recycle as they have very high rates of contamination from food and liquids. At 55% of the plastic waste generated by businesses (and 52% of household plastic waste) it is strongly recommended that stores be discouraged from providing customers with plastic bags to carry their purchase. Stores could be given the incentive of reduced business fees if they agree to stop giving out plastic bags. The Luganville Municipal Council is assessing the potential of implementing a plastic bag tax or a complete ban on plastic bags in the province and it is suggested that Lenakel Council follow their lead, or go ahead and implement a tax and or ban as soon as possible.

Two products that 'require' a plastic bag, in that they have no natural packaging (like the skin on fruit), are bread and meat. Although a replacement packaging for the sale of meat in plastic bags is difficult, it would be worth investigating the import of paper bags for the sale of bread, particularly as plastic bags make the bread sweat and become soggy if not consumed immediately.

The focus for the coming year with regards to plastic bags should be:

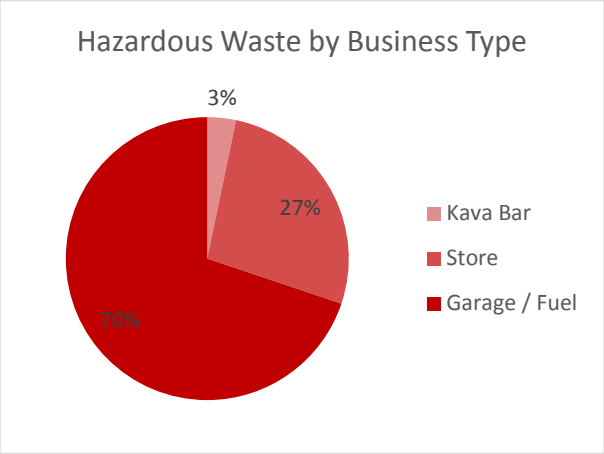
Awareness targeting stores on the issues with plastic bags and strongly discourage their being handed out – consider incentives to promote change, investigate options for import of paper bags, Investigate plastic bag tax or ban.

Hazardous and Electrical and Electronic Waste (WEEE)

In this characterisation of business waste, 2.8 kilograms of hazardous waste was collected but no WEEE. Hazardous waste is the most dangerous type of waste because it contains toxins that, even in small amounts, have very adverse effects on the environment. The hazardous waste collected was primarily made up of batteries and oil. The main generators of this waste were the garages and fuel station.

It may be that collection points or days once or twice a year, specifically targeting; garages, fuel stations and stores, would be an appropriate place to start the management of hazardous and WEEE waste. However, the safe storage of this waste at businesses and at the storage site will need to be addressed before a collection service can begin.

Figure 38



The focus for the coming year with regards to hazardous and WEEE waste should be:

Awareness campaigns specifically for garages, fuel stations and stores for the safe storage of hazardous waste, Collection locations or days, Safe storage at the storage site

Education and Awareness

Any initiatives that may be implemented as a result of this report, or later when the Waste Management Plan is developed, will need to be supported by education and awareness campaigns. For businesses, these awareness campaigns should be undertaken in the context of Business Association meetings. The information provided will help to ensure the smooth implementation and continued operation of waste initiatives. In addition it will assist in educating the community to reduce waste in every aspect of their lives, through increased awareness of environmental issues, provoking a response to change their behaviour, and providing access to the knowledge and skills to do so.

A characterisation of waste generated by Lenakel Presbyterian College may be an effective way of educating students and staff at the college in waste management. The students make up a significant proportion of the population of Lenakel. These students also wander the streets of Lenakel during their lunch break and purchase their lunch from the markets or stores, disposing of the packaging that contains their food in various ways. Across the road from the school is a large waste pile that should be only organic waste but is mixed waste. The Lenakel Municipal Council should organise a waste characterisation as an educational opportunity for students and to help the college to implement a waste management system. This may include the placement of receptacles within the school grounds for the disposal of readily recyclable waste types that include; plastics PET 1 and HDPE 2, aluminium, tin and glass. If it was discovered through the results of a waste characterisation that the school is producing large amounts of organic waste then the installation of a compost bin and corresponding composting course should be initiated.

All waste management initiatives to be presented at Business Association meetings, Conduct waste characterisation of Lenakel Presbyterian College's waste

LIMITATIONS

A number of factors need to be taken into consideration whilst reading this report:

- A relatively small proportion of businesses registered in Lenakel were selected for the characterisation. It is recommended that a larger number are selected for next year's waste characterisation in order to gather more accurate results. For Lenakel Municipal Council's first waste characterisation survey however, the total number of households and businesses selected was sufficient for the level of skill of those organising the event and those participating.
- As with all waste characterisations, there is a risk that some participants will use this 'free' collection as an opportunity to have a clear out of rubbish that is lying around. This is inevitable and may change the results slightly, but when these waste quantities are extrapolated out for the entire town it should not significantly affect the results.

MARKET & PUBLIC RUBBISH BINS

OVERVIEW

There is one large central market in Lenakel that looks out over the waterfront of Lenakel Bay. There are another three small market areas referred to as 'road markets' within the Lenakel Municipal boundary. The Municipal Council owns and manages 20 rubbish bins that are located along the roadsides of Lenakel. These are identified on the map on the following page. All waste collected from the market and the public rubbish bins is taken to the Council's storage site.

