SANMA PROVINCIAL GOVERNMENT

HOUSEHOLD WASTE CHARACTERISATION SURVEY

REPORT

MARCH 2012

EXECUTIVE SUMMARY

Sanma Province staff carried out the first Household Waste Characterisation Surveys in January this year. The surveys were done in three sub-divisions (Showgrounds, Ban Ban 1, 2 and 3 and Million Dollar Point) that have been identified for further residential development. Whilst this first sample is relatively small it appears to be very representative of the 'average' Vanuatu household.

What the surveys show is that on average each household is producing approximately 100kg of rubbish every week. That equates to 5.2 tonnes per year per household. There are approximately 350 households in total in the sub divisions currently, therefore over 35 tonnes of waste is being generated each week or 1820 tonnes per year.

Growth projections for these sub divisions are in the order of 300 more households in the next 5 years, that is an additional 300 tonnes of waste being generated each week.

As Luganville continues to grow, so too will the quantity of waste generated. This report suggests a number of forward planning initiatives that should be instigated in the coming year. Priority should be given to

- Completeing additional waste characteristaions of both households and commercial businesses as well as government departments
- Research into markets for recyclables
- Research into local business opportunites with recycled materials.

INTRODUCTION

The overall goal of the Vanuatu National Waste Strategy 2011-2016 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 minimized to the lowest possible amount"* In order to measure progress towards this, it is important that detailed, accurate and up-to-date information regarding the composition of 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 first of all what type and quantities of waste are being generated. This will enable target waste streams to be identified for action, and will enable the effects of prevention and minimisation policies to be measured.

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.

As such, a series of household waste characterisations were carried out in Luganville in January 2012.

STUDY AREA

Currently the household waste collection service for the urban area of Luganville is provided by the Luganville Municipal Council. The collection service does not extend to this study area which is outside of the Luganville Boundary (Appendix 1). Therefore the residents of these areas currently dispose of their waste along the roadside, within their own yards and in water ways. The study area was chosen in order to quantify the amount of waste that is being generated in the peri-urban areas not currently provided with a waste collection service. The demand for a service is likely to increase as these sub-divisions expand and develop in the coming years.

METHODOLOGY

A sample size of 10 households were chosen for this study, this is in line with the World Health Organisation Western Pacific Region Healthy Cities, Guides for Municipal Solid Waste Management in Pacific Island Countries (1996). Two households from each of the following peri-urabn sub-divisions were randomly selected to participate:

- Showgrounds
- Ban Ban 1
- Ban Ban 2
- Ban Ban 3
- Million Dollar Point

These sub-divisions were selected as they have been marked for further development and expansion, which will result in a significant increase in population and waste generation over time.

On Thursday 19th and Friday the 20th of January the staff of Sanma Province met with those present at each house and discussed the waste characterisation study with them. They were then asked if they were happy to participate (no one declined). They were then given one coded rubbish bag and a set of instructions. They were then provided with a survey (Appendix 2) that would be collected on Monday 23rd along with their first rubbish collection.

Meeting with the residents

Coded rubbish bags and surveys

The participants were asked to put all the rubbish they generate each day (unsorted) into the plastic bag and to leave it in a designated place for collection the following day.

On Tuesday 24th January the rubbish was collected first thing in the morning from each household and they were provided with their next coded rubbish bag. This occurred every day of the week On Monday 30th and Tuesday 31st of January the waste was collected for the Friday, Saturday and Sunday prior.

Each day the collected waste was taken back to the Sanma Province buildings where the total weight of each bag of waste was weighed. Each bag of waste was then spread on the tarpaulin and sorted according the WHO Guides for Municipal Solid Waste Management in Pacific Island Countries 2006. (Appendix 3). Each waste type was then weighed and the volume approximated.

Waste Characterisation Photos

SURVEY RESULTS

Household size

The average household size was 5.2 people, with the smallest household having 4 members and the largest having eleven. This compares favourably with the Luganville average household size of 5.1 (Census 2009). There was an even spread across the sub-divisions of 'nuclear family' (2 parents and children) and extended family household arrangements.

Income/Employment

On average at least one person from each household was employed and 6 of the ten households have an income of more than 5000 Vatu per week or a minimum of 20,000vatu per month. This is comparable with the average monthly income per capita of 18,800 Vatu for a resident of Luganville (Household Income and Employment Survey 2006).

