



**Department of Environment and Pollution Control (DEPC)  
Port Vila Municipality (PVMC)  
Japan International Cooperation Agency (JICA)**

**Japanese Technical Cooperation Project for  
Promotion of Regional Initiative on  
Solid Waste Management in Pacific Island  
Countries Phase II**

**(J-PRISM II)**

**Report on  
Waste Amount and Composition Survey**

**January 2018**

**Port Vila, Vanuatu**

## Photo of Waste Amount and Composition Survey



Instruction of Questionnaire Survey by Ms. Rebecca,  
PVMC



Questionnaire Survey conducted by survey  
volunteers



Group Photo of Waste Amount and Composition  
Survey Team



Instruction of the waste survey at the workshop



Weighing a plastic bag during the waste survey



Segregation by survey volunteers





Waste Amount and Composition Survey (Cont.)



Example of Restaurant Waste



The Certification of Waste Audit was given by Mrs. Michelle, Acting Town Clerk of PVMC.



Mr. Rex, PVMC and J-PRISM II also express our thanks to the Volunteers one by one.



Group photo in Closing Ceremony of Waste Audit (23rd November, 2017)



## Press release on Waste Amount and Composition Survey

Announcement of the survey is spread through radio and newspaper below.

4 | VANUATU DAILY POST | Friday, November 10, 2017LOCAL NEWS

# Waste amount and composition survey to commence shortly

**THE JAPANESE TECHNICAL** Cooperation Project for Promotion of Regional Initiative on Solid Waste Management (J-PRISM), is a project aimed at tackling and to achieve sustainable solid waste management in the Pacific region.

In May this year the second

phase of the Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries (J-PRISM) was launched.

J-PRISM is funded by Japan International Corporation Agency (JICA) and is being implemented by Department

of Environmental Protection and Conservation (DEPC) in collaboration with Port Vila Municipal Council (PVMC) and is a five-year project.

The project is based on strengthening the organization and executing structures of all municipal areas in Vanuatu targeting the management of

Solid Wastes. Continuing from phase 1, which ended two to three years ago.

It will be conducting a "Waste Amount and Composition Survey" in all five municipal wards.

A random selection process has been followed and a handful of businesses and households

have been approached and this press release is to re-inform and/or remind them about the survey which will begin on the November 14 and finishes on November 24, 2017.

The purpose of the survey is to update the Vanuatu Government, through this project and determine the

different types of wastes and how much of it is produced daily by households and businesses.

This information will serve to better inform so as to strive to improve where needed and possible, ways of solid waste management in the municipal areas as well as the dump sites.

Vanuatu Daily Post (Friday, November 10<sup>th</sup>)

4 | VANUATU DAILY POST | Wednesday, November 15, 2017LOCAL NEWS

# Waste management survey targets 105 households

**WASTE HAS BECOME A CONCERN** for many Pacific island countries.

In May this year phase II of a project targeting waste management in the Pacific known as the Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management or J-PRISM was launched.

As part of Phase II, a survey is currently being undertaken by nine volunteers in joint collaboration between Japan International Cooperation Agency (JICA), Port Vila Municipal Council (PVMC) and the Department of Environmental Protection and Conservation (DEPC), with aims to determine the status of wastes management in Port Vila and finding solutions at how to improve and control wastes.

The overall goal of the project is to help Vanuatu improve how it manages waste. And every household counts, what you use and how you dispose it contributes to the big picture.

The survey is targeting a total number of 105 households, 12

markets and 30 businesses which includes both small scale and large scale businesses, such as hotels, resorts, and kava bars, to name a few.

It comes in three parts.

Firstly, all 105 selected households are being interviewed regarding waste management practices at home.

This takes place on Day 2 and Day 3 which is Tuesday (November 14) and Wednesday (November 15).

Amount & Composition part: Secondly the survey team are handing out plastic bags to each household and businesses for which the Port Vila Municipal Council (PVMC) team will pick up and deliver to the team for assessment.

All rubbish will be carefully separated by hand and weighed.

Reporting: And finally it may take a few weeks to evaluate all the data and provide a report but all information will be available at the Department of Environmental Protection and Conservation (DEPC) and PVMC.



The survey's end date is now moved to Thursday 23 November, due to recent changes but this will not affect the outcome, as everything will be carried out as planned.

A total of nine volunteers will conduct the survey, four of which were previous participants of the same survey done here in 2014, the rest are other youths that have been helping out now and again with PVMC activities.

Vanuatu Daily Post (Wednesday, November 15<sup>th</sup>)

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## **CHAPTER 1 INTRODUCTION OF THE WASTE AMOUNT AND COMPOSITION SURVEY**

### **1.1 Introduction**

The waste amount and composition survey was conducted from October 28, 2014 to November 4, 2014, in Port Vila City. The main purpose of the survey is to grasp how much and what types of waste are generated in the City. The target waste is the one generated from the households, markets and business establishments.

In the past the household waste was audited in 2011, while the market and business waste was surveyed in 2013. The comparison with the past data will serve to monitor the transition of waste generation amount and type, which can help to plan the future waste management in the City; for example, to estimate the life expectancy of the Bouffa landfill and to examine the possible actions for the promotion of 3R (Reduce, Reuse, Recycle).

The survey was conducted under the initiative of the *Department of Environment and Pollution Control (DEPC)* and *Port Vila Municipality Council (PVMC)* with the support of *Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries, Phase-2 (J-PRISM II)*, which is ongoing solid waste management project under the scheme of Japan International Cooperation Agency (JICA).