Market Days

Market days are Monday, Wednesday and Fridays. The market on Wednesday is smaller than the Monday and Friday markets. The market size fluctuates in accordance with government pay days every two weeks on Fridays, meaning larger markets on Friday pay days. Three Municipal staff work at the market on market days to collect fees and keep the market place in good order. Approximately 80 mamas set up a stall on Mondays and Fridays, each paying 100 vatu to sell their produce. On Wednesdays, approximately 50 mamas set up a stall.

Current Waste Types

The market waste is largely organic being made up from items such as coconut baskets and the excess from fresh produce after it has been cleaned, for example, outer cabbage leaves that are removed as are the husks of coconuts.

Waste Disposal Practices

Behind the central market is a waste pile where coconut baskets, full of mostly organic waste from the market, are placed until collected by the Municipal Council on Wednesdays. There are five rubbish bins located within or very close to the market ground. These bins are mostly filled with organic waste from the market and because of their location, have been considered part of the market waste results for this characterisation as opposed to being included with the rest of the public rubbish bins.

The Municipal Council's Waste Collection Service

The Municipal Council collects the waste from the public rubbish bins and the market pile every week on Wednesdays. The Council hires a truck to collect the waste which usually costs 4000 vatu to complete the work – 1000 vatu per trip to the storage site. Waste from the rubbish bins is emptied onto the back of the truck and waste from the market pile lifted up onto to the back. The staff unload the waste at the Council's storage site.

The Storage Site

The Municipal Council rents the land on which the storage site is located for 15,000 vatu per month. The site is located outside the boundary of the Municipal Council. Organic waste is disposed of into a dry stream bed that borders the site. The stream water has been diverted after the implementation of a drainage scheme on the neighbouring road. All other non-organic waste is sorted into various waste type piles awaiting future potential recycling or landfill disposal.

Communication

The market is the social hub of Lenakel and for much of Tanna - given that Lenakel is the only town and therefore the central gathering place for people from all over the island. Various organisations and groups use the market place to promote their cause, give awareness talks or performances.

MARKET AND PUBLIC WASTE COLLECTION

LOCATION MAP

KEY

- Lenakel Municipal Council Boundary
- Road to the Council's storage site (outside the Municipal boundary)
- Green Rubbish Bin (10 in total)
- Yellow Rubbish Bin (10 in total)
- Market Waste Pile

M	Central Market
RM	Small Road Markets
C	Lenakel Presbyterian College
S	Stadium
W	Wharf

Top: A Municipal staff member weighs a coconut basket of organic market waste.
Below: The tarpaulin and buckets used to separate the market waste into waste types.