Education

Figure 1 below outlines the education levels achieved within each of the households. The results show that there is still a significant proportion of people in each household who have 'no education' these were primarily the parents in the household, however the next generation is generally being educated.

Figure 1.   Level of Education by Sub-Division
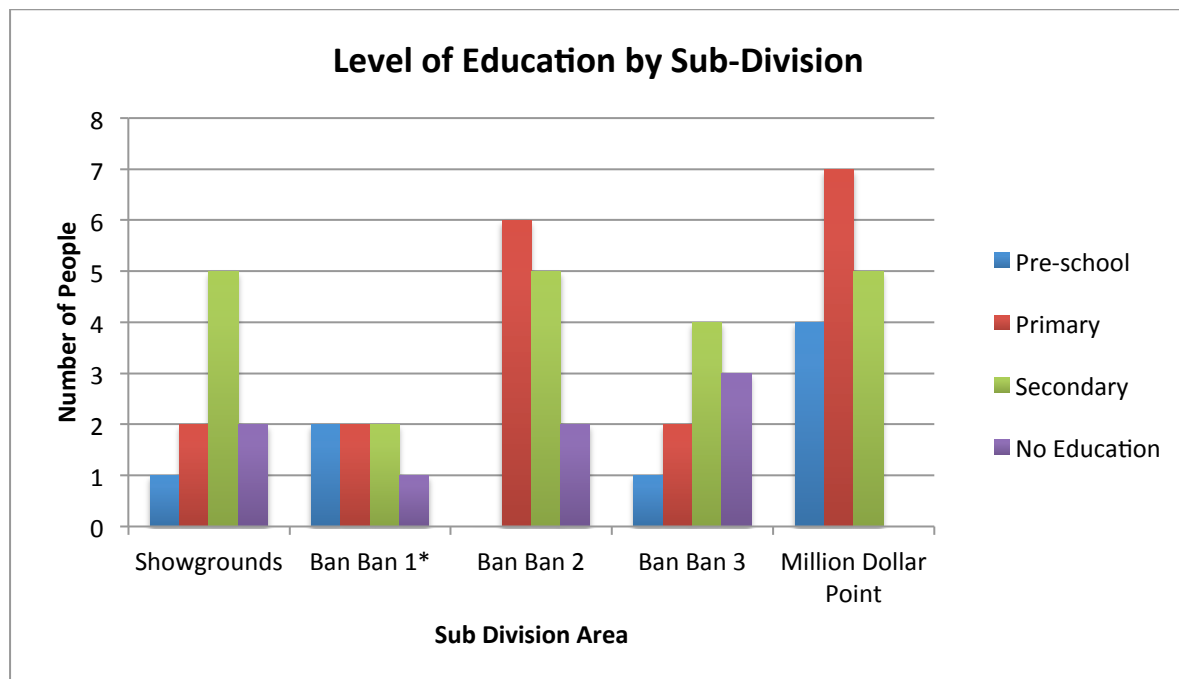
*The survey for one Ban Ban 1 Household was not completed in full so there is data missing from this area.

Figure 2 below shows that the education levels obtained within each household is in line with the National Census results 2009.

Figure 2.   Level of Education – National Comparison


Level of Education - National Comparison
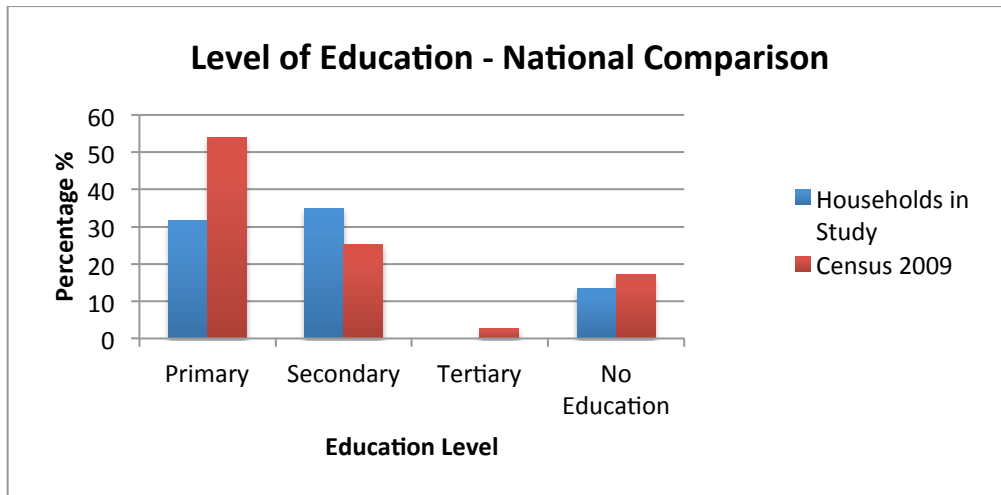
Housing