### **1.2 Schedule of the Waste Amount and composition Survey**

Prior to the waste amount and composition survey, announcement of the survey should be implemented for each target households/markets/business. At the same time, it is necessary to obtain the basic information such as the number of habitants at each target household. Nine (9) survey assistants are hired by the J-PRISM II to support the survey, for which the briefing meeting and workshop should be held. After the 8-days survey in November, the data will be analyzed mainly by the staff members of Port Vila Municipality.

Tentative schedule of the waste amount and composition survey is shown in Table 1. The name of the persons who participated in the waste amount and composition survey is shown in Table 2.

**Table 1: Tentative Schedule of Waste Amount and composition Survey**

Date	November										
	13	14	15	16	17	18	19	20	21	22	23
Work item	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu
Preparation/Breifing											
Preparation/Coding											
Interview (Questionnaire Survey)											
Distribution of plastic bags											
Collection of plastic bags											
Waste separation and weighing											

Source: JICA Expert Team

**Table 2: Participants of Waste Amount and composition Survey**

	Name	Organization/ Position
1	Mr. Rontextar Mogeror	DEPC/ Pollution Control Officer
2	Ms. Rebecca Vuta	PVMC/ Environmental Officer, Town Planning Division
3	Ms. Florence Tamara	PVMC / Southern Ward Secretary
4	Mr. Fred Ruben Palcoq	PVMC / Central Ward Secretary
5	Mr. Watson Bulu Tavi	PVMC / Northern Ward Secretary
6	Mr. Ruth Samson	PVMC / Anamburu-Malapoa Ward Secretary
7	Mr. Andrew Mark	PVMC/ Landfill Unit, Town Planning Division
8	Mr. Jean Paul	PVMC/ Landfill Unit, Town Planning Division
9	Mr. Eti Samson	PVMC/ Landfill Unit, Town Planning Division
10	Mr. Calo Mark	PVMC/ Landfill Unit, Town Planning Division
11	Mr. Lency Seule	PVMC/ Landfill Unit, Town Planning Division
12	Mr. George Belam	PVMC/ Landfill Unit, Town Planning Division
13	Mr. Paladino Tabi	PVMC/ Landfill Unit, Town Planning Division
14	Ms. Rikae Kodani	J-PRISM/ JICA Expert
15	Mr. Molu Hango Bulu	J-PRISM/ Project assistant
16	Mr. Berry George	J-PRISM/ Project assistant (Scheduled)
17	Mr. Zannel Lui	Survey assistant (hired by J-PRISM)
18	Mr. Philip John	Survey assistant (hired by J-PRISM)
19	Mr. Sam George	Survey assistant (hired by J-PRISM)
20	Ms. Joyce Karowi	Survey assistant (hired by J-PRISM)
21	Mr. Jason Mark	Survey assistant (hired by J-PRISM)
22	Mr. James Taho	Survey assistant (hired by J-PRISM)
23	Mr. Max Bem	Survey assistant (hired by J-PRISM)
24	Mr. Toara Charley	Survey assistant (hired by J-PRISM)
25	Mr. Taiwia James	Survey assistant (hired by J-PRISM)

Source: JICA Expert Team

### 1.3 Selected Samples for the Waste Amount and composition Survey

According to the discussion among the DEPC, PVMC staff members and JICA expert, the number of target was decided and the samples were selected: 105 households, 4 markets, 30 business establishments. The number of selected samples is shown in Table 3. The selected areas for household waste audit by income level are shown in Table 4.

**Table 3: Sample for the Waste Amount and composition Survey**

Type	Description	Low income	Middle income	High Income	Unknown	Number of selected samples
Households	Northern ward	6	7	8	0	21
	Anamburu ward	5	7	9	0	21
	Freshwota ward	7	6	7	1	21
	Central ward	4	5	11	1	21
	Southern ward	10	4	6	1	21
	<b>Sub total</b>	<b>32</b>	<b>29</b>	<b>41</b>	<b>3</b>	<b>105</b>
Market	Central market					5
	Freshwota market					3
	Man ples market					2
	Anamburu market					2

Type	Description	Low income	Middle income	High Income	Unknown	Number of selected samples
<b>Sub total</b>						<b>12</b>
Business	Kava Bars					5
	Hotels					5
	Restaurants					10
	Offices					5
	Shops					5
	<b>Sub total</b>					<b>30</b>

Source: JICA Expert Team

**Table 4: Selected Areas for Households Waste Audit by Income Level**

Type	Description	Income level	Target Areas (No. of selected samples)
Households	Northern ward	Low income	Switi (4), 21 Jump street (4), Akatis- Saratoga (4), 7 stars (4), Olen (4)
		Middle income	
		High income	
	Anamburu ward	Low income	Main road Lilly Chan - Ecole public (right) (7), Side road (left) (5), Simpolo (3)
		Middle income	Willie Jimmy - Sato - Sisivi - Clinic (5)
		High income	
	Freshwota ward	Low income	Freshwota 1 (5), Freshwota 4 (10), Freshwota 5 (2), Freshwota 6 (3)
		Middle income	Freshwota 2 (5), Freshwota 3 (5)
		High income	
	Central ward	Low income	Seaside Tongoa - Seaside Futuna (5), Seaside middle (2), Seaside Paama (2)
		Middle income	Independence park (5), Gallardo- Yaw shopping center (6)
		High income	
	Southern ward	Low income	Tokyo (1), Erasa (1), Number 2 Wales (2)
		Middle income	Bare - ABC Store (2)
		High income	Pango (1), Elluk (3), Tampulo - Seaside lagoon (4), Loustallet - Chief Nakamal (6)