MARKET - WASTE CHARACTERISATION RESULTS

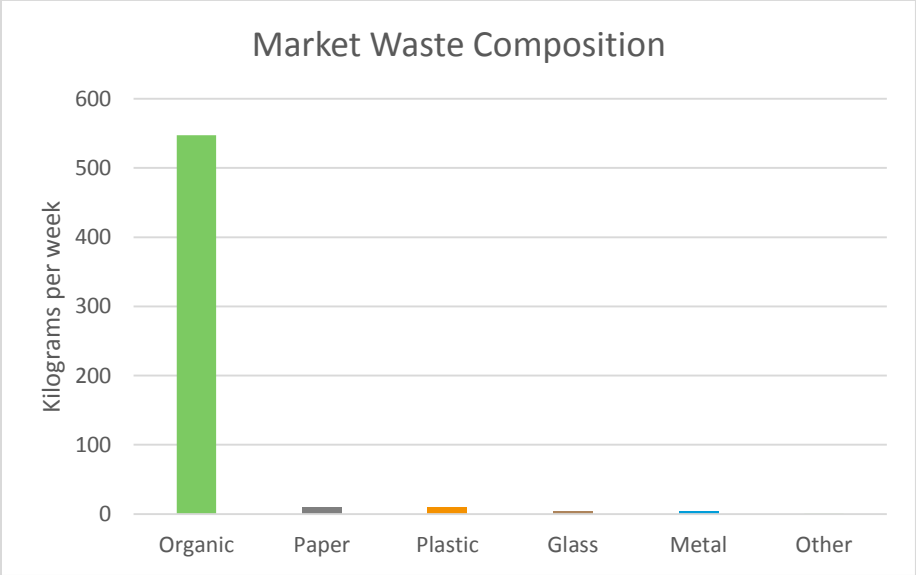
Waste Generation

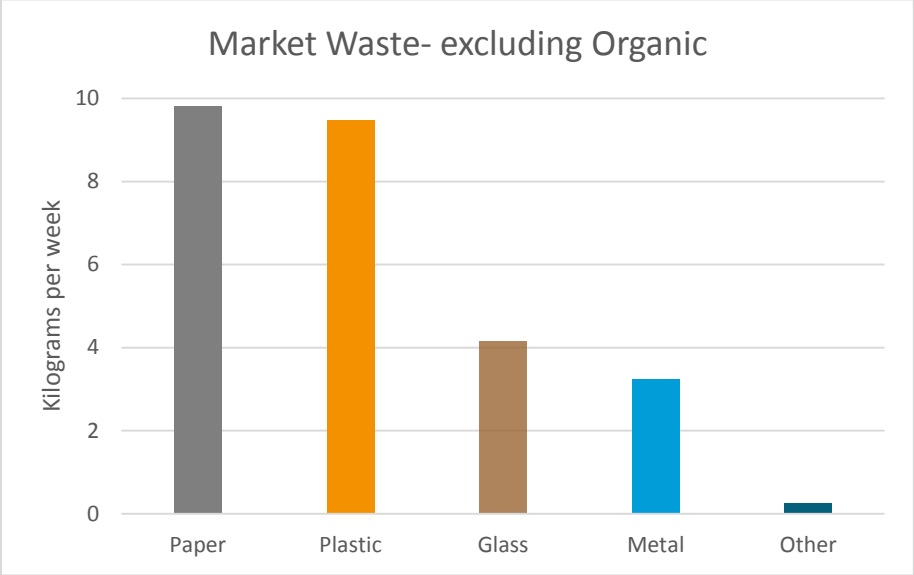
Over the seven day collection period a total of 573 kilograms of market waste was collected.

Waste Composition

Figure 39 below shows the composition of all the waste generated from the market which includes; the pile at the back of the market and five rubbish bins within close proximity to the market. 548 kilograms of that waste or 95% was organic. Figure 40 shows in more detail the quantity by weight of waste types – excluding the larger organic waste type.

Figures 39 and 40





PUBLIC RUBBISH BINS - WASTE CHARACTERISATION RESULTS

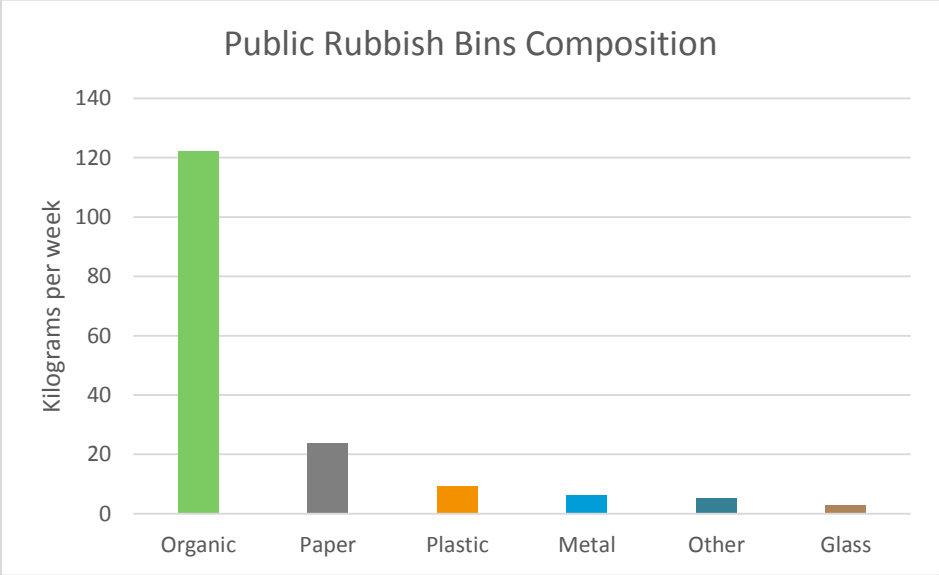
Waste Collection

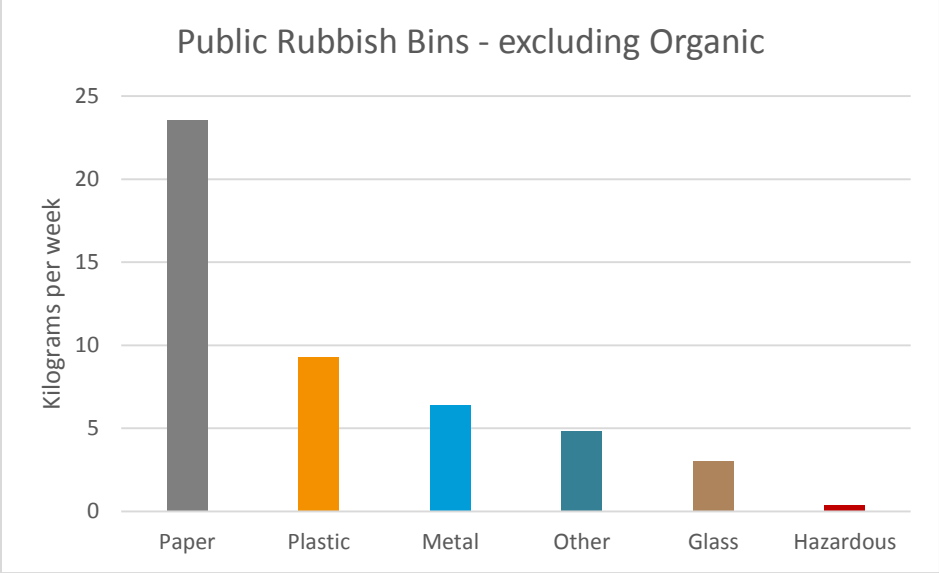
Over the seven day collection period a total of 170 kilograms of waste was collected from the public rubbish bins.