There was a mix of housing within the study area, from traditional houses mostly made from local materials to separate buildings for sleeping, cooking and bathing. There were a number of permanent buildings constructed out of cement blocks or wood with a galvanised iron or similar roof and cement floor as well as some mixed housing with some permanent and some traditional materials, such as an iron roof and concrete floor with woven thatch walls.

Waste Management Behaviour

Figure 3 below outlines the current waste management behaviour of the households. It can be seen that the half the households feed their food waste to the animals (pigs, chickens, dogs) and 100% of the households burn their yard waste. Half the households bury all the recyclables (plastic, tin, aluminium, glass and metal) and the other half of the households either take them to the dumpsite or burn them.

Figure 3.   Waste Management Behaviour

Waste Management Behaviour
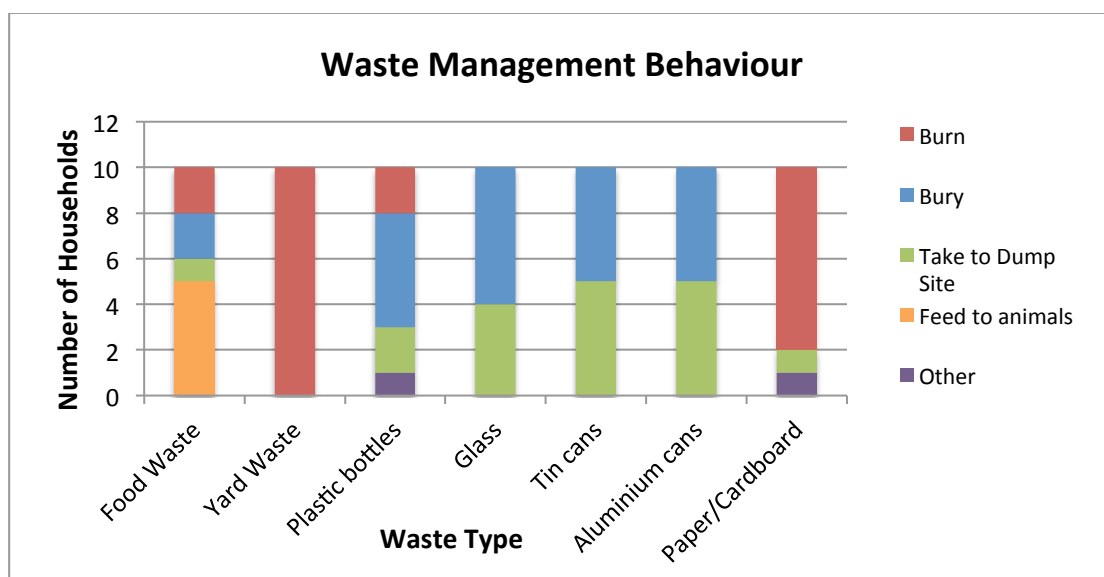
The survey also asked three behaviour based questions of the householders in an attempt to gather information on both the level of understanding of waste management and also how willing they would be to change their behaviour. When asked if they currently use re-usable shopping bags 60% said no. 40% of the households said they know how to compost food and yard waste and only 30% of the households would be willing to pay a charge (10vatu) for plastic bags.

In summary, the randomly selected households within the study area have proven to be more than comparable with both National and Local (Luganville) statistics and trends. They therefore ensure that this study is credible and the data collected is worthy of being extrapolated for use at a larger scale.

RESULTS

WASTE CHARACTERISATION RESULTS

Over the 7-day collection period the ten households produced a total of 987.93 kilograms of waste. This equates to approximately 19kg per person per week or almost 3 kg per person per day. Figure 4 shows the waste quantities from each sub division. The rate of waste generation is highest in the Showgrounds area and lowest in Ban Ban 3.