Source: JICA Expert Team

**Table 5: Selected Areas for Business Waste Audit by Business Type**

Type	Description	Target Areas (No. of selected samples)
Kava Bar	Northern ward	Akatis road
	Anamburu ward	Tour Vanuatu Nakamal
	Freshwota ward	Green Light Nakamaru
	Central ward	Shefa Nakamal
	Southern ward	Tafau Nakamal
Hotel	Northern ward	Airlines Business Hotel
	Anamburu ward	-
	Freshwota ward	Sunset Bungalow
	Central ward	Grand hotel
	Southern ward	Lagoon, Melanesian hotel
Restaurant/ Takeaway	Northern ward	KTV restaurant, Happy Castle restaurant
	Anamburu ward	<u>Yum Yum restaurant*</u> , Harbor View
	Freshwota ward	Vanuatu Fried Chicken, Au Bon Marche Take Away
	Central ward	Pêche migion, Cheng ting (vallet)
	Southern ward	MK restaurant, Kanpai
Office	Northern ward	Vanuatu Blue Ltd.



Type	Description	Target Areas (No. of selected samples)
	Anamburu ward	APTC
	Freshwota ward	Au Bon Marche Office
	Central ward	Air Vanuatu
	Southern ward	Carpenter motors office
Shop	Northern ward	Selovia Store
	Anamburu ward	QQ Store
	Freshwota ward	Sakari
	Central ward	Chew store
	Southern ward	ABC store

Source: JICA Expert Team

## CHAPTER 2 DATA ANALYSIS/OBSERVATION

### 2.1 Household Waste

Target household and family member is shown in Table 7-1. Average family member is 6.6 people/household. Income level is unknown for 3 households from the questionnaire survey. Unit waste generation by income level is calculated by correction average number of family member in Table 7-2.

**Table 7-1: Target Household and family member**

Income Level	No. of HHs	Family member (Total)	Family member (Average)
		(people)	(people/HH)
High	32	169	5.8
Middle	29	199	6.9
Low	41	274	6.7
unknown	3	32	10.7
Total	105	674	6.6

Source: JICA Expert Team

**Table 7-2: Target Household and family member (collection)**

Income Level	No. of HHs	Family member (Total)	Family member (Average) (correction)
		(people)	(people/HH)
High	32	180	6.2
Middle	29	210	7.2
Low	41	284	6.9
unknown	3	-	-

Total	105	674	6.6
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Source: JICA Expert Team

The waste generation amount in Port Vila was 1.07 kg/capita/day. The Low-income households have higher generation rate. The unit generation rate of household waste is shown in Table 8.

It was found out that the waste generation rate has drastically increased from 2011 to 2017. Compared with the results in 2011 and 2014, it is also evident that the unit generation rate of low-income households went up considerably. In general, 1.07 kg/capita/day is quite high. Japanese unit generation rate is shown in Table 9 for comparison.

**Table 8: Unit Generation Rate of Household Waste**

(Unit: kg/capita/day)				
Year	Low	Middle	High	Average
2011	0.39	0.35	0.62	0.43
2014	0.60	0.68	0.65	0.63
2017	0.96	1.20	0.87	1.07

Source: JICA Expert Team

**Table 9: (Reference) Unit Generation Rate of Household Waste in Japan**

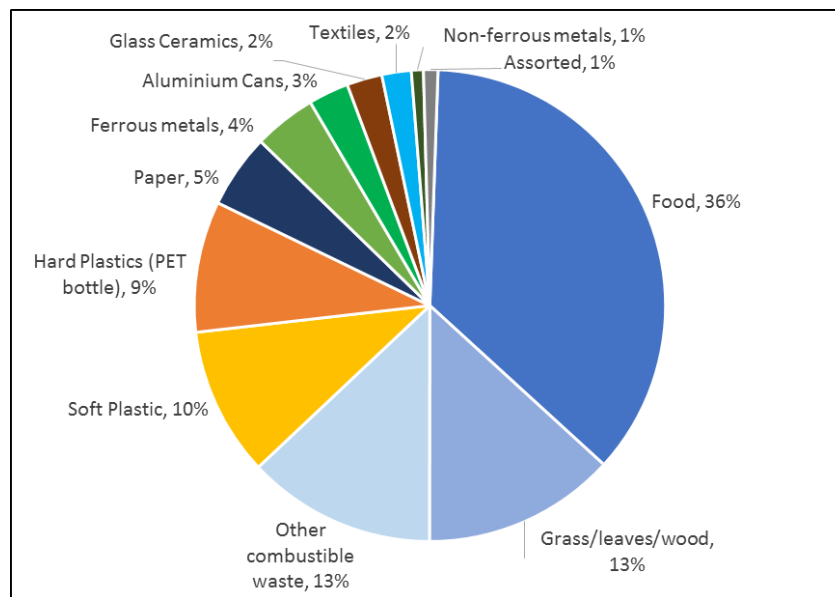
(Unit: kg/capita/day)		
Prefecture	Name of city/ town	Unit generation rate (kg/capita/day)
Nagano	Anan Town	0.41
Tokyo	Koganei City	0.63
Shizuoka	Iwata City	0.73
Tokyo	Hachioji City	0.83
Chiba	Funabashi City	0.94

Source: Waste Management in Japan, 2013, Ministry of Environment

The composition of household waste is shown in Figure 1 and Table 10. 62.4%<sup>1</sup> of household waste is vegetables or organic waste, which should be taken into consideration in terms of waste reduction. It is also remarkable that 19.2 % of all the household waste is plastic. Since currently there is few companies to treat plastic waste in Port Vila City, it is desirable to establish some system to Return these recyclables, including cans and metal.