Waste Composition

Figure 41 below shows the composition of all the waste generated from the public rubbish bins which includes; 15 roadside rubbish bins either green or yellow in colour. 122 kilograms or 72% of the waste collected was organic. Figure 42 shows in more detail the quantity by weight of waste types – excluding the larger organic waste type.

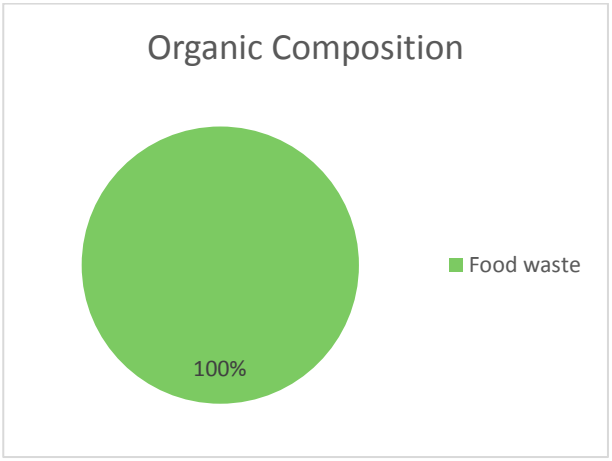
Figures 41 and 42

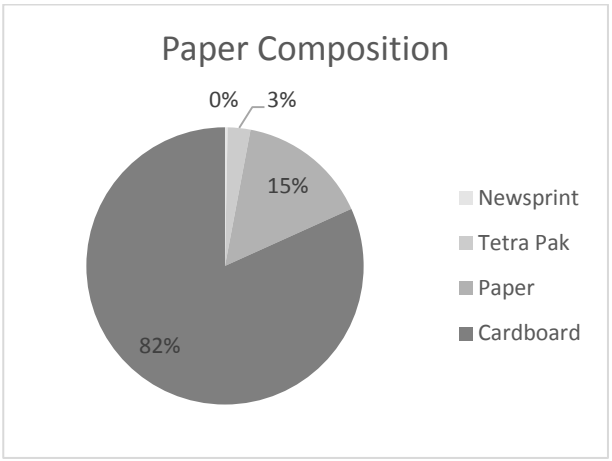


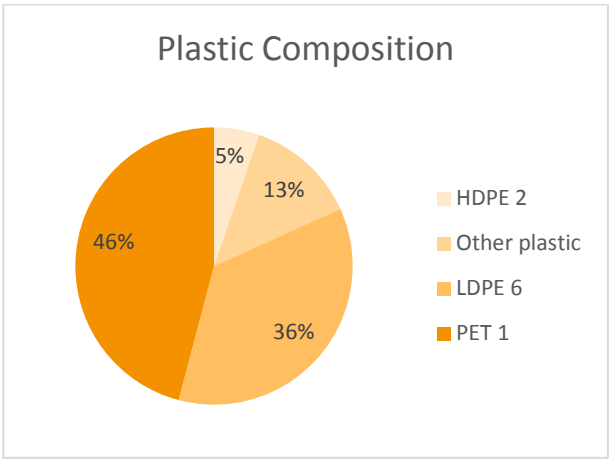


Figures 43 – 52 show the composition of the different waste types from both the market and the public rubbish bins. The graphs are presented next to each other according to waste type for ease of comparison. All of the organic waste from the market is food waste but close to a third of organic waste in the rubbish bins is yard waste. For both the market and rubbish bin waste, the majority of: paper waste was cardboard, plastic waste was LDPE 6 or soft plastic, and metal waste was tins.