Figure 4.   Waste Quantity by Sub-Division
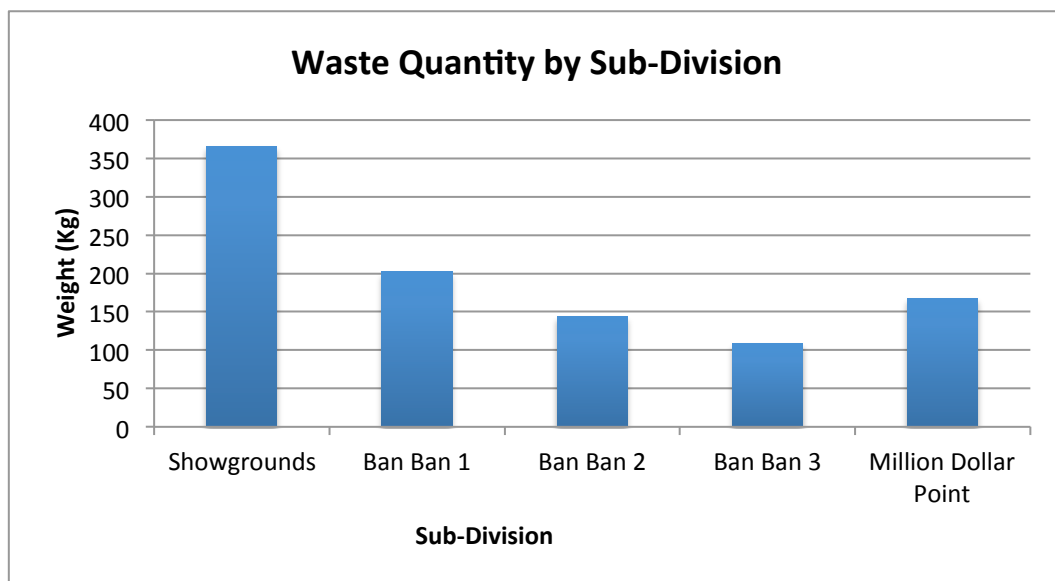
The composition of the waste is shown in Figure 5. It can be seen that food and garden waste (organic waste) make up 84% (by weight) of