The composition of household waste by income level is shown in Figure 2. 42% of waste from Low-income is food waste, which is higher compared with Middle-income and High-income. Concerning plastic waste (soft plastics and hard plastics), 23% of waste from Middle-income is the highest amount compared with Low-income and High-income. Density of waste is 0.45kg/L.

<sup>1</sup> Data of Day-2 is extracted for circulation because of irregular data.



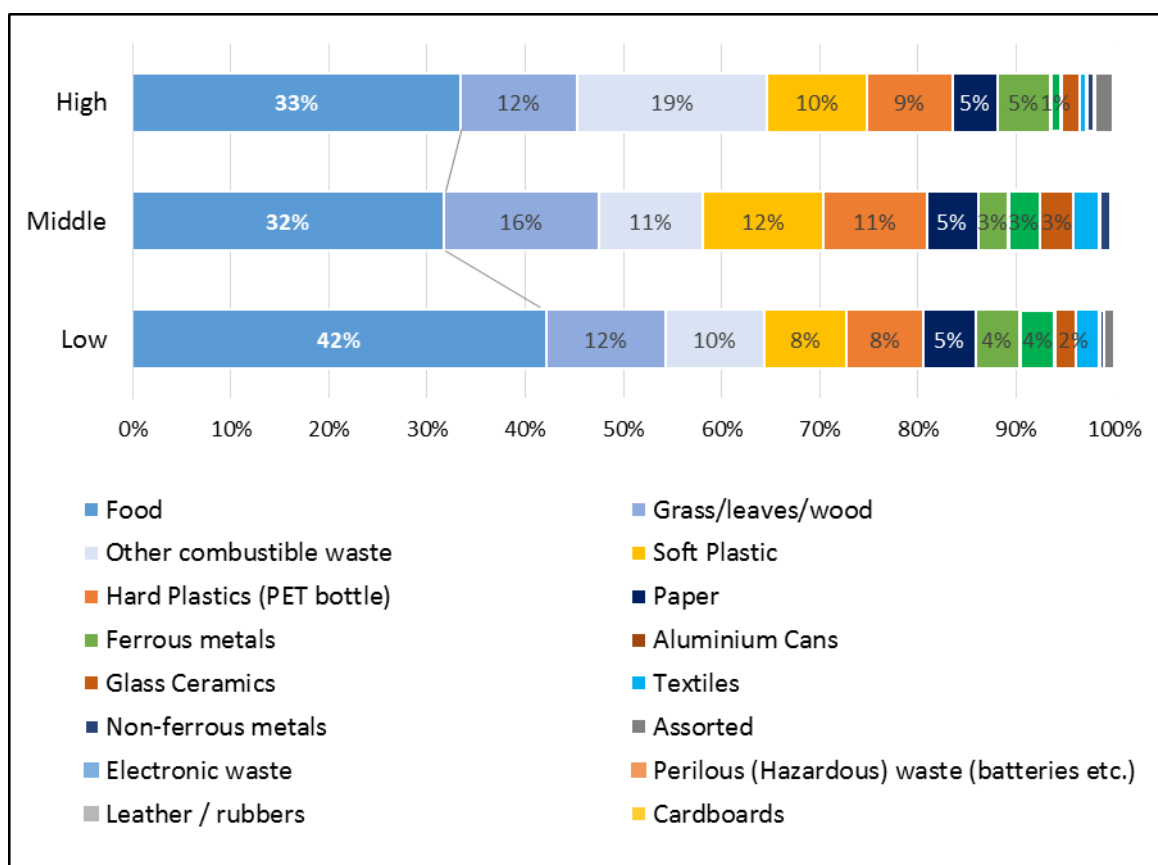
Source: JICA Expert Team

**Figure 1: Composition of Household Waste**

**Table 10: Composition of Household Waste**

TOTAL per Waste type	(kg)								Composition(%)
	Day-1	Day-2	Day-3	Day-4&5	Day-6	Day-7	Day-8	TOTAL (Day1,3-8)	
Paper (Newspaper, magazine)	25.3	24.4	13.9	36.8	42.8	34.6	46.1	199.3	5.1%
Grass/leaves/wood	68.3	0.0	74.5	11.5	121.2	161.2	83.8	520.5	13.2%
Food	363.4	217.6	59.3	218.6	277.1	303.8	200.9	1,423.1	36.2%
Cardboards	0.0	0.0	0.0	0.0	2.0	0.0	0.8	2.8	0.1%
Other combustible waste (Nappies, cottons, etc.)	45.4	59.2	26.4	255.3	97.2	61.8	23.0	509.1	12.9%
Textiles	18.1	18.3	13.8	0.0	29.8	13.1	4.5	79.4	2.0%
Hard Plastics (PET bottles, other plastic bottles, other plastics)	39.2	34.4	36.1	113.5	75.5	39.2	49.4	352.8	9.0%
Soft Plastic (flimsy plastics, polystyrene, etc.)	89.2	58.7	29.6	55.5	89.8	86.6	50.3	401.0	10.2%
Leather / rubbers	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.8	0.0%
Aluminium Cans	16.9	4.9	2.2	1.7	11.4	2.3	74.3	108.7	2.8%
Ferrous metals (steels, irons)	13.8	0.0	18.5	14.8	62.8	51.3	7.2	168.3	4.3%
Non-ferrous metals (copper, brass, etc.)	0.0	0.0	0.0	0.0	28.3	0.0	4.0	32.3	0.8%
Glass (glass bottles, board glass, broken glass) Ceramics	25.1	2,101.5	9.5	15.6	32.9	5.5	6.8	95.3	2.4%
Electronic waste	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.0%
Perilous (Hazardous) waste (batteries etc.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Assorted	7.8	77.4	0.0	12.8	3.7	0.0	14.7	38.9	1.0%
<b>TOTAL</b>	<b>712.4</b>	<b>2,596.4</b>	<b>284.6</b>	<b>736.6</b>	<b>874.3</b>	<b>759.3</b>	<b>565.6</b>	<b>3,932.8</b>	

Source: JICA Expert Team



Source: JICA Expert Team

**Figure 2: Composition of Household Waste by income level**

## 2.2 Business Waste

The comparison of average waste generation by business type is shown in Table 1. The average waste generation by business type is shown in Table 12.

**Table 11: Comparison of Average Waste Generation Rate by Business Type**

(Unit: kg/business establishment/day)

Year	Hotel & Restaurant	Office	Shop
2013	13.9	17.1	10.2
2014	10.6	2.7	3.3
2017	9.76	2.76	7.41

Source: JICA Expert Team



**Table 12: Average Waste Generation by Business Type**

(Unit: kg/business establishment/day)

Area	Unit generation rate (kg/capita/day)
Kava Bar	7.95
Hotel	10.16
Restaurant	9.37
Office	2.76
Shop	7.41

Source: JICA Expert Team

## **Attachment**

Attachment 1: Questionnaire

Attachment 2: Tips for the next waste amount and composition survey

