



Centre for Environment
Fisheries & Aquaculture
Science



Vanuatu – Best Practice Waste Management report

**Overview and outcomes of the Best Practice Actions –
November 2018 - February 2019**

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Executive Summary

The Commonwealth Litter Programme (CLiP) is an initiative delivered by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) and funded by the United Kingdom's Department for Environment, Food and Rural Affairs. The initiative supports developing countries across the Commonwealth in advancing national litter action plans focused on preventing litter, including plastics entering the oceans.

In 2018, CLiP contracted Asia Pacific Waste Consultants (APWC) to study waste management practices in Vanuatu and offer best-practice solutions and training to staff engaged in the design and delivery of waste services.

Over the course of data collection in November 2018, best practice demonstrations were undertaken in all communities and islands visited to provide residents with ideas on source separation and waste disposal that could be undertaken locally without extensive external intervention. This report presents some of the best practice actions and demonstrations undertaken in various communities across Vanuatu.

A number of problem waste streams were identified during the waste audit process. In response, APWC developed a programme to share knowledge and ideas relevant to the Pacific context. One objective was to build collaborative relationships by sharing solutions and lessons learned in the Australian context to help tackle marine litter and broader waste issues.

This report also presents the Best Practice Showcase delivered to delegates from Vanuatu, Solomon Islands and other regional organisations with a presence in the South Pacific from 4–6 February 2019 in Sydney, Australia.

Over the course of three days, several presentations and site visits were conducted to provide Australian context and candid discussion on a range of waste management areas of interest including contract structures and contract management, optimised waste fleets and their management, container deposit schemes (CDS), extended producer responsibility schemes (EPS), education and engagement.

Evaluation of the showcase identified a high level of delegate satisfaction with the programme. All delegate responses were positive. Respondents felt there was a high degree of relevance and professional growth arising from their participation.

These seminars provide a strong foundation for tailored in-country training to be delivered in February 2019. Due to the showcase, the in-country training better reflected the specific and unique needs of Vanuatu's waste management challenges.

Table of Contents

1	Introduction	1
1.1	Project need	1
1.2	The Commonwealth Litter Programme (CLiP)	2
1.3	This report.....	3
2	Recap: Waste data, service gaps and training	5
2.1	Service gaps.....	7
2.2	Training and knowledge gap analysis	9
3	Stage 1 – Local solutions case studies	13
3.1	Issues identified	13
4	Suggested best-practice actions	19
4.1.1	Management of nappies.....	19
4.1.2	The plastic bag ban	19
4.1.3	Containers deposit legislation.....	21
5	Stage 2 - The Best Practice Showcase	23
5.1	Overview and objectives.....	23
5.2	Summary of the Showcase experience – Day one	26
5.2.1	Day 1- Seminar series.....	26
5.2.2	Day 1 – Site visits.....	29
5.3	Summary of the Showcase experience – Day two.....	30
5.3.1	Day 2 – Seminar Series.....	30
5.3.2	Day 2 – Site tours	32
5.4	Summary of the Showcase experience – Day three	35
5.5	Delegate Evaluation of the Best Practice Showcase	38
6	Lessons learned.....	46
6.1	Visa Issues	46
6.2	Ongoing support	46
6.3	Nation-specific examples	46
7	References	47

Tables

Table 1:	Gaps in overall waste management in Vanuatu	7
Table 2:	Container deposit schemes currently in Vanuatu.....	21
Table 3:	The Best Practice Showcase three day programme	25
Table 4:	Free text feedback provided by delegates to inform future programmes	44

Figures

Figure 1:	Project delivery organisations.....	2
Figure 2:	CLiP sponsors and objectives	3
Figure 3:	Household sample distribution in Efate.....	5
Figure 4:	Household sample distribution in Luganville.....	6
Figure 5:	Vanuatu top 10 waste items and proposed solutions	7
Figure 6:	Stakeholders consulted in Vanuatu regarding training needs.....	10
Figure 7 :	Training gap analysis	12
Figure 8:	Detailed breakdown of waste in Vanuatu	20
Figure 9:	Vanuatu's most common containers	22
Figure 10:	Vanuatu's containers by CDS status.....	23
Figure 11:	Site map of the Kimbriki resource recovery centre	38
Figure 12:	Delegate evaluation of Day 1.....	40
Figure 13:	Delegate evaluation of Day 2	41
Figure 14:	Delegate evaluation of Day 3	42

Images

Image 1:	APWC staff demonstrate source separation.....	14
Image 2:	Source-separated waste from 8 households	14
Image 3:	Using discarded materials to build moisture barriers around plants	15

Image 4: Demonstrating digging a small backyard landfill	15
Image 5 Demonstrating reducing volume by stuffing soft plastics inside plastic bottles.....	15
Image 6: Metal dumped near a Mavea beach	16
Image 7: Demonstrating volume reduction to school teachers at Mavea	17
Image 8: Mini landfill in Tutuba	17
Image 9: Green waste from Luganville market with less than 1% contamination	18
Image 10: Composting trial	18
Image 11: Mesh bags being used extensively at the market for selling produce	20
Image 12: Day 1 Best practice showcase attendees	24
Image 13: Tony Knoury talking about the China ban and impacts on Australian markets.....	26
Image 14: Anne Prince and Jack Whelan presenting a proposed pacific hub	27
Image 15: Miriam Cumming's presentation on Contracts led to healthy discussions	28
Image 16: Fairfield council concrete recycling facility. A jaw crusher attachment for an excavator is the most useful piece of equipment for concrete recycling.....	29
Image 17: Visit to e-waste recycling facility.....	30
Image 18: Tony Khoury's opening session on Work Health and Safety in waste	31
Image 19: Peter Bruce, CEO for exchange for Change sharing the Australian journey of introduction of the Container Deposit Scheme	32
Image 20: The local ute-based truck designed for a project in Indonesia that was of high interest to the delegates	33
Image 21: Bucher municipals range of equipment was appreciated by the delegates.....	33
Image 22: Bradley Nolan from SPREP presenting the availability of funds through the PacWaste Plus program	35
Image 23: Delegates getting their hands dirty learning small scale composting and wick bed preparation	36
Image 24: Musical introduction to composting	37
Image 26: Worm farming demonstration	37

Acronyms

ACRONYMS	
ANCP	Australian NGO Co-operation Program
APWC	Asia Pacific Waste Consultants
CCOA	Commonwealth Clean Oceans Alliance
CDS	Container deposit scheme
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CHOGM	Commonwealth Heads of Government Meeting
CLIP	Commonwealth Litter Programme
DEPC	Department of Environment Protection and Conservation
Defra	Department for Environment, Food and Rural Affairs
DPM	Department of Ports and Marine
EPRS	Extended producer responsibility scheme
EU	European Union
FFA/SPC	Pacific Islands Forum Fisheries Agency
GEF	Global Environment Facility
GMPII	Global Monitoring Plan on Persistent Organic Pollutant Phase II
HCC	Honiara City Council
ICC	International Coastal Cleanup
IUCN	International Union for Conservation of Nature
IMDG	International Maritime Dangerous Goods Code
IR	Inception Report
IUCB	International Union for Conservation of Nations
JICA	Japanese International Co-operation Agency
J-PRISM	Japanese Technical Co-operation Project for Promotion of Regional Initiative on Solid Waste Management
LMC	Luganville Municipal Council
LTMC	Lenakel Town Municipal Council
MARPOL 73/78	The International Convention for the Prevention of Pollution from Ships (Marine Pollution), 1973 as modified by the Protocol of 1978
MGB	Mobile garbage bin
MSW	Municipal solid waste
NBSAP	National Biodiversity Strategy and Action Plans
NEPIP	National Environment Policy and Action Plans 2030
NGO	Non-government organisation
NSDP	National Sustainable Development Plan 2030
NWMPCSP	National Waste Management and Pollution Control Strategy and Investment Plan 2016-2020
NZ	New Zealand
ODA	Official development assistance
PET	Polyethylene terephthalate
PGF	Pango Green Force

ACRONYMS	
PICS	Pacific Island Countries
PVMC	Port Vila Municipal Council
PPE	Personal Protective Equipment
PRIF	Pacific Region Infrastructure Facility
PV	Photo voltaic
RESCCUE	Restoration of Ecosystem Services and Adaption to Climate Change 2014-2018
RFT	Request for Tender
RMI	Republic of the Marshall Islands
SAMOA	Small Islands Developing States Accelerated Modalities of Action Pathway
SID	Small Island Developing States
SPREP	Secretariat of the Pacific Regional Environment Programme
SWM	Solid Waste Management
UNEP	United Nations Environment Program
VESS	Vanuatu Environment and Science Society
VUV	Vanuatu Vatu
WCRA	Waste Contractors and Recyclers Association of New South Wales
WMAA	Waste Management Association of Australia
WMPC	waste management and pollution control
WWC	Waste Wise Consulting

1 Introduction

1.1 Project need

Capacity building within Pacific Island communities (PICs) is a key priority to help deal with the growing problem of waste management and the prevention of land- and marine-based litter. The implications of pollution on marine ecosystems have been widely studied, however the impact on human health remains poorly characterised. Human health impacts are perceived to be an emerging problem requiring increased scrutiny and attention (Seltenrich, 2015; Ocean Conservancy and International Coastal Cleanup, 2014). There is increasing urgency among industry, government, non-governmental organisations and environmental groups to develop tools and policies to track, capture and recycle waste (particularly plastics) before it reaches the oceans.