the waste stream, whereas only 9% of waste stream is made up of recyclable waste and 7% non-recyclable waste.
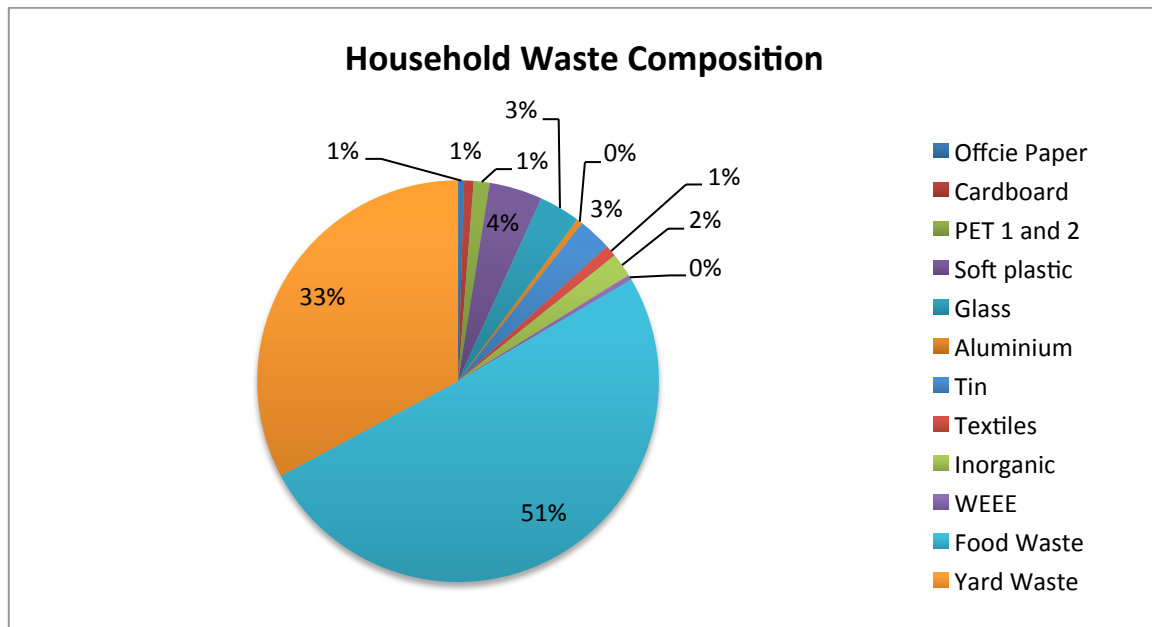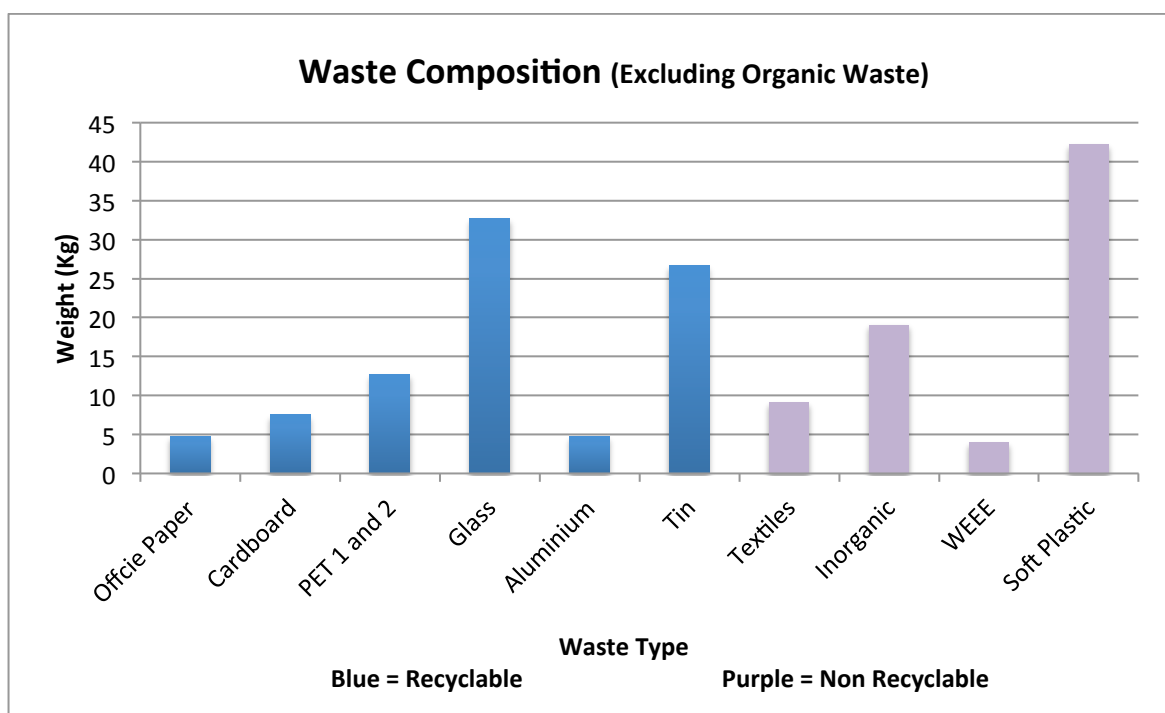
Figure 5.   Waste Composition