Attachment 3: Materials and budget list

Attachment 4: Methods for waste amount and composition survey

Attachment 1: Questionnaire

**WASTE CHARACTERIZATION SURVEY**

**INTERVIEW FORM (QUESTIONNAIRE) FOR HOUSEHOLD**

**Household Code** \_\_\_\_\_

*(Note: Household was Defined as a Group of People Living Together in the Same 'House' and Having Evening Meal Together)*

**PART I: Basic Information**

**Q.1 Household**

1.1 Name of Head of

Household: \_\_\_\_\_

1.2 Male or Female (M / F): \_\_\_\_\_

1.3 Age: \_\_\_\_\_

1.4 Nationality: \_\_\_\_\_

1.5 Employment

- a) Employed
- b) Self-employed (Kava bar, retail shop, microfinance etc.)
- c) Not employed (Household work, Retired/Pension/Elderly etc.)

1.6 Number of persons in the household: \_\_\_\_\_

1.7 Type of Household:

- a) Nuclear family
- b) Parents or parents with no children
- c) Extended family (with Aunty or Sister's family etc.)
- d) Others (please explain): \_\_\_\_\_

1.8 How long have you lived here? : \_\_\_\_\_ years/ months

**Q.2 Level of Income** *(Circle the Average Household Income per 2 Weeks (Vatu))*

- a) Less than 10,000 Vatu/fortnight
- b) 10,000 - 20,000 Vatu/fortnight
- c) More than 20,000 Vatu/fortnight

**PARTII: YOUR VIEWS and OPINIONS ON WASTE MANAGEMENT**

**Q.1 How important is waste management to you and your household?** *(Circle Only One)*

- a. Very Important
- b. Important
- c. Less Important
- d. Not Important

**Q.2 What is your most priority issue?** *(Circle Only One)*

- a. Education
- b. Sanitation & Health
- c. Waste management
- d. Social welfare & Economy

**Q.3 What do you do with waste?** *(Please Circle more than one)*

- a. Collected by PVMC
- b. Collected by private collectors
- c. Burying
- d. Burning
- e. Backyard open dumping
- f. Take myself to dumpsite

**Q.4 Frequency of collection per week by PVMC and private collectors?** *(Please Tick)*

	PVMC	Private collectors
a. Once		
b. Twice		
c. Three Times		
d. Once a Month		
e. Never		



**Q.5 Are you satisfied with the service provided by PVMC?** *(Please Tick)*

- a. Satisfied
- b. Not satisfied

Reasons

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**Q.6 What Disposal Method Do You use for Your Household Waste?** *(Circle more than one)*

- a. Pre-paid bags (Yellow bags)
- b. Rubbish plastic bags
- c. Rubbish bins
- d. Cardboard boxes
- e. Others

**Q.7 Do you think pre-paid bags (Yellow bags) help to reduce waste?** *(Please circle one)*

- a. Yes
- b. No

**Q.8 Are you willing to do waste separation at source?** *(Please circle one)*

- a. Yes
- b. No
- c. Not sure

**Q.9 Have you participated in cleanup activities in your community?** *(Please circle one)*

- a. Yes
- b. No

**Q.10 Observation by the interviewer** *(Please tick)*

	Yes	No
1. The household property is kept clean?		
2. Waste is separated properly?		
3. Compost is already introduced?		
4. The interviewee understood the questions clearly?		