PICs face unique and significant obstacles in the development and implementation of sustainable waste management solutions to address and combat litter in terrestrial and marine environments. Organic waste, waste oils and waste from shipping and cruise liners also produce a unique challenge for the area. Globalisation, including increased affluence and consumer-based lifestyles with a heavy reliance on imported goods, has had a substantial impact on the amount of waste generated within communities. The waste challenges for island communities are considerable, due in large part to geographic location and physical size coupled with lack of suitable land availability for waste management solutions such as transfer stations, waste treatment and disposal sites, and recycling and reuse facilities. Other obstacles, including the topography and location of some communities, as well as resourcing and infrastructure limitations, means that many communities, especially those in remote locations, have limited or no access to sustainable waste management. As a result, waste is often dumped, burned or buried, leaving it susceptible to dispersal into the environment.

Transboundary marine litter is another issue facing PICs, with many livelihoods dependent on the continuing health of the ocean. Creating a balance between satisfying the economic aspirations of increasing populations while maintaining healthy marine and terrestrial environments is of major importance in reducing risks to human health, as well as the land- and marine-based life. Major waterways are capable of transporting a substantial amount of waste and litter. Up to 90 per cent of marine litter consists of plastics originating from both land- and sea-based sources (UNEP and GRID-Arendal, 2016). Plastic debris from the land comes primarily from two sources: first, ordinary litter; and second, waste disposed of at open dumps, landfills or illegally dumped waste which then becomes airborne or washes into the ocean from inland waterways and wastewater outflows (Jambeck, J.R. et al., 2015). Marine sources of plastic debris are more nuanced but arise from shipping activities related to transport of goods, services, tourism and fishing.

It is estimated that in the Asia–Pacific region the cost of marine litter to marine industries is a minimum of €1.26 billion per year, including losses from tourism, entangled ship propellers and time lost for fishing (McIlgorm, A., et al., 2008). In the EU, it has been suggested that the cost for coastal and beach cleaning is about €630 million annually (Acoleyen, M., et al., 2013; Werner, S., et al., 2016).

Preventing pollution, especially plastics from entering the environment, requires focused efforts on behaviour change (for example, reducing reliance on single-use plastics), improvements in waste

management and developing a more sustainable life cycle for wastes such plastics. The steps to improve poor systems of waste management or mismanagement of waste rely on quantifying the scale of the problem and the sources of plastics leakage and other wastes into the system. To date, this quantification has not happened. Gaps in local capacity, as well as details of infrastructure and management systems, must be quantified and linked to the leaked waste in order to adequately deal with the issues.

1.2 The Commonwealth Litter Programme (CLiP)

The Commonwealth Litter Programme (CLiP) will support developing countries across the Commonwealth to advance national litter action plans, focusing on preventing litter (including plastics) entering the oceans. The programme is starting in the South Pacific Region, working with Vanuatu and Solomon Islands, and this project forms a part of the programme.

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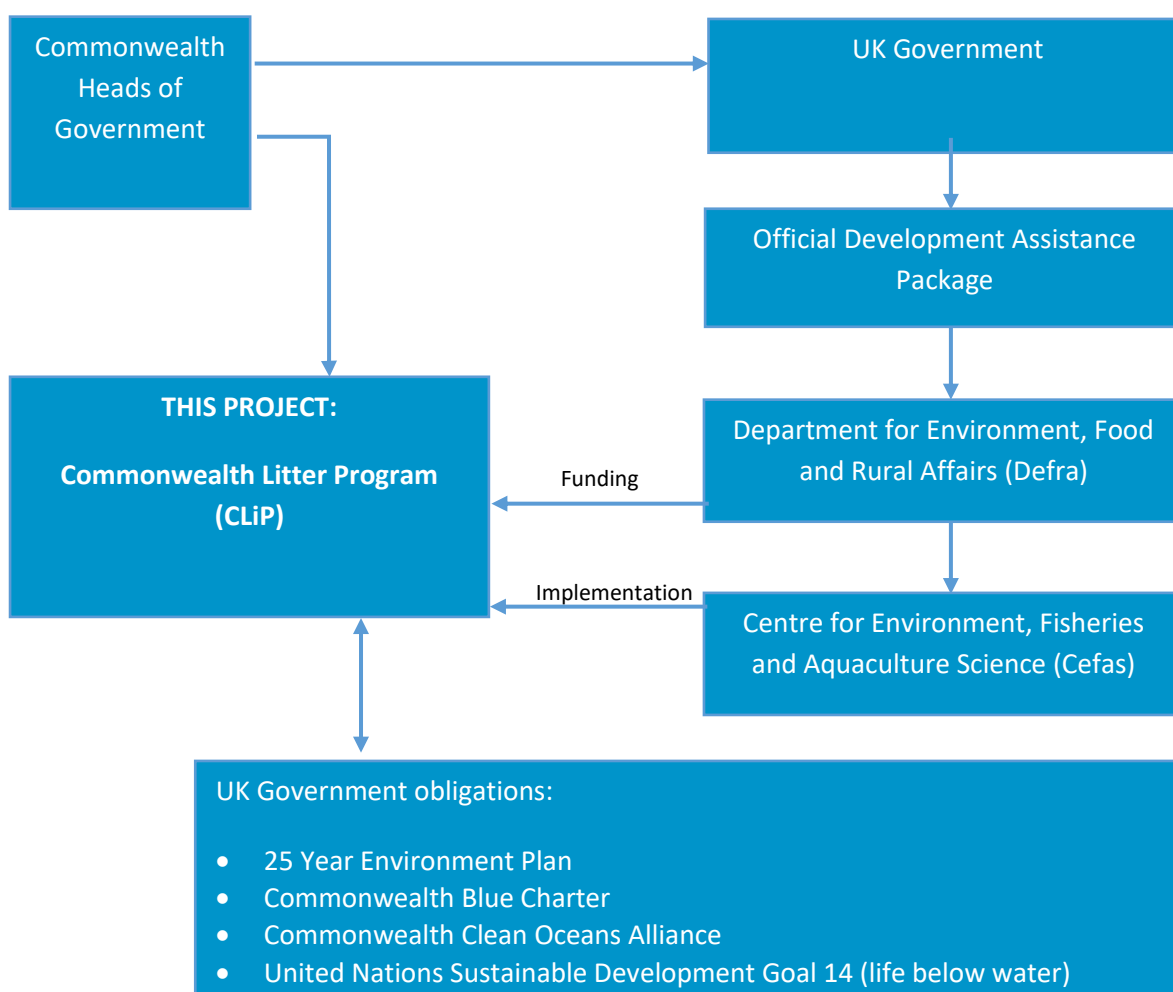


Figure 1: Project delivery organisations

Funded by the Department for Environment, Food and Rural Affairs (Defra), CLiP is led by the United Kingdom through the Centre for Environment, Fisheries and Aquaculture Science (Cefas). Cefas is the UK's largest applied marine science organisation, shaping and implementing policies through scientific and collaborative relationships that span the EU, UK government, non-governmental organisations, research centres and industry.

The programme contributes to the UK meeting its responsibilities under the Commonwealth Blue Charter, which calls for Commonwealth countries to drive action and share expertise on issues affecting the world's oceans, including marine litter. CLiP will contribute delivering the objectives under the UK- and Vanuatu-led Commonwealth Clean Oceans Alliance (CCOA), which calls on other countries to pledge action on plastics to eliminate avoidable plastic waste. CCOA also promotes actions in line with the United Nations Sustainable Development Goal 14 (life below water) to conserve and sustainably use the oceans.