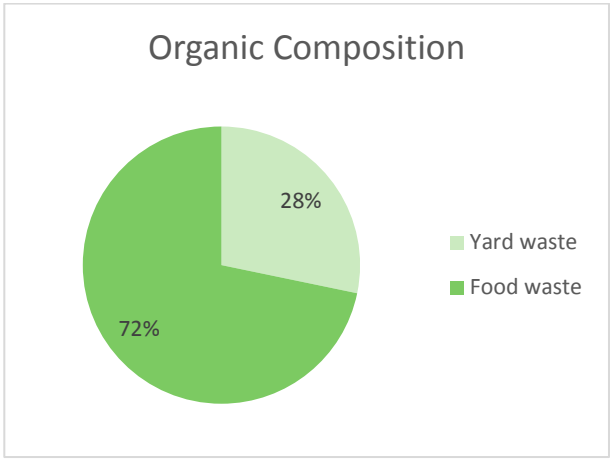
Market Waste

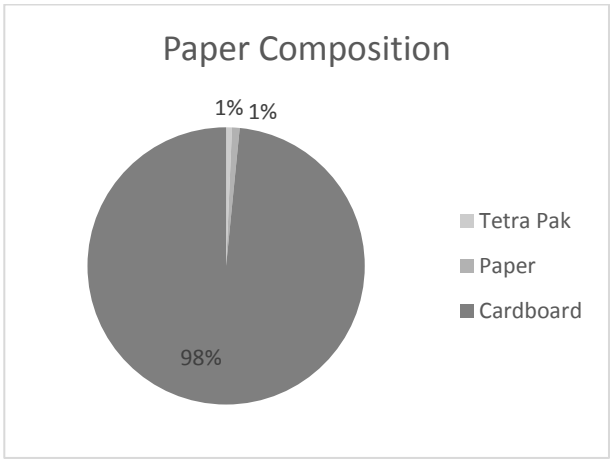


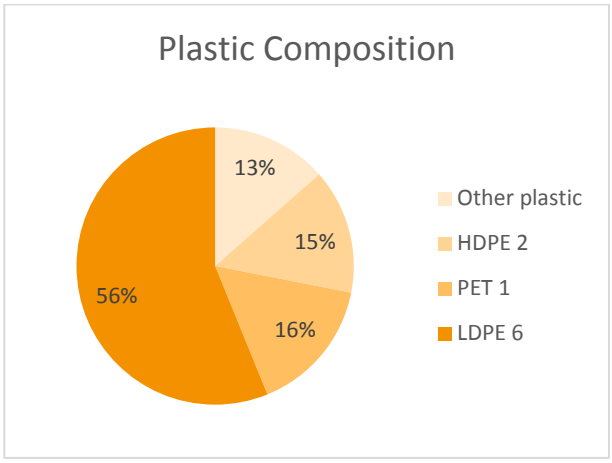


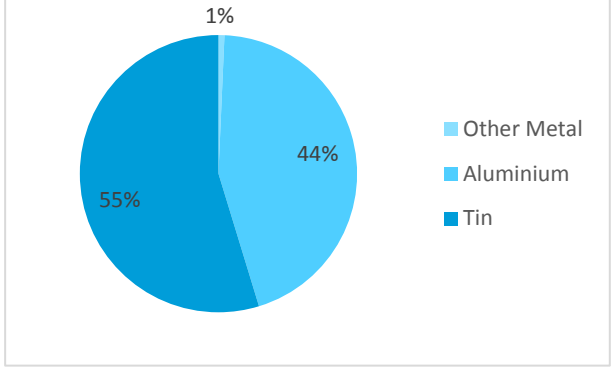


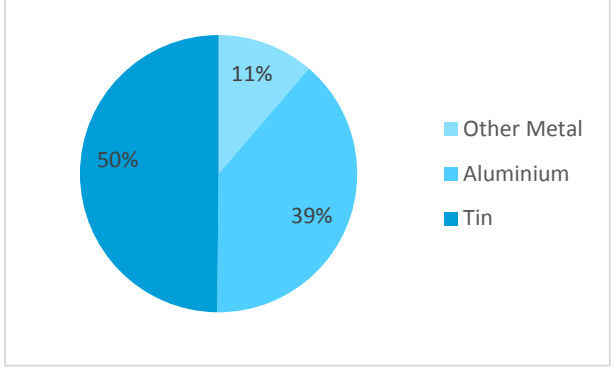
Public Rubbish Bins

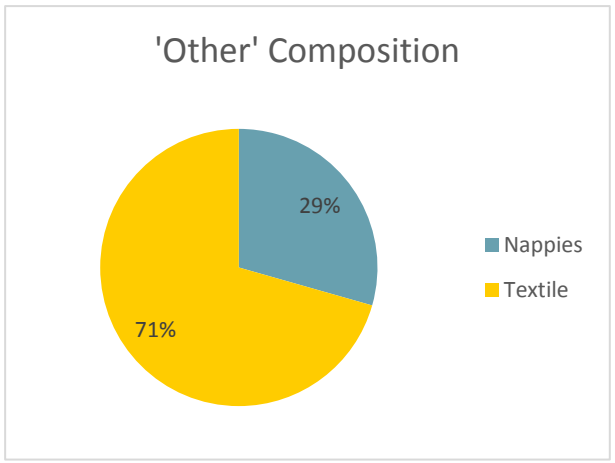


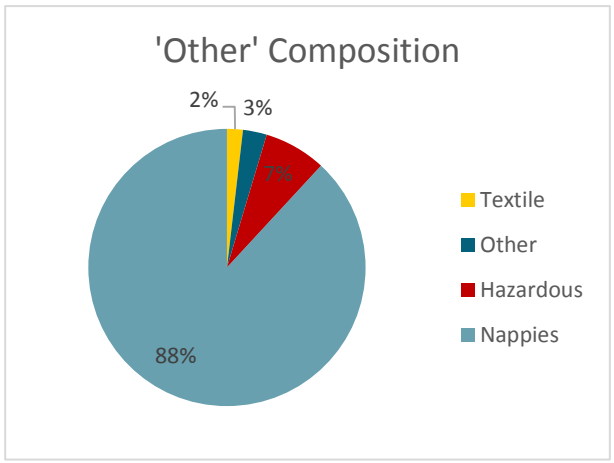




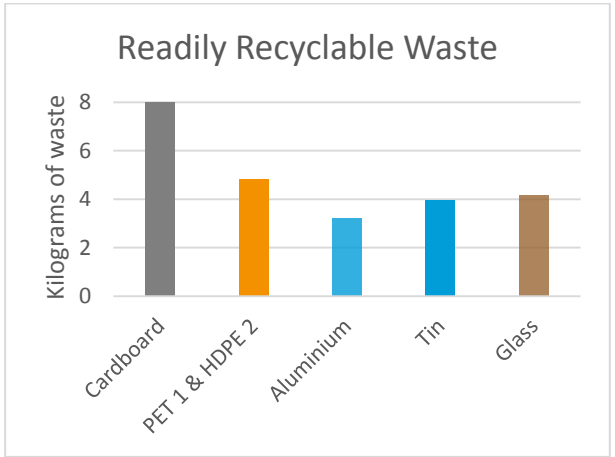


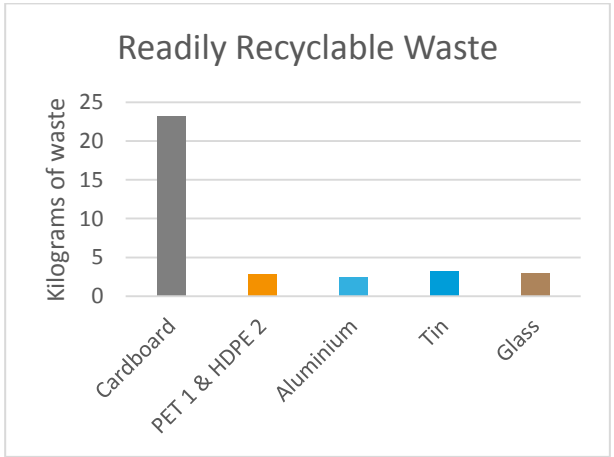






Figures 53 and 54





No hazardous waste was collected at the market but 390 grams was found in the public rubbish bins. Figures 53 and 54 show in kilograms how much of each readily recyclable waste type was collected. The public rubbish bins contained 23 kilograms of cardboard, 15 kilograms more than the market waste.

MARKET & PUBLIC RUBBISH BINS - DISCUSSION/ANALYSIS

Organic Waste

548 kilograms (95%) of the waste from the market was organic and 170 kilograms (72%) of the waste collected from the public rubbish bins. The quantity of organic market waste collected, its concentrated location at the market place, and the openness of people to learning about compost making (from the household survey results) make the installation of a composting system very feasible at or close to the market site. The set up could be the primary tool for general training of the process of compost making.

The Council could re-launch an awareness campaign to encourage people to separate their waste into the different coloured rubbish bins – green for organic, yellow for inorganic. The council would need to ensure that at every rubbish bin location, a green and a yellow bin are found together so that the public have the two options of waste disposal before them for proper disposal of their waste type. These locations should also be fixed so that people become familiar with the places where they can properly dispose of their waste. If stores are disposing of their waste in the bins, the Council should negotiate a collection fee in the absence of a business waste collection service.

The focus for the coming year with regards to organic waste bins should be:

Install a compost bin at the central market, Re-launch public rubbish bin awareness campaign, Choose fixed locations for public rubbish bins