Figure 6 shows the recyclable and non-recyclable waste streams in more detail.

Figure 6.   Waste Composition ex Organic Waste

Organic Waste

The large percentage by weight of organic (food waste and yard waste) in the waste composition (80%) is largely being managed in a sustainable way. The food waste is being given to the pigs, dogs and chickens and the yard waste is being burnt. As long as there are no other non-organic materials in the fire, the fires are carbon neutral so are reasonably harmless. The smoke that they generate can however be of nuisance value to neighbours but has been occurring in the peri-ubrban environment for many years so is well accepted.

In the more urban environment of those living in Luganville it is unlikely that all houses will have animals that can eat the food waste. They also receive a collection service from the Municipality so are able to put all their wastes on stands on the side of the road for collection. It is also likely that they too burn their garden waste. What this shows is that the focus of waste management in the peri-urban area should be on the remaining waste types – plastic, glass, tin, aluminum, textiles, WEEE and inorganic waste and that additional waste characterisation studies will need to be completed in the urban environment to assess the characteristics of the waste and what additional services may be required.
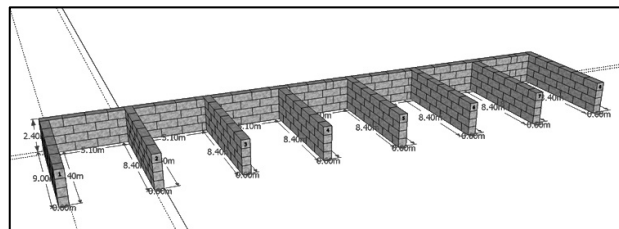
Recyclable Waste

Whilst the percentage of recyclable waste by weight in this survey is relatively small it still warrants being managed better than it is currently. Particularly as the quantities will only increase over time as the sub-divisions become more populated. Possible options for consideration would be to create dedicated drop off points for all recyclable materials (plastic glass, aluminium and tin) These 'bring banks' would need to be located at key intersections throughout the sub divisions that are both convenient for the residents on major walking routes as well as being accessible for collection by a front loading truck or similar.

The benefit of these bring banks is that they will take months to fill and therefore only require intermittent collection. Potentially the waste materials can be stored in shipping containers or in semi contained areas until it is cost effective to ship off the Island; Port Vila, Australia and New Zealand are all possible export options. This will need to be considered further once more studies have been completed in the urban Luganville area and more accurate data is available.

Bays for separation and storage of recyclables

Front loading truck for collection

Alternatively if these waste materials are to be collected it presents a unique opportunity for locals to start some small businesses. From large scale factory set up where the materials are melted or chipped and then made into new products to small reuse operations where the materials are designed into pieces of art and craft and sold locally. Below are some suggestions of how recyclable materials can be recycled or reused.

Tin/Steel
Tin/Steel cans are 100% recyclable, meaning they can be recycled over and over again into new products without loosing any of it's quality or strength. Tin or steel can be melted down and made into many useful products such as "new" cans, vehicle parts, toys, bikes, appliances (such as refrigerators), fire hydrants, or tools.

Aluminium
Aluminum is also 100% recyclabe and does not loose strength or quality each time it is recycled. Aluminium can be recycled into lawn chairs, window frames, pie pans, foil, car parts, or house siding. In Santo there is currently a system in place whereby some restaurants, cafés and resorts have cages provided for the collection of aluminium cans. This system was put in place by Rotary and has the potential to be expanded.

Plastic (1 and 2)
Plastic can be chipped and melted down into buckets, pegs, art and craft, 'new' bottles, carpet, park benches, picnic tables, pipes, flowerpots, t-shirts, fleece jackets, or sleeping bags.

Glass
Glass is possibly the most financially viable material of all the recyclables that would be worth exporting but alternatively it too can be reused through take back programmes (Vanuatu Brewing who produce Tusker Beer give 10 vatu for each empty bottle returned). Alternatively glass can be crushed and used as an aggregate for construction and road sealing or recycled into new jars and bottles, tiles, marbles, jewelry, and fiberglass insulation. Glass may be recycled an infinite number of times since it never loses strength.

Waste Electrical and Electronic Equipment (WEEE)

In this Waste Characterisation Survey there was only a small amount of WEEE present, however it is clear that it is likely to be an increasing problem in Luganville. As families move into the new sub-divisions which will all have electricity, it is inevitable that over time more and more electrical appliances will be purchased, e.g. kettle, toasters, computer, radio, fridge, fan etc. What happens to this waste at the end of its life? The preference is that the item is repaired (this will be of benefit to local businesses in this trade) However because WEEE can contain harmful and hazardous chemicals such as lead, cadmium, beryllium and other toxic materials it is essential that the waste is properly sorted, de contaminated and disassembled correctly before it is disposed of. WEEE does also present opportunities whereby the valuable components such as lead, copper and gold can be recovered and on-sold. There is also the option of working with the suppliers and developing a user pays principal whereby an additional charge or 'recycling fee' is added to the product that will help pay for its recycling or safe disposal at the end of it's life. All of these options need to be researched further and will be a priority in the Sanma Waste Management Plan.

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 extensive education and awareness campaigns. This will ensure accurate and timely information is provided to the community to ensure 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.

RECOMMENDATIONS

From the data collected in this survey the following recommendations can be made:

1. Additional household and business waste characteristion studies to be completed in the Luganville urban area to ensure a complete profile of the waste generated.