1.3 This report

Asia Pacific Waste Consultants (APWC) has been engaged by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) to study waste management practices in Vanuatu and offer best-practice solutions and training to staff who are engaged in the design and delivery of waste services in the country (including provinces). This is a deliverable under CLiP.

The delivery pathways for the project are listed in **Error! Reference source not found..**

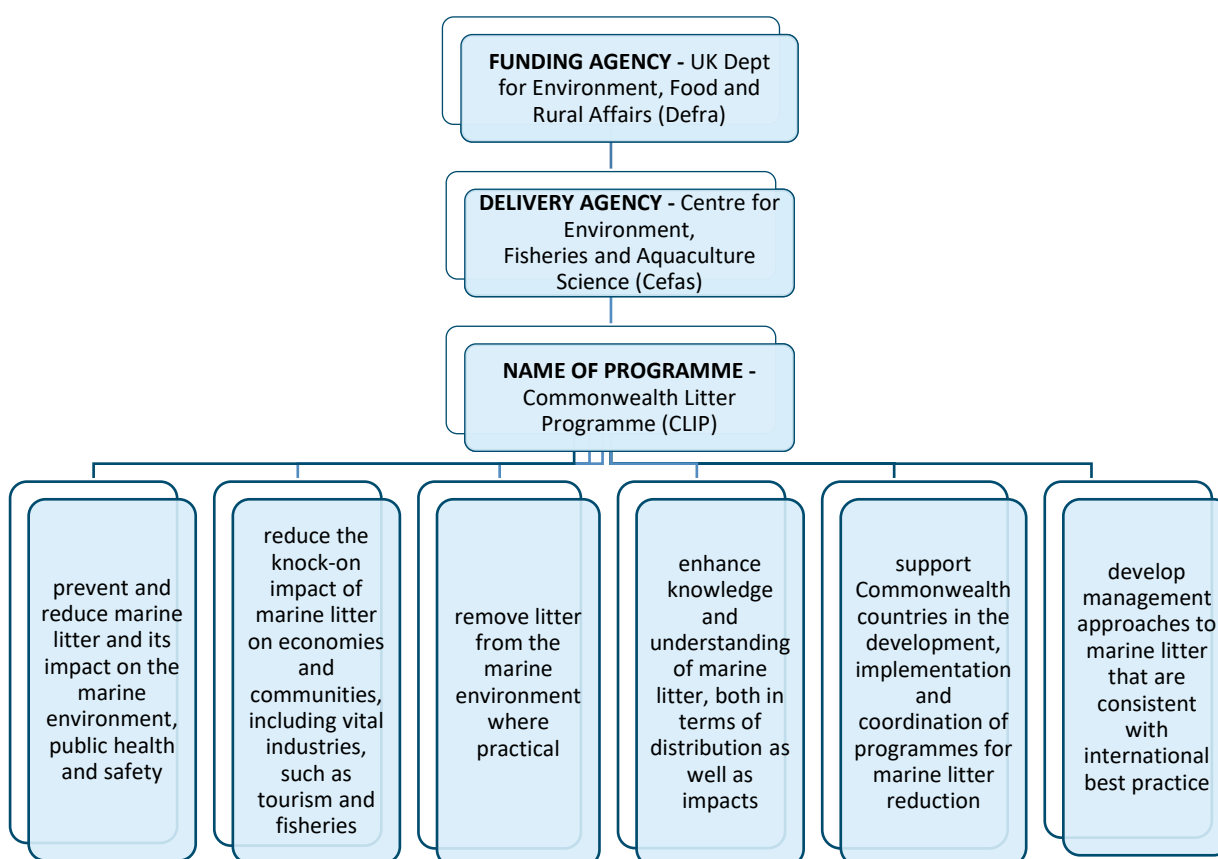


Figure 2: CLiP sponsors and objectives

APWC deliverables have three focus areas, listed below:

- Data collection on waste collection and disposal services, and disposal behaviour
- Best-practice solutions to the current situation
- Provision of training for in-country staff.

This report presents the results of the work undertaken for the second focus area i.e. best practice solutions, however, should be read in conjunction with the Waste Data report, the Port Waste Reception Facilities report and the training report for Vanuatu.

The report starts with a recap of the key findings of the Waste Data report, the gaps identified in services and infrastructure and recommendations for best-practice approaches. The next section presents the work undertaken in November 2018 and best practice case studies. An overview of the Best Practice Showcase follows, with the design of the showcase responding to the gaps. The final section of the report provides the delegate evaluation of the showcase to inform any future events, along with the lessons learned by APWC through the organisation and delivery of the showcase.

2 Recap: Waste data, service gaps and training

The APWC team worked in Vanuatu for three weeks during November 2018, covering the islands of Efate and Espiritu Santo and the respective provincial governments for Shefa and Sanma province and the municipalities of Port Vila Municipal Council (PVMC) and Luganville Municipal Council (LMCC). Household and commercial waste samples were taken from the main island communities of Port Vila and Luganville and the rural community called Black Sands in Shefa province. Black Sands is a highly affected village where communities have relocated from outer islands because of the devastating effects of tropical cyclone Pam in 2015. Four outer islands were also visited: Lelepa (Efate), Ifira (Efate), Tutuba (Espiritu Santo) and Mavea (Espiritu Santo).

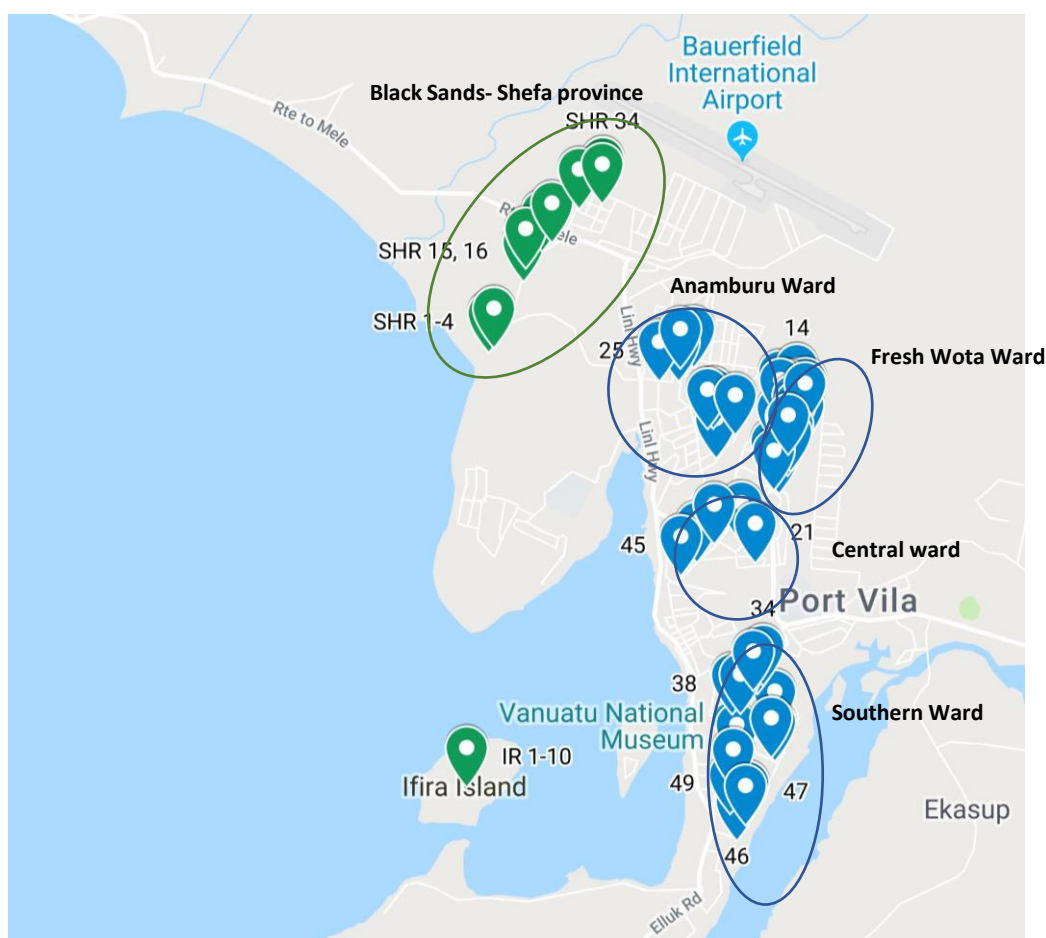


Figure 3: Household sample distribution in Efate

In total, 205 samples were collected, with 105 from outer islands and 50 urban samples collected from five different communities. In addition to the household samples, a total of 45 commercial premises were sampled, of which 30 were shops in Port Vila and 15 in Luganville. APWC's team collected and sorted 1,546 kilograms of waste from five locations and 246 premises in Vanuatu. A further 7 tonnes of green waste was weighed and assessed in Luganville.