Readily Recyclable Waste

Of the 573 kilograms of waste generated by the market, 24 kilograms or 4% was readily recyclable waste. Of the 170 kilograms of waste collected in the public rubbish bins, 35 kilograms or 20% was readily recyclable waste. For the purpose of this report, these waste types include; cardboard, plastics PET 1 and HPDE 2, aluminium, tin and glass.

Cardboard

8 kilograms of cardboard waste was recorded in the market waste. 23 kilograms in public rubbish bins. It is assumed that the majority, if not all, of the cardboard found in rubbish bins has been placed there by store keepers wishing to dispose of their waste. Although the purpose of the public rubbish bins is to service the public, in the absence of a business waste collection service, it is encouraging that some businesses are choosing to place their cardboard waste inside the bins instead of burning it. This practice of disposal may indicate that the Council is in a position to negotiate a waste collection service with businesses.

Plastic (1 & 2)

5 kilograms of PET 1 & HDPE 2 in the market waste. 3 kilograms in public rubbish bins.

Aluminium

3 kilograms in the market waste. 2.5 kilograms in public rubbish bins.

Tin

4 kilograms in the market waste. 3 kilograms in the public rubbish bins.

The focus for the coming year with regards to readily recyclable waste should be:

Place a series of receptacles for the collection of readily recyclable waste type at the central market

Hazardous and Electrical and Electronic Waste

No hazardous or WEEE waste was found in the market waste. 39 grams of hazardous waste was collected in the public rubbish bins, but no WEEE waste.

Plastic Bags

LDPE or soft plastics, including plastic shopping bags and food wrappers, are very difficult to recycle as they have very high rates of contamination from food and liquids. Options to reduce the quantity of soft plastic waste are: to ban the sale of plastic bags at the market, offer a reduced market fee to mamas who sell their produce only in local baskets or bind it with pandanas, investigate importing paper bags. This may help to create a local market for the production of local baskets or pandanas ties.