## Attachment 2: Volunteer's Recommendation for the next WACS

Challenges and recommendation are summarized as shown below;

1. Use light colored rubbish bags instead of black. Eg, blue, green, yellow.
2. Spend one or two days for coding/ labelling all rubbish bags
3. Timing for rubbish bag pickups in the morning should be early, 7am.
4. Hire/secure a bigger sized vehicle for picking up rubbish bags for survey.
5. Use a flatbed truck to pick up volunteers instead of a bus so that the truck can also pick up rubbish bags
6. Ensure to inform PVMC staffs of normal rubbish pickups so as not to pick up survey rubbish bags
7. Have an extra scale and a bucket for measuring KG and L (volume)
8. Have format for recording info for amount and composition survey prepared in advance
9. Announcement and/or memo to volunteers to inform households to fill a plastic bag with daily rubbish, not month or year old garbage
10. Have PVMC organize better for Sunday rubbish pick ups
11. Include volunteers in door-to-door confirmations so that they know which houses to interview. Do this for one whole week.
12. Ward secretaries to assist identifying households that will not take too long for the vehicle to pick up
13. Maybe could have two bags per households, one for indoor waste and the other for outdoor wastes
14. Make sure facilities for cleaning up after days' work (soap, sponge, towels) are available daily
15. Have more volunteers with equal numbers of Sunday and Saturday worshippers, so Sunday worshippers can rest on Sunday and Saturday worshippers can rest on Saturday
16. Daily allowance raise
17. When coding of plastic bags, have the volunteers split into groups according to categories (Households, Markets, Hotels, etc.) to make work faster

**(Reference) Tips from the waste amount and composition survey 2014**

Challenges		Solutions/ Recommendations	
1	Transportation and drivers for plastic bag collection/ mobilization were not prepared enough.	•	To prepare two specific trucks and drivers for the survey for full day (7:30-15:00)
2	There was no specific plan and no scheduling in advance.	•	To prepare a plan including the budget at least two month before, so that the budget can be secured
3	Some youth (survey assistants) live very far, which made it difficult to organize the survey.	•	To select the youths who have experienced the past survey
		•	To have an interview to consider the background (where the youth lives; churches; availability; survey experience)
4	Some households complained about the change of plan.	•	To select the proper number of households
5	Some business didn't want to collaborate with the survey, especially the hotels, because of the waste collection system done by PVMC.	•	To visit the business at least a few days before the survey, to make an agreement for the collaboration, and to make a list
6	No enough budgets and no cost sharing were done.	•	To prepare a plan including the budget at least two month before, so that the budget can be secured
7	Not active participation of counterparts was observed.	•	To have a meeting and encourage the participation by phone and e-mail
		•	To organize the survey when the counterparts are available.
8	On the first and second day, there were bags not collected at the selected shops.	•	To prepare a list of shops in advance
9	PVMC trucks wrongly collected plastic bags, because of no information for the drivers	•	To select another color of plastic bags to identify plastic bags for the survey
		•	To inform the drivers before the survey
10	There was no management of the materials such as gloves	•	To give a proper instruction to the youth before the distribution of materials
		•	To buy strong gloves, instead of disposable gloves.
11	Explanation to the households was not enough, and some waste generated before the survey was put into the plastic bags.	•	To select the youths for the next survey who have joined the past survey
		•	To prepare a list of explanation points to each household, and the youth bring it when they explain
12	Proper separation site was not prepared.	•	To set up two table for waste separation (for example, 2m x 2m)
13	There was no mobilization for the questionnaire survey.	•	To secure two trucks for the questionnaire survey (2 ways/day; 2,000vatu/day)



Attachment 3: Materials and budget list

	Item	Quantity		Unit price (vatu)	Amount (vatu)	Responsi bility
1	Tarpaulin (5.4m x 5.4m)	1	piece	2,995	2,995	JPT
2	Scale (up to 200kg)	1	set	29,150	29,150	JPT
<b>3</b>	<b><u>Scale (up to 100kg)</u></b>	<b><u>2</u></b>	<b><u>set</u></b>	<b><u>N/A</u></b>	<b><u>N/A</u></b>	<b><u>PVMC</u></b>
4	Plywood (9mm)	1	sheet	3,350	3,350	JPT
<b>5</b>	<b><u>Buckets (Big)</u></b>	<b><u>1</u></b>	<b><u>set</u></b>	<b><u>N/A</u></b>	<b><u>N/A</u></b>	<b><u>PVMC</u></b>
6	Buckets (Small)	2	set	N/A	N/A	JPT
7	Masks	15	boxes	860	12,900	JPT
8	Hand gloves	15	boxes	1,035	15,525	JPT
9	Gumboot	13	pairs	N/A	N/A	JPT
<b>10</b>	<b><u>Plastic bags (Green)</u></b>	<b><u>(110+12+30)*8</u></b>	<b><u>pieces</u></b>	<b><u>N/A</u></b>	<b><u>N/A</u></b>	<b><u>PVMC</u></b>
11	Per diem	10*11	persons/day	1,000	165,000	JPT
12	Refreshment/Lunch	15*11	persons/day	350	57,750	JPT
13	Water	15*2*11	persons/day	50	16,500	JPT
14	Transportation (from the households/markets/business to waste separation site)	11	day	N/A	N/A	JPT
15	Transportation (for the youths)	11	day	N/A	N/A	JPT

## Attachment 4: Methods for the waste amount and composition survey

### 1. Purposes

- (1) To update the data on unit waste generation rate and waste composition in Port Vila
- (2) To utilize the collected data to analyze the impact of ongoing activities and the future plan on solid waste management

### 2. Survey Description

The survey will contain the following activities:

#### **Preparation stage:**



In the stage, it is necessary to prepare all the equipment as well as the arrangement with the target households.