Figure 4: Household sample distribution in Luganville

Interviews were conducted with all households where waste was collected to cross-reference socio-economic and waste behaviour data with the waste disposed. APWC was able to draw upon previous work completed by JICA analysing waste generation. JICA studies are estimating the total amount of waste generated at source rather than the amount people are willing to place in a bag. The comparison of the two studies shows that although the introduction of the prepaid bags is largely helping with the visible waste issues, there are matters that can be further addressed.

In summary, the key outcomes of the waste disposal research and analysis are:

- The amount of waste generated between urban and rural areas differed;
- A correlation between waste generation and the average grocery bill for an area was identified, however this did not translate down to the household level;
- 30–70% of waste generated in urban areas is being captured through waste management systems currently in place;
- All waste generated in rural areas is being disposed of through burning, burying and dumping;
- Very small numbers of people are dumping rubbish in waterways and most reported instances of dumping in waterways came from areas with no collection systems in place. Port Vila reported absolutely no dumping in waterways, which indicates a high level of awareness among residents regarding the impact of waste on waterways. Although anecdotally waste continues to be dumped in waterways, residents are aware that this is not the right thing to do.

Based on the disposal data, APWC draw the following improvements proposed were:

- Increase participation rate in the use of the yellow bag system through community education;
- Improve the use of the yellow bag to ensure that all waste is being disposed of correctly;
- Review the yellow bag pricing to make it more affordable for people of all income levels.

Error! Reference source not found. lists the top ten individual items disposed of in Vanuatu and the proposed best-practice actions to manage these items. Best-practice actions are proposed based on both qualitative and quantitative data included in the Waste Data report.

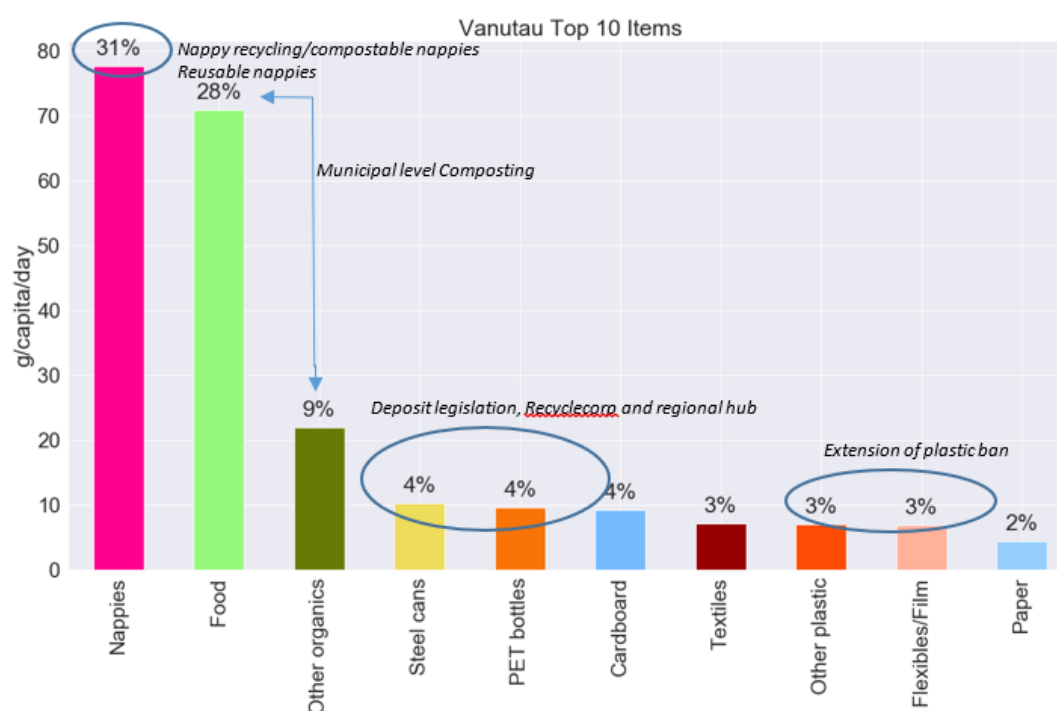


Figure 5: Vanuatu top 10 waste items and proposed solutions

Commercial sources had comparatively more paper and e-waste and less hygiene and metal waste than household sources. Both had similar quantities of organic waste. Solutions for organic waste and containers would go some way to addressing more than 70% of commercial waste generated in both Port Vila and Luganville. Batteries, metal and e-waste, which are more common in business waste than household waste, are included in the scope of the PRIF regional hub.

2.1 Service gaps

The following gaps have been identified in the provision of waste management services in Vanuatu.

Table 1: Gaps in overall waste management in Vanuatu

Theme	Gaps
Policy/legislation	- SWM by-law has not yet been passed. PVMC has no legal basis to collect waste fees. (This is not true for LMC.) - The new solid waste management plan for PVMC has to be adopted in 2019. There is no current plan. - There is no clarity around accountability for waste management and implementation of plans both within PVMC as well as within the Department of Environment. - There is no waste unit or team within the Department of Environment. - Provinces are lagging and there is no clear policy or plan in place around waste management. - The ban on plastic bags has led to the introduction of other materials, such as mesh bags, which pose similar (if not worse) environmental risks. - The plastic bag ban has the potential to be more extensive.

Theme	Gaps
	Both municipal councils and provinces need to have action plans with specific targets to work towards.
Data collection and decision making	- All waste data i.e. household collection and disposal as well as litter of dumping data, is collected with the help of JICA volunteers. - There is no internal capacity within local councils or provincial staff to use data for decision-making processes. Not only is there no capacity to analyse the data collected by various external organisations, the analysed data where provided is also not being utilised appropriately. - While most international waste data collection is focused on household waste management, there is no clarity on who should collect litter data and then use it to make decisions around litter reduction. - Data for incoming waste is collected at the Bouffa landfill in registers but it is not being entered into the computer or used for any decision making. - Luganville landfill records are limited to data collected by the JICA volunteer. - Most provinces don't have landfills or even managed dumping spaces. - Most islands don't have any waste disposal facilities or any accounting structure for what is happening with their waste.
Economic instruments	- All income from yellow bags/red bags goes to a central account. - All expenditure on solid waste management cannot be clearly accounted for in either PVMC or LMC. - The budget for solid waste management is limited. - The provinces are behind in developing economic instruments. - Although provinces are thinking about having financial mechanisms in place, it is not currently the case.
Collection services	- Collection services are only provided by PVMC, LMC and in LTMC. - No provinces or islands are covered by a collection service or have plans to do so. - The collection services in PVMC and LMC are also limited to the urban areas and expansion to the peri-urban areas, although required, will require substantial support.
Equipment and maintenance	- There is limited stock of spare parts. - Maintenance capacity is limited. - There were broken-down collection trucks in each of the municipal councils visited. - Both PVMC and LMC need more collection trucks.
Contracts and tenders	- Waste collection contractors are not being used by either of the councils, but this option should be explored. - Tender and contract management capacity is limited in each of the councils and the provincial governments assessed.
Landfill design and management	- Lifespan of landfill is limited for Bouffa and Luganville. - Landfill is not sanitary and there was no soil cover seen in either of the landfills. - Lack of equipment at landfill for daily, weekly or monthly activities. - Heavy equipment is not available (LMC) or broken down (PVMC). - Both municipalities are dependent on hired equipment to undertake landfill activities work.