The focus for the coming year with regards to plastic bags should be:

Ban sale of plastic bags at the market, Reduce market fee for mamas who sell produce that is packaged using only local products

Education and Awareness

The waste characterisation results for the public rubbish bins showed that the public are not separating their waste according to the Council's instructions in April 2013. These instructions were that organic waste be placed in green coloured bins and inorganic waste be placed in yellow coloured bins. The awareness for these bins consisted of two talks on FM 104 that were replayed over one week approximately three or four times each. It is recommended that future awareness campaigns are of longer duration and respond to the results of the household survey, as an indication of public opinion, that there is a strong expectation to be personally consulted on waste management initiatives. As the central market is the social heart of Lenakel it would be advisable to announce all initiatives at the market place at regular intervals to keep the public updated on progress.

LIMITATIONS

A number of factors need to be taken into consideration whilst reading this report:

- As with all waste characterisations, there is a risk that some participants will uses this 'free' collection as an opportunity to have a clear out of rubbish that is lying around. There was a coconut basket full of paper, plastic, metal and glass waste types that was clearly from a household. It was decided that this basket be included on the assumption that this may be a regular disposal pattern for that particular household and is therefore part of the market waste each week. Inevitably this changes the 'true' market waste results slightly, but when these waste quantities are extrapolated out for the entire market waste it will not significantly affect the results.

RECOMMENDATIONS

This report has shown that there is a need to improve waste management in Lenakel. The first priority in response to this report is the need to develop a **Waste Management Plan** for Tafea Province and the Lenakel Municipal Council. A Waste Management Plan would direct the implementation of the following waste management initiatives which are recommended as a result of the data collected in this Waste Characterisation Survey:

Household

- Home composting training
- Application to donors for funding of a waste collection truck
- Placement of receptacles in town sectors for the collection of readily recyclable waste types
- Research shipping options to Vila
- Raise awareness of hazardous waste and WEEE

Business

- Place receptacles for the collection aluminium cans around town, particularly near stores and garages
- Provide collection options for readily recyclables: plastics PET 1 and HDPE 2, aluminium, tin and glass
- Conduct awareness targeting stores on issues with plastic bags to discourage them being handed out and consider incentives to promote change
- Investigate options for the import of paper bags
- Investigate plastic bag tax and ban
- Awareness campaigns specifically for stores, garages and fuel stations for the safe storage of hazardous waste
- Organise collection days for hazardous waste and WEEE
- Develop a place for the safe storage of hazardous waste at the storage site
- All waste management initiatives presented at Business Association meetings
- Conduct a waste characterisation of Lenakel Presbyterian College's waste

Market and Public Rubbish Bins

- Install a compost bin at the central market
- Re-launch a public rubbish bin awareness campaign
- Fix the locations of the public rubbish bins and always place one green and one yellow together
- Ban the sale of plastic bags at market places
- Reduce market fees for mamas who sell their produce using only local materials – local baskets and pandanas ties

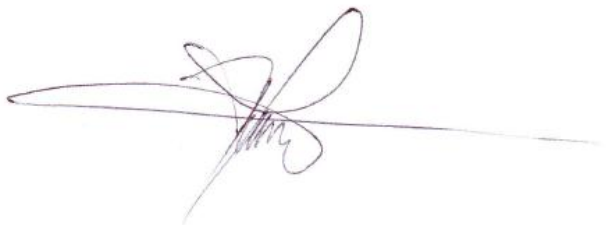
All initiatives that are proposed must go through the community consultation process. When agreed upon, each initiative must be accompanied by a comprehensive education and awareness campaign, to ensure both the success and the sustainability of each initiative.

ENDORSEMENT

Lenakel Municipal Council

It is with pleasure that the Lenakel Municipal Council endorse this Waste Characterisation Report.

Signed: Date:



20.11.14

_____ _____

Honourable Mayor Reginald Tangap

Signed: Date:

20.11.14

_____ _____

Administrator Nalau Manakel

APPENDIX ONE

HOUSEHOLD SURVEY

Nem blong man blong haoshold: _____ Namba blong ol man we oli stap long haos: _____ Haoshold namba: _____

Wanem kaen haoshold? (putem wan tick long wan box)

Mama, papa mo pikinini ☐

Mama, papa wetem pikinini we hemi ova 16 yia ☐

Mama, papa wetem pikinini moo l narafala family ☐

Eni narafala plis explainem: _____

Nem blong ol memba blong haoshold	Yia	Male or Female	Highest level blong education (primary, secondary, tertiary)	Wok (Yes or No)	Wanem kaen wok (katekori I stap daon)

Wok katekori: haos girl, stoa, handikraft, smol kontrakt, offis, gavamen, draeva, hospital, tourism, jej, restron, bekari, otha

Expenses

Wanem nao yu spend moa long hem long wan week?

Kakai ☐

Elektrik bill ☐

Wota bill ☐

Medikal ☐

Skul ☐

Rent ☐

Yu kat hamas truk?