2. Further research into possible household recycling collection systems is required.

3. Further research into possible markets for recyclable materials is required.

4. Further research into possible local business opportunites with recycled mateirals is required.

5. Further research into the type and quantity of WEEE being generated is required and also what collection systems may already be in place.

APPENDIX ONE

Luganville Boundary

PHYSICAL PLANNING AREA OF LUGANVILLE

LEGEND

Luganville Municipal Boundary

Physical Planning Area encompassing
3km from Municipal Boundary

APPENDIX TWO

SANMA PROVINCE HOUSEHOLD WASTE AUDIT SURVEY JANUARY 2012

HOUSEHOLD NAME/NUMBER _____

1. The Household

A. Name of head of household _____

B. Male or Female (Circle)   Male   Female

C. Number of people in the household _____

D. Type of Household (Circle)

Nuclear family

Parents or parents with no children

Extended family (with aunty or sister family etc)

Others (please explain)

_____
_____
_____

Name (all members of the household)	Age	Male/Female	Level of education (primary, secondary, tertiary)	Employed yes/no	Employment Type

2. Level of Income

A. Circle the average household income per week (vt)

Less than vt 500 per week   Vt 500 – vt1000/wk   Vt 1000 – vt3000/wk

vt3000 – vt5000/wk   >Vt 5000/wk

Other sources of income (estimation/year?)

B. Expenses

Circle the main household expenses per week (vt)

Food   Electric bills   Water bills   Medical   School
Recreation

Others (explain)…………………………………………………..

C. Average household expenses per week (vt) (Circle)

Less than vt 500 per wk   Vt 500 – vt1000/wk   Vt 1000 – vt3000/wk

vt3000 – vt5000/wk   >Vt 5000/wk

D. Household assets (Vehicles)

Circle the assets of the household:

No vehicle   One vehicle   Two vehicles   Three or more
vehicles

Others (explain)

E. Circle the type of household residence building

Natangora House   Concrete   Wood & concrete   Iron/Tin
Cardboard

Others (explain)

F. Access to Land and Land title (Circle only one)

Town allotment is registered in a member of the household

If no, what's the land arrangement? (Informal from a relative or friends/lease)

G. Views on Waste Management
How important is waste management to you and your household? (Circle only one)

Very important   Important   A little important   No importance

H. What waste management issues would you like the Province or the municipality to address?

_____
_____

I. Waste Management Behaviour

A. How do you normally dispose of the following wastes (Circle only one)

Food waste   Burn   Bury   Place on stand on road side   Take to the dump site
Other

Yard waste   Burn   Bury   Place on stand on road side   Take to the dump site
Other

Plastic bottles Burn   Bury   Place on stand on road side   Take to the dump site
Other

Glass   Burn   Bury   Place on stand on road side   Take to the dump site
Other

Tin cans   Burn   Bury   Place on stand on road side   Take to the dump site
Other

Aluminium cans   Burn   Bury   Place on stand on road side   Take to the dump site
Other

Paper/cardboard Burn   Bury   Place on stand on road side   Take to the dump site
Other

B. When you go shopping do you take your own reusable shopping bags ?   Yes   No

C. Do you know how to compost your kitchen and yard waste?   Yes   No

D. Would you be willing to pay 10VT for each plastic bag that is used for your shopping?   Yes
No

Tank yu tumas.

APPENDIX THREE

SANMA PROVINCE - WASTE AUDIT ASSESSMENT SHEET

Household Name:

Date of Audit:

Sample Collected   1 Day   2 Days   Other

Employees Conducting Audit:

Factors Affecting the Waste Audit (some waste not available, low staff numbers, weather etc):

TOTAL WEIGHT BEFORE AUDIT:

Waste Type	Weight (Kg)	Volume Bucket (Litres)
Paper		
Office Paper		
Newsprint		
Cardboard		
Magazines		
Tetra Pak		
Sub Total		
Plastic		
PET 1 and 2		
HDPE		
PVC soft plastics		
Other		
Sub Total		
Glass		
Sub Total		
Metal		
Aluminium		
Tin		
Sub Total		
Organic		
Food waste		
Garden waste		
Sub Total		
Other		
Polystyrene		
Hazardous (batteries)		
WEEE		
Textiles		
Rubber		
Inorganic (ceramic)		
Ink Cartridges		
Leather		
Other		
TOTAL		

APPENDIX FOUR

List of Figures