Theme	Gaps
	- Both landfills have waste pickers of all ages and genders working in unsanitary conditions. - In both landfills, waste picker activity is not regulated or formalised.
Education and engagement	- There is no formal environment education/awareness programme for communities including remote islands where there is little likelihood of collection services being provided in the immediate future, although awareness activities are undertaken by both councils. Environment education is a part of school syllabus. - Waste education/awareness is missing in provinces and outer islands. - There is no co-ordination between the plethora of national and international projects being undertaken in the waste space. - There is no staff capacity within either the Department of Environment nor within councils to undertake this co-ordination. - There are no staff currently undertaking nor responsible for waste education or awareness activities.
Recycling	- The only recycling currently happening in Vanuatu is the result of waste-picker and scavenger activity plus the bottle buy-back scheme. - Organics are not being composted or even source-separated; 30–50% of household waste being brought to landfills is organic in nature and composting or processing of organics provides great opportunity to save on landfill space and achieve good environmental outcomes. - There has been no push for better source separation. In communities where it has been trialled, there is real disillusionment due to lack of follow-up and in some cases pick-up when the materials were separated. 10–20% of material in households and 20–40% in commercial premises is recyclable, including plastic, paper, aluminium, etc. However, recycling capacity in Vanuatu is very limited. Shipping cost is expensive, which makes it harder to export materials for recycling.
Monitoring	- There is no monitoring and evaluation being undertaken for the NWMPCS nor for the local solid waste management plans. - There is no internal capacity within either the department nor local councils to do so.
Training	- Some local council and Ministry of Environment staff have had extensive training under the JICA, EU and other regional projects whereas others have had none. - There is a disparity between waste management capacity in councils in urban areas and staff in provinces.

2.2 Training and knowledge gap analysis

APWC team spent three weeks in Vanuatu to understand the current capacity of staff implementing waste management initiatives in both Port Vila, Shefa Province, Sanma Province and Luganville.

Figure 6 lists and categorises the stakeholders that were consulted to understand the current capacity gaps and to determine the training needs to improve waste management in Vanuatu.

Please note that this list excludes port authorities and those involved in managing ship waste and medical waste. A separate report detailing the consultation process for those wastes will be provided to Cefas.

National & international agencies	Municipal council	NGOs and community groups	Provincial Government, islands & contractors
•Department of Environment • SPREP •JICA (JPRISM II)	•PVMC waste manager •PVMC collection supervisor •PVMC landfill manager •PVMC assistant landfill manager •Chief health officer LMC •JICA volunteer LMC •Assistant Accountant LMC • Waste officer LMC •Foreman LMC • Mayor and City Clerk LMC	•Green Wave Pacific - Won Smol bag - World Vision •Vanuatu Conserve •Waste Wise Consulting •RecycleCorp •Vanatu Environment and Science Society	•Sanma Province enforcement officer • Chief finance officer Shefa province •Paramount Chiefs - Lelepa, Tutuba, Mavea, Ifira •Ward supritendant Ifira •CK rubbish removal • Shefa province waste contractor

Figure 6: Stakeholders consulted in Vanuatu regarding training needs.

Each stakeholder was consulted on their current workload, capacity to deliver services, their previous training history, their history with the organisation as well as their understanding of the gaps in their training and capacity.

Nine major themes emerged, which are presented below in

Theme	Gaps identified
1. Basic data collection and management skills (government officials, contractors and community groups)	• Data collection on household waste generation and litter • Data collection from landfills and dumpsites • Understand trends in waste data • Use data collected for decision making
2. Design and implementation of waste collection systems (government officials)	• The option of setting up in-house vs. contracted-out model of waste collection for municipalities • How to monitor effectiveness of collection systems if in-house or contracted out
3. Design and implementation of economic instruments (government officials, contractors)	• How to design and implement any or all of the following (include policy, by-law and legislation): • User pays system (post-use fee collection) • Pre-paid bag system • Green fees • Bans
4. Equipment and maintenance (government officials, contractors)	• Acquisition of vehicles that can be used and maintained in the long term • Collection vehicles maintenance and stock management of spare parts • Landfill heavy equipment maintenance and stock management of spare parts
5. Contracts and tenders (government officials)	• Design of tender processes and evaluation • Design of contracts for pre-paid bag systems, CDL, collection contracts, contracts for hire of equipment
6. Landfill design and management (government officials)	• Determine the next stage of landfill design or management for each country • Help staff be ready for the next stages
7. Education and engagement (government officials/NGOs)	• Use case studies to help staff, community groups learn about best practice for engagement
8. Waste management strategy and monitoring (government officials/NGOs)	• Waste strategy development and development of a monitoring framework
9. Recycling (government officials and contractors)	• Help recyclers find the best market for their products • Train government officials in EPR projects like CDL

Figure 7. This figure is not exhaustive but rather presents the gaps identified based on the stakeholders consulted. Both, training and best practice actions undertaken by APWC were based on this gap analysis. Please note the gaps are applicable to the stakeholder groups identified under each theme.

Theme	Gaps identified
1. Basic data collection and management skills (government officials, contractors and community groups)	• Data collection on household waste generation and litter • Data collection from landfills and dumpsites • Understand trends in waste data • Use data collected for decision making
2. Design and implementation of waste collection systems (government officials)	• The option of setting up in-house vs. contracted-out model of waste collection for municipalities • How to monitor effectiveness of collection systems if in-house or contracted out
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9. Recycling (government officials and contractors)	• Help recyclers find the best market for their products • Train government officials in EPR projects like CDL

Figure 7 : Training gap analysis

3 Stage 1 – Local solutions case studies

The scoping visit undertaken by APWC in November 2018 helped the team understand further requirements of the best practice actions required within the communities. During our visit to various remote communities and islands (Lelepa (Efate), Ifira (Efate), Tutuba (Espiritu Santo) and Mavea (Espiritu Santo)), the team was able to undertake waste management demonstrations of mini landfill and organics composting and moisture retention using green waste for the communities to improve their waste management, in some cases with a high degree of success. The details of the activities undertaken and resulting response and success is provided as case studies below.

3.1 Issues identified

As part of APWC's scoping visit, several remote communities were visited. These include:

- Lelepa and Ifira off the coast of Efate
- Tutuba and Mavea off the coast of Santo

Most remote communities have no collection service, and with the municipalities struggling to get their collection services right in the short term, the team was not able to provide a solution in the form of a collection service. Therefore, short-term local solutions were provided to the communities. Based on initial observations, the problem priority wastes to be managed in the island communities are:

- Nappies (currently being buried or thrown into the ocean and streams)
- Organic waste (currently being burnt)
- Plastics – both PET and soft plastics – (currently being burnt)
- Tin cans – aluminium and steel – (currently being burnt)

More than 50% of the waste in Port Vila and Luganville is organic in nature, with both cities rapidly running out of landfill space. Therefore, finding a solution to organic waste and nappies, along with recycling of PET and aluminium, would provide ideal solutions for various communities in Vanuatu.

Burning of waste was consistently observed in Vanuatu. This practice of burning waste leads to the generation of POPs (Persistent Organic Pollutants) that have been demonstrated to be harmful to the environment human and animal health. Some of the POPs are banned under the Stockholm Convention that Vanuatu is a signatory to.¹

The best practice work already undertaken along with proposed actions are presented as case studies below.

¹ <http://chm.pops.int/Countries/StatusofRatifications/PartiesandSignatoires/tabid/4500/Default.aspx>

CASE STUDY: LELEPA

Lelepa (or Lélépa) is an island in the southwestern Pacific island nation of Vanuatu. It is located off the northwest coast of the island of Efate.



Island length	•5kms N-S
Population	•500 people
Villages	•Two
Village assessed	•Lelo
Local language	•Lelepa

Current status of waste management:

- ✗ Organics: Burnt
- ✗ Plastics: Burnt then thrown to ocean
- ✗ Metal: Burnt then thrown to ocean
- ✗ Nappies: Buried or thrown to ocean
- ✗ Glass: Thrown to ocean
- ✗ Paper and cardboard: Burnt



The village chief named nappies as the most concerning material.

THE APWC team visited the village of Lelo on Lelepa island in November 2018. Sixty household samples were collected for waste characterisation, with 60 households interviewed and the following best practice actions demonstrated:

- ✓ Source separation of waste
- ✓ Organics to be used for household composting and organic matter retention around fruit trees
- ✓ Mini landfill behind houses for plastics, paper, metal and other leftover materials
- ✓ Methods to reduce volume of waste to be buried

STEP 1: All waste collected from the first 10 households was separated into five major categories. APWC staff demonstrated best practice source segregation for that community.



Image 1: APWC staff demonstrate source separation



Image 2: Source-separated waste from 8 households

STEP 2: Organics – demonstration of composting and moisture retention using green waste



Image 3: Using discarded materials to build moisture barriers around plants

The paramount chief was open to the idea of using the yellow prepaid bag for disposal of nappies and remaining material for those not wanting to dig mini-landfills. The first set of yellow plastic bags was picked up by PVMC staff on 25 November 2018 and yellow bags have been picked up every Saturday since by PVMC staff. This was confirmed by PVMC staff at the Vanuatu in-country training session organised by APWC on the 20-22 February 2019.