No kat ☐

1 nomo ☐

2 nomo ☐

Ful up ☐

Eni narafala samting, plis explanem: _____

Waste Management Behaviour

Wanem nao yu mekem witem ol toti blong yu? Jusem sam long olgeta is mo putem tick

	Bonem	Berem	Putem long drum long road	Karem I go long ples blong Munisipol	Fidim long pig mo fowl
Toti blong kakai					
Dry leaves					
Plastik botal					
Klas botal					
Tin kan					
Drinking kan					
Pepa / Karton					

Wanem tingting blong yu long waste management?

Yu tingting tumas long:

Ol toti we I stap long haos?	Y	N
Ol toti we yu stap saken long toti ples close up long haos?	Y	N
Ol toti we yu stap burnem close up long haos?	Y	N
Yu tink se smok hemi gud long healt blong family or no?	Y	N
Yu tink se Lenakel town hemi wan klean ples or I toti?	K	T
Yu save se Munisipol I gat wan ples we oli sakem toti long hem or no?	Y	N

Eni narafala samting we yu save givem tingting long hem:

_____

Sappose yumi wantem toktok tugeta abaot waste management projeks, wanem bes wei nao yumi save mekem hemia? (plis tick)

Publik notis long skul or jej or narafala ples	☐
Radio FM 104	☐
Radio FM 107	☐
Lenakel Munisipol Councillors bae I kam toktok witem yu	☐

Eni narafala samting: _____

Taem yu go long stoa or wokbaot long market yu karem own basket blong yu blong shoping or no?	Y	N
Yu save wei blong usem ol toti kakai mo dry leaf long karen blong yu blong makem wan samting we I save makem karen I grow gud?	Y	N
Yu kat interest blong save go long wan training long learnem ha oblong makem hemia?	Y	N

Tank yu asul

APPENDIX TWO

BUSINESS SURVEY

Nem blong bisnis: _____ Bisnis leta: _____

Nem blong ona blong bisnis: _____

Wanem kaen bisnis yu kat?

Stoa	☐	*Restauran*	☐
Kava Bar	☐	*Karaj*	☐
Bukjari	☐	*Fuel / Mazut*	☐
Guesthaos	☐	*Rent Haos*	☐

Eni narafala wan: _____

Hamas dei yu open mo hamas haoa?

Dei:		Haoa:
Mondei – Fridei	☐	
Mondei – Satadei	☐	
Mondei – Sundei	☐	

Eni narafala samting: _____

Yu kat hamas ful taem staf? _____ Yu kat hamas par taem staf? _____

Wanem ol toti blong yu? Jusem sam long olgeta is mo putem tick:

Kakai	☐	*Tin kan*	☐
Karton	☐	*Plastik botal*	☐
Pepa	☐	*Plastik bag*	☐
Klas botal	☐	*Karton*	☐
Drinking kan	☐		

Samtaem yu kat ol toti we oli no safe blong sakem? Sappose yes, jusem sam long olgeta ia mo putem tick:

Oil

Kemikal (bleaj, poisin blong rat)	☐
Elektronic waste (komputa, eletrik kabel)	☐
Paent	☐
Batri	☐

Yu save Minisipol I kat wan ples we oli sakem toti long hem or no? Y N

Waste Management Behaviour

Wanem nao yu makem witem ol toti blong yu? Jusem sam long olgeta is mo putem tick

	Bonem	Berem	Putem long drum long road	Karem I go long ples blong Munisipol	Fidim long pig mo fowl
Toti blong kakai					
Dry leaves					
Plastik botal					
Klas botal					
Tin kan					
Drinking kan					
Pepa / Karton					

Sappose yu karem toti go toti ples blong Munisipol, hao mas taem yu sakem toti long storaj site?

1 taem lo week ☐

Evri 2 week ☐

1 taem lo manis ☐

Eni narafala samting: _____

Hao mas ol kost blong yu long sakem long storej site? Putem tick long box ia:

50 vatu ☐ 200 vatu ☐ 500 vatu ☐

Sappose yu wantem toktok tugeta abaot waste management projeks, wanem bes wei nao yumi save mekem hemia? Plis tick

Publik notis long skul or jej or narafala public ples ☐

Bisnis Association Meeting ☐

Radio FM 104 ☐

Radio FM 107 ☐

Eni narafala samting plis explainem: _____

Tank yu asul

APPENDIX THREE

WASTE AUDIT ASSESSMENT SHEET

Haoshold namba / Bisnis leta: _____ Date of audit: _____

Total weight before audit: _____

Waste Type	Weight (grams)
Paper	
Cardboard	
Tetra Pak	
Sub total	
Plastic	
PET 1	
HDPE 2	
LDPE 6 soft plastic/bags	
Sub total	
Glass	
Metal	
Aluminium (drink cans)	
Tin	
Sub total	
Food waste	
Garden waste	
Sub total	
Hazardous (batteries, oil filter, paint)	
Textile	
Other* (please specify)	
Total	

*Other waste types include:

Newsprint, magazines, polystyrene, computer waste, ceramic, ink cartridges, rubber, nappies