#### **Implementation stage**



Questionnaire survey (for all the sampled households and commercial establishments) and waste auditing are conducted.

#### **Analysis and Reporting stage**

Data entry, calculation and analysis are done and put into a waste amount and composition report.

### 3. Detail process

#### 3.1 Preparation stage

##### (1) Task 1: Schedule and location

Decide the date when to conduct the survey. Also, identify the location to conduct waste auditing.

No.	Activities	Date	Notes
(1)	Announcement & Questionnaire Survey		Announcement and questionnaire survey for all the sampled households and commercial establishments.
(2)	Waste auditing		Waste is collected and scaled.

##### (2) Task 2: Human resources

Identify who can join the survey. It is also recommended to hire some youths or students as survey assistants. The workshop for survey assistants can be held for a half day before the implementation.

**(3) Task 3: Selection of sample areas (Households)**

Discuss and select the target areas according to the categorization of income level. The total sampling number should be decided. Also, inform the communities about the survey schedule, if necessary.

No.	Income level	details	Name of areas
(1)	High income	Less than 10,000 Vatu/fortnight	
(2)	Middle income	10,000 - 20,000 Vatu/fortnight	
(3)	Low income	More than 20,000 Vatu/fortnight	

**(4) Task 4: Selection of sample areas (Business)**

Discuss and select the target commercial establishments.

No.	Type	Name of business establishments	Notes
(1)	Kava Bar		
(2)	Hotel		
(3)	Restaurant		
(4)	Office		
(5)	Shop		

**(5) Task 5: Preparation of materials and equipment**

Prepare the necessary materials and equipment, which are listed as follows.

No.	Item	Quantity	Price/ Budget
(1)	Garbage bags (Households)	Sample number x 8 days	
(2)	Garbage bags (Commercial)	Sample number x 8 days x 2	
(3)	Gloves (disposal)	Number of survey assistants x 8 days	
(4)	Masks (disposal)	Number of survey assistants x 8 days	
(5)	Scale	2 units	
(6)	Tarpaulin	1 or 2 units	
(7)	Buckets	4 units	
(8)	Stationary (pens, masking tapes etc.)	*cording of plastic bags and recording	
(9)	Transportation	2 days (for announcement, if necessary) 8 days (for waste bag collection)	
(10)	Water	Number of survey assistants x 8 days	
(11)	Lunch	Number of survey assistants x 8 days	
(12)	Per diem for survey assistants	Number of survey assistants x 8 days	

**(6) Task 6: Information sheets**

Finalize the information sheets before the implementation. The information sheets will be distributed for all the sampled households and commercial establishment.

**(7) Task 7: Preparatory workshop**

Preparatory workshop can be held for the survey assistants. The draft contents will be as follows:

No.	Contents	Description	Person in charge
(1)	Outline of the survey	- Survey purposes - Survey schedule - What to do during the survey	
(2)	How to segregate waste	- Demonstration	
(3)	Cording of plastic bags		

### **3.2 Implementation stage**

**(1) Task 8: Announcement**

Distribute the information sheet and plastic bags (one plastic bag for each household and two plastic bags for each commercial establishment) and explain to the residents and workers that every waste should be put into the plastic bags. At the same time, number of family member, household income level and area information should be questioned and recorded.

It is recommended to attach the masking tape at the entrance of each household for code identification.

**(2) Task 9: Waste auditing**

Distribute and collect the waste bags.

- For the First Day, collect and transport the plastic bags to the dumpsite and discard all the waste. In collecting waste bags, distribute additional plastic bags (one plastic bag for each household and two plastic bags for each commercial establishment).
- From the Second to Eighth Day, collect and transport plastic bags to the pre-specified location and implement the waste auditing.
- Waste weight will be scaled for all the samples.
- Household waste volume and composition will be studied for randomly selected plastic bags.
- Commercial waste volume and composition will be surveyed for all the samples.

### **3.3 Analysis and Reporting stage**

#### **(1) Task 10: Data entry, calculation, analysis and reporting**

Do data entry, calculation, analysis and reporting.

Attachment 5: Sample of Recording Sheet

**WASTE AMOUNT SURVEY SHEET (Households) (Sample: Central Ward)**

Date of Audit:

Name of Recorder:

Day	CENTRAL WARD					
Category	Households					
	LOW		MIDDLE		HIGH	
	KG	L	KG	L	KG	L
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

## WASTE AMOUNT SURVEY SHEET (Business)

Date of Audit: \_\_\_\_\_  
Name of Recorder: \_\_\_\_\_

**DAY:** \_\_\_\_\_

	Businesses												
	Markets		KAVA BARS		HOTELS		Restaurants		OFFICES		SHOPS		
	KG	L	KG	L	KG	L	KG	L	KG	L	KG	L	
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													



## WASTE CHARACTERIZATION SURVEY SHEET (Households)

Date of Audit:

Name of Recorder:

Ward:                      CENTRAL                      FRESWOTA                      MANPLES                      ANAMBROU                      SOUTHERN