STEP 3: Mini landfill – demonstration of reducing volume and small-scale landfilling



Image 4: Demonstrating digging a small backyard landfill



Image 5 Demonstrating reducing volume by stuffing soft plastics inside plastic bottles

CASE STUDY: MAVIA

Mavea is a small island in Vanuatu across a channel east of Loganville, Espiritu Santo under the Sanma province. The population is about 172, with only 34 speakers of the Mavea language, a dying language not usually spoken outside of the home.



	Population	•About 200
	Mavea language speakers	•About 30
	Villages	•Four
	Village assessed	•All
	Local language	•Mavea

Current status of waste management:

- ✕ Organics: Burnt
- ✕ Plastics: Burnt then thrown to ocean
- ✕ Metal: Burnt then thrown to ocean
- ✕ Nappies: Buried or thrown to ocean
- ✕ Glass: Thrown to ocean
- ✕ Paper and cardboard: Burnt

Villagers noted that they regularly have to fish out waste from the ocean and add to their burn piles.



THE APWC team visited all four villages on Mavea in November 2018.

We noted that the consumption of plastics is very low on the islands and the island still practices the use of reusable nappies.

All organic food waste are given to pigs for eating and green waste is burnt.

There is only one shop servicing the entire village. Due to low incomes, purchasing power is low.

Metals is the most commonly dumped item. No solution could be provided at the time of the visit.



Image 6: Metal dumped near a Mavea beach

The villagers already dig holes for the waste not burned. A demonstration of reducing volume of waste by placing soft plastics in PET bottles was undertaken for school teaching staff.



Image 7: Demonstrating volume reduction to school teachers at Mavea

Follow-up actions:

- LMC staff to undertake a follow-up visit to Mavea with the JICA volunteer to demonstrate composting and green waste reuse. The first visit was undertaken during APWC's follow-up visit in February 2019.
- A schedule of visits and awareness programs has been incorporated into the LMC work plan for 2019 and can be requested directly from the waste division at LMC or by contacting Ray Vilvil directly.

CASE STUDY: TUTUBA

	Population	•About 600
	Size	•7km long/2.5km wide
	Villages	• Six
	Village assessed	•All
	Local language	•Tutuba

The APWC team visited Tutuba in November 2018 and the island already had good waste management practices in place.



Image 8: Mini landfill in Tutuba

The villagers dig mini-landfills for their waste.

- Every two to five houses has a mini-landfill
- Once full, the material is burnt, and the landfill is filled up
- The next landfill is then dug adjacent.

The difference in waste disposal practices in villages could possibly be attributed to the impacts of external programs through church groups, World Vision and various peace keeping forces

Space is limited, so not burning the material would mean that the village would not have enough space to manage their waste the way they currently do. Due to proximity to Luganville, the village elders were encouraged to consider the use of red bags for disposal which they are supportive of. LMC officials who visited with APWC team agreed that if red bags were brought to the mainland, they would collect the waste. However, currently the waste collection at LMC is limited due to the availability of only one truck.

CASE STUDY: LUGANVILLE

Luganville is the second largest city in Vanuatu, with a population of 16,312.

The city is called Santo by people from Vanuatu's northern islands, who use Luganville as their big city. It is called Kanak (from French Second Canal) by rural residents of Espiritu Santo on which the city lies.



	Population	• About 17,000
	Size	• 8.32 km ²
	Assessment	• Luganville
	Village assessed	• All
	Language	• Bislama, English, French

Current waste management practices:

- General waste is collected
- Some residents still burn and illegally dump waste
- Commercial premises also have a waste collection service
- Cardboard is collected separately from the commercial premises
- There is no source separation of waste at the household level

Vanuatu Best Practice report

- All green waste collected goes to landfill

The APWC team visited Luganville to undertake a waste audit from 50 households and 15 commercial premises.

Green waste from the markets was also assessed and the contamination rate noted.



Image 9: Green waste from Luganville market with less than 1% contamination

Based on the spot assessment, a green waste composting trial was started at LMC landfill site.



Image 10: Composting trial

APWC also created a map of illegal dumping sites for LMC and suggested actions to monitor these sites. In February 2019, as part of APWC's training program; APWC supported LMC in hosting a training workshop for staff from the Ministry of Environment and PVMC that included a showcase and tour of all the work undertaken by LMC. The details of this training workshop are provided in the APWC training report for Vanuatu.

4 Suggested best-practice actions

4.1.1 Management of nappies

Nappies as a separate product have not been counted in any of the previous audits conducted in Vanuatu, therefore it is difficult to determine the scale of the problem prior to this visit. Clearly, however, the residents of Vanuatu have difficulty finding appropriate disposal methods for nappies. Yellow and red bags are seen as an appropriate means of disposal for nappies due to the high incidence of nappies in the bags assessed, with 27% or 61 grams per capita per day of the overall waste assessed represented by nappies.

Data also shows that in Lelepa, where there are no disposal systems available, 35% burn the nappies, 19% throw them in the ocean and 46% bury them in the backyard.

APWC's team encouraged the practice of burial during our visit to the island, but we believe that would be a problem waste in most (if not all) remote islands of Vanuatu. We noted that on the island of Mavea, off the coast of Santo, which has no local shops and all families living off subsistence farming, only reusable nappies were being used and the residents had not heard of disposables. This leads us to the conclusion that with increased purchasing power and access to shops, the problem of nappies is bound to increase.

The Vanuatu government announced an extension of the plastic ban to include nappies containing plastic in February 2019. For the ban to work, reusable and compostable nappies must be made available to the community at an affordable price and at a competitive cost with that of the traditional plastic-containing nappy. Compostable nappies if introduced will need to be compostable at the community scale.

The introduction of compostable and reusable nappies will need to be aligned with a community-level education campaign. This would assist communities to understand the available choices, their lifecycle and costs.

4.1.2 The plastic bag ban

Vanuatu's plastic bag ban is working. On average, plastic bags formed only 0.6% of the overall household waste in Vanuatu, and of these, the majority was glossy bags that are not banned. APWC undertook a similar project capturing waste data in Solomon Islands during late November, early December 2018 and found that by comparison, approximately 4.4% of the overall waste collected from households in Solomon Islands was plastic bags, where no such ban currently exists.

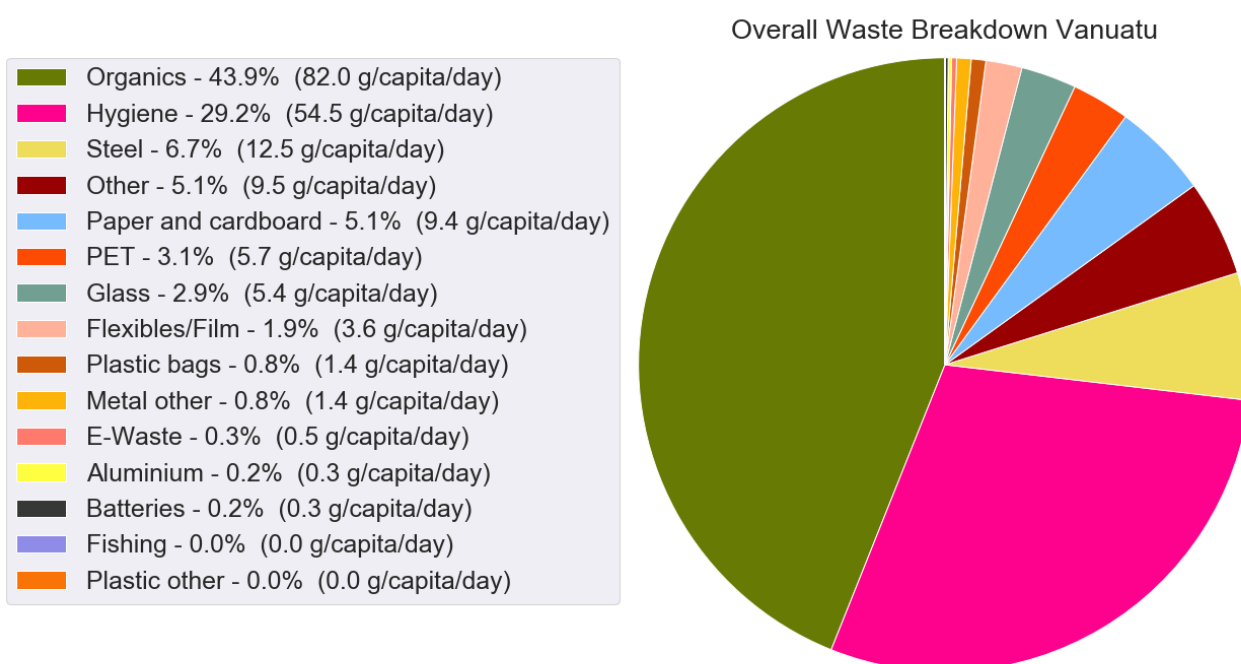


Figure 8: Detailed breakdown of waste in Vanuatu

The plastic bag ban has been effective in reducing the amount of soft plastic going to landfill as evidenced by the difference in Vanuatu and Solomon Islands data (See associated report for Solomon Islands). An audit conducted in August 2018 by JICA reported that 2% of the overall waste disposed of at Bouffa landfill was plastic bags (DEPC, 2019). The data is not directly comparable because the landfill receives waste from both households and commercial premises as well as self-disposal. However, the PVMC staff has now been trained to undertake waste audit as per APWC methodology and should be able to conduct ongoing monitoring audits as required.



Image 11: Mesh bags being used extensively at the market for selling produce

APWC also notes that the ban on plastic bags has led to the introduction of other materials, such as mesh bags, which were found in large quantities in the household audits. However, the Vanuatu government has extended the existing ban on plastics to include fruit and vegetable wraps made of plastics as of February 2019. This ban comes into place on 1 December 2019.

4.1.3 Containers deposit legislation

Container deposit schemes (CDS) encourage recycling in the community while reducing litter and the number of containers going to landfill. Under such schemes, eligible empty containers can be returned at return points in the community for a refund. The best schemes have different refund amounts for different containers or materials depending on the value of the recyclable material.

In Vanuatu, two private companies – Azure Pure Water and Vanuatu Brew – currently offer a 5 VT to 10 VT redemption when their bottles are returned. APWC understands that glass bottles are reused. It has not been ascertained how the PET bottles are being recycled.

Table 2: Container deposit schemes currently in Vanuatu

Proponent	Scheme
Azure Pure Water	Opened Vanuatu's first plastic bottle buy-back and recycling programme on 1 August 2017, offering a 5 VT rebate for any of their branded plastic bottles to be returned clean at their factory by Bauerfield Airport. Azure states: 'For a long time we have recognised that waste management and plastic bottle disposal in Vanuatu is a challenge, and we recognise our responsibility as a manufacturer to be providing viable and sustainable solutions for the management of the waste which we produce so as to keep our country clean.' (Azure Pure Water, 2017). Azure is working in partnership with RecycleCorp Vanuatu, Australian packaging supplier VISY and Department of Industry Vanuatu to deliver the programme. Bottles are stripped down into individual plastic components, baled and shipped to Australia for recycling. It is the first scheme of its kind in Vanuatu. Azure hopes to add additional collection points for consumers to drop off bottles for recycling.
Vanuatu Brewing and Vanuatu Beverage Ltd	Provide a CDS for glass bottles at the point of sale. The deposit is refunded on return of the bottle in order to adhere to environmental correct practices

As part of the APWC audit, all containers (plastic, aluminum, steel, LPB and glass) were sorted by size, material type and product type. Each household on average produced 7.7 containers per day. Figure 9 show the counts of the most common containers in Vanuatu.

There were some common trends. Aluminium soft drink cans (150–500 ml) were common everywhere, but particularly in urban Vanuatu. This was also true of PET (500 ml–1 litre) plain water bottles. Both trends could be associated with the impact of tourism on urban centres. We already know that landfill pickers on Bouffa and the LMC landfill site collect PET bottles and sell them to local kava bars and women at the market stalls. Aluminium beer containers were very common in Luganville but rare elsewhere in Vanuatu.

Based on an extensive number of deposit legislations, APWC modelled the eligibility criteria for container legislation to be most effective in Vanuatu. The analysis is based on the inclusions and exclusions provided in the Waste Data report. These inclusions and exclusions are only proposed based on the data available to APWC and would encompass more than 90% of the containers in the waste stream for most communities. They would allow for any Pacific country to become an extension of the CDS working in Australia, thereby reducing the amount of new research required.

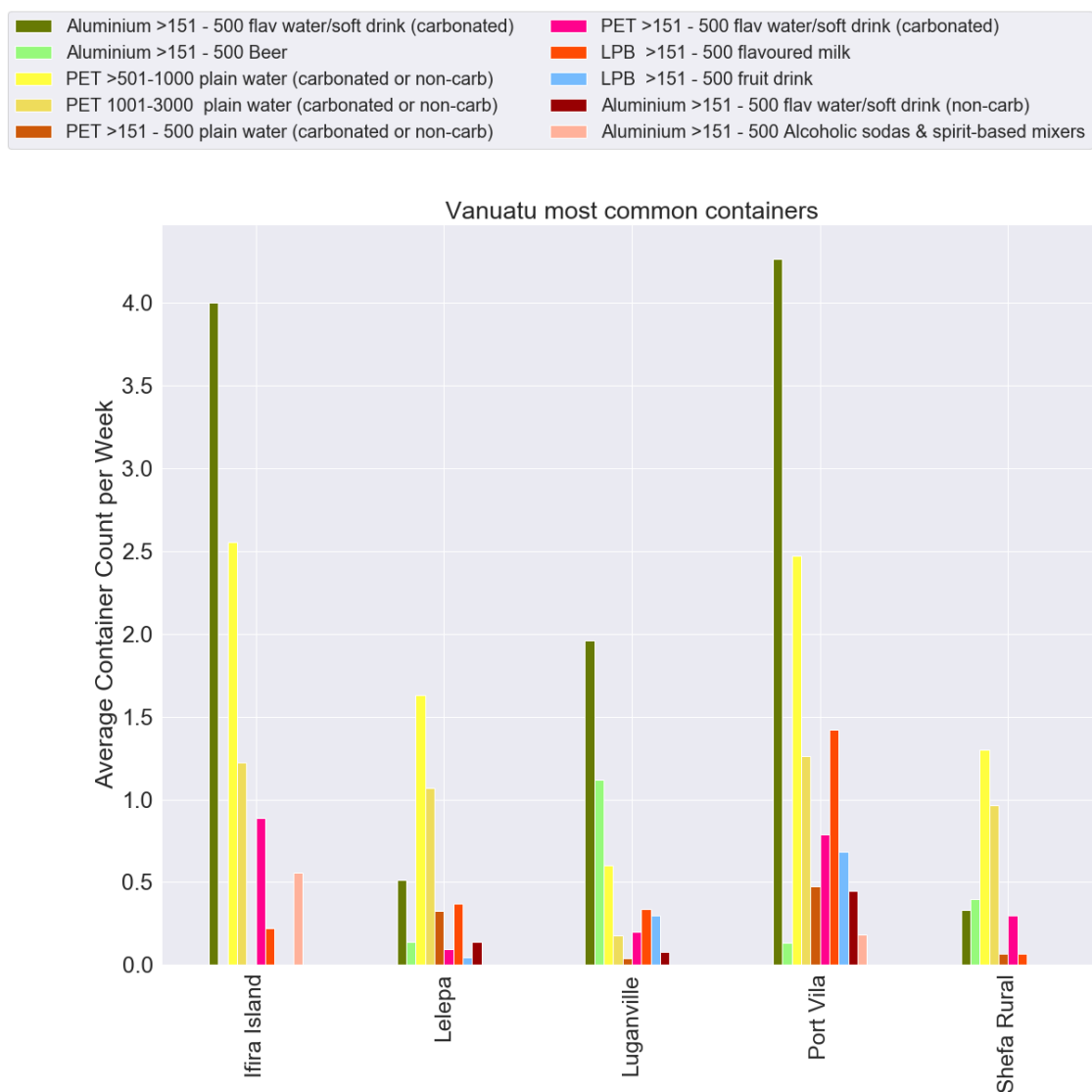


Figure 9: Vanuatu's most common containers

Many bottles and cans are also currently in circulation within Vanuatu communities as they are reused within communities for water and kava. These containers often end up buried, burned or in the environment once they cannot be reused. A deposit on these containers would likely increase their return at the end of their usefulness.