Waste Type	Income Lvl	Weight (KG)	Volume (Litres)
Paper (Newspaper, magazine)			
Paper (Newspaper, magazine)			
Paper (Newspaper, magazine)			
Grass/leaves/wood			
Grass/leaves/wood			
Grass/leaves/wood			
Grass/leaves/wood			
Grass/leaves/wood			
Food			
Food			
Food			
Food			
Food			
Food			

Cardboards			
Cardboards			
Cardboards			
Cardboards			
Other Combustible Waste (Nappies, cottons, etc.)			
Other Combustible Waste (Nappies, cottons, etc.)			
Other Combustible Waste (Nappies, cottons, etc.)			
Textiles			
Textiles			
Hard Plastic (PET bottles, other plastic bottles, other plastics)			
Hard Plastic (PET bottles, other plastic bottles, other plastics)			
Hard Plastic (PET bottles, other plastic bottles, other plastics)			
Soft Plastic (film plastics, polystyrene, etc.)			
Soft Plastic (film plastics, polystyrene, etc.)			
Soft Plastic (film plastics, polystyrene, etc.)			
Leather / rubbers			
Leather / rubbers			

Aluminium Cans			
Aluminium Cans			
Ferrous metals (steels, irons)			
Ferrous metals (steels, irons)			
Non-ferrous metals (copper, brass, etc.)			
Glass (glass bottles, board glass, broken glass) /CERAMICS			
Glass (glass bottles, board glass, broken glass) /CERAMICS			
Electronic Waste			
Electronic Waste			
Perilous (Hazardous) waste (batteries etc.)			
Perilous (Hazardous) waste (batteries etc.)			
Assorted			
Assorted			

## WASTE CHARACTERIZATION SURVEY SHEET (Businesses)

Date of Audit:

Name of Recorder:

Type:            Kava Bar      Hotel                      Restaurant/Takeaway                      Office                      Shop

Waste Type	Weight (KG)	Volume (Litres)
Paper (Newspaper, magazine, book, office paper, etc.)		
Paper (Newspaper, magazine, book, office paper, etc.)		
Paper (Newspaper, magazine, book, office paper, etc.)		
Grass/leaves/wood		
Grass/leaves/wood		
Grass/leaves/wood		
Grass/leaves/wood		
Grass/leaves/wood		
Food		
Food		
Food		
Food		
Food		
Food		
Cardboards		

Cardboards		
Cardboards		
Cardboards		
Other Combustible Waste (Nappies, cottons, etc.)		
Other Combustible Waste (Nappies, cottons, etc.)		
Other Combustible Waste (Nappies, cottons, etc.)		
Textiles		
Textiles		
Hard Plastic (PET bottles, other plastic bottles, other plastics)		
Hard Plastic (PET bottles, other plastic bottles, other plastics)		
Hard Plastic (PET bottles, other plastic bottles, other plastics)		
Soft Plastic (film plastics, polystyrene, etc.)		
Soft Plastic (film plastics, polystyrene, etc.)		
Soft Plastic (film plastics, polystyrene, etc.)		
Leather / rubbers		
Leather / rubbers		
Aluminium Cans		
Aluminium Cans		

Ferrous metals (steels, irons)		
Ferrous metals (steels, irons)		
Non-ferrous metals (copper, brass, etc.)		
Glass (glass bottles, board glass, broken glass) /CERAMICs		
Glass (glass bottles, board glass, broken glass) /CERAMICs		
Electronic Waste		
Electronic Waste		
Perilous (Hazardous) waste (batteries etc.)		
Perilous (Hazardous) waste (batteries etc.)		
Assorted		
Assorted		

## WASTE CHARACTERIZATION SURVEY SHEET (MARKET)

Date of Audit:

Name of Recorder:

Ward:                      CENTRAL                      FRESWOTA                      MANPLES                      ANAMBROU                      SOUTHERN

Waste Type	Weight (KG)	Volume (Litres)
Paper (Newspaper, magazine)		
Paper (Newspaper, magazine)		
Paper (Newspaper, magazine)		
Grass/leaves/wood		
Grass/leaves/wood		
Grass/leaves/wood		
Grass/leaves/wood		
Grass/leaves/wood		
Food		
Food		
Food		
Food		
Food		
Food		
Cardboards		



Cardboards		
Cardboards		
Cardboards		
Other Combustible Waste (Nappies, cottons, etc.)		
Other Combustible Waste (Nappies, cottons, etc.)		
Other Combustible Waste (Nappies, cottons, etc.)		
Textiles		
Textiles		
Hard Plastic (PET bottles, other plastic bottles, other plastics)		
Hard Plastic (PET bottles, other plastic bottles, other plastics)		
Hard Plastic (PET bottles, other plastic bottles, other plastics)		
Soft Plastic (film plastics, polystyrene, etc.)		
Soft Plastic (film plastics, polystyrene, etc.)		
Soft Plastic (film plastics, polystyrene, etc.)		
Leather / rubbers		
Leather / rubbers		
Aluminium Cans		
Aluminium Cans		

Ferrous metals (steels, irons)		
Ferrous metals (steels, irons)		
Non-ferrous metals (copper, brass, etc.)		
Glass (glass bottles, board glass, broken glass) /CERAMICs		
Glass (glass bottles, board glass, broken glass) /CERAMICs		
Electronic Waste		
Electronic Waste		
Perilous (Hazardous) waste (batteries etc.)		
Perilous (Hazardous) waste (batteries etc.)		
Assorted		
Assorted		