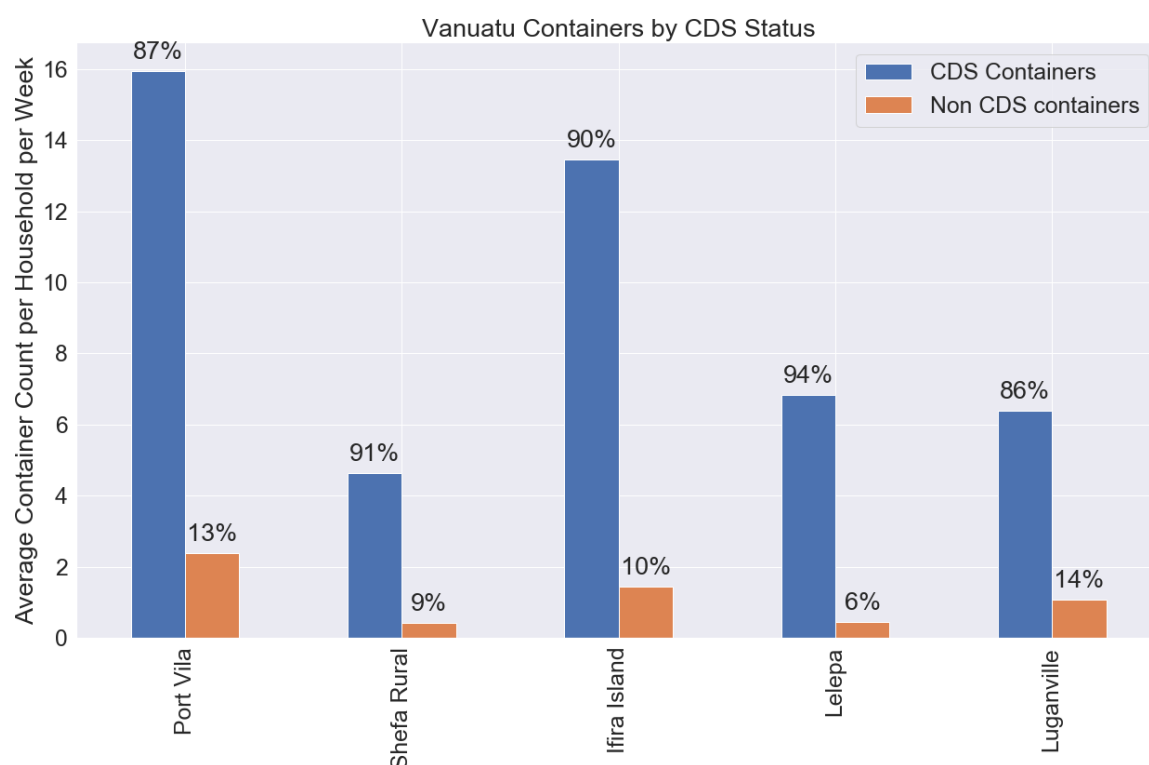


Figure 10: Vanuatu's containers by CDS status

Traditionally, the biggest challenge for Vanuatu has not been the collection but the sale and recycling of materials once they have been collected. The cost of shipping materials from Vanuatu to various international recycling markets like China or other parts of Asia is prohibitively high compared with the relatively small amount of material being generated in the country. Further, the additional cost of shipping materials from outer islands to the main islands must be borne by the recycler.

Although the Moana Taka partnership currently exists for the movement of materials within the Pacific, it is restricted to materials of no commercial value. The proposed Pacific Regional Recycling Hub currently under investigation, led by the Pacific Regional Infrastructure Facility (PRIF) with the support of all donors and SPERP, will allow Pacific countries to ship recyclable materials to a hub for consolidation and local value-adding. The feasibility study to undertake this project is proposed to be carried out in 2019–2020 and Vanuatu will be invited to participate. Used beverage containers, paper and cardboard, scrap metal, batteries, e-waste and end-of-life renewables are also included in the scope for the PRIF regional recycling hub.

5 Stage 2 - The Best Practice Showcase

5.1 Overview and objectives

An intensive three-day training and development opportunity was delivered on 4–6 February 2019 in Sydney. The objectives the showcase were to:

- Transfer knowledge and ideas to the Pacific context;
- Share learnings from similar problem waste streams that have been tackled;
- Provide forward insight into ideas that are currently being developed for delivery;
- Build a collaborative relationship between Australia, Solomon Islands and Vanuatu.



Image 12: Day 1 Best practice showcase attendees

There were various reasons for holding the best practice showcase in Sydney. These are below:

- Previous showcase projects through JICA and SPREP had undertaken study tours to Fiji and other Pacific islands and some of the selected stakeholders had already attended these trips.
- Three major activities of great interest to Vanuatu currently are deposit legislation, organics management and the formation of a Recycling association. The intent of the Sydney program was to ensure that the participants got a well rounded foundation on the principles of both deposit legislation and composting as well as establish ongoing connections with the waste and recycling association in Australia due to its 25 year history.

The delegates were chosen based on the following criteria:

- Management of waste collection services in each country
- Management of landfill in each country
- Management of waste management policy in each country
- Overview of country level waste management activities through the Ministry of Environment
- Management of finances at the municipality level.

Delegates from Vanuatu, Solomon Islands and collaborative organisations including JICA and SPREP attended. Seminars were hosted in the Waste Contractors and Recyclers Association of NSW (WCRA) offices and site visits arranged so that delegates could observe waste management practices first hand. Table 3 outlines the programme that was delivered.

Table 3: The Best Practice Showcase three day programme

Day 1 04 FEBRUARY 2019		
9am–9.30am	Welcome	Anne Prince and Amardeep Wander (APWC)
9.30–10am	Recycling after the China Ban	Tony Khoury (WCRA)
10am–11am	Proposed solution for the Pacific	Jack Whelan (PRIF) and Anne Prince
11am–11.30am	Morning tea	
11.30am–12.45	WCRA – Association what is it, how does it work?	Tony Khoury
11.30am–12.45pm	Associations in the Pacific	Amardeep Wander (APWC)
	How can associations benefit from working with WCRA and how will they contribute to the recycling hub?	Tony Khoury and Anne Prince
12.45pm–1.15pm	Lunch break	
1.45pm–2.15pm	Contracts – How to use and transferability	Miriam Cumming (APC)
2.15–5:15pm	Concrete recycling	SITE VISIT – Fairfield Council
	E-waste	SITE VISIT – Sims Recycling Solutions e-waste, Villawood
	Container Deposit Scheme Reverse Vending Machine	SITE VISIT – Woolworths, South Granville
Day 2 05 FEBRUARY 2019		
9am–10am	WHS and training	Tony Khoury (WCRA)
10am–10.30am	Policy Options for the Pacific	Amardeep Wander (APWC)
10.30am	Morning tea	
11am–12.30pm	CDS in Australia and overseas overview CDS in NSW Questions and Answers	Anne Prince and Peter Bruce (Exchange for Change)
12.30pm–1pm	Lunch	
1pm–4pm	Visit to Bucher Municipal (small collection trucks, balers, bins, street sweepers, etc.)	SITE VISIT – Bucher Municipal Luke Aitken
	Presentation from Ace Waste (clinical waste)	John Homewood (Ace Waste)
	Presentation from Paintback Limited	Mark Pobje (Paintback)
4pm	Discussion: Where to next?	Session moderated by Tony Khoury (WCRA)
Day 3 06 FEBRUARY 2019		
9am–5pm	HANDS ON BEST PRACTICE DEMONSTRATION – ALL DAY Topics covered:	SITE VISIT – Kimbriki Resource Recovery Centre Peter Rutherford and

• Composting • Worm Farming • Wick beds • ANL and large scale composting • Metal and e-waste drop-off • Concrete recycling • Dry landfilling • BuyBack centre • EcoHouse and Garden workshops and school engagement • Artists' programme	Mark Winsor
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5.2 Summary of the Showcase experience – Day one

5.2.1 Day 1- Seminar series

Following an introduction from Anne Prince and Amardeep Wander of APWC on day one of the showcase, the delegation heard from WCRA's Executive Director Tony Khoury on the impacts of the China ban on the Australian recycling industry. Tony expanded on the issues facing the industry, including areas such as the adjustments required to address contamination and the lack of viable options and pathways for recyclable material that, for years, has been accepted and processed in China.



Image 13: Tony Knoury talking about the China ban and impacts on Australian markets

Jack Whelan (PRIF) and Anne Prince then presented on proposed solutions for the Pacific. This session focused on the unique issues faced by operators and governments while they plan to tackle a growing and ever diversifying waste stream.



Image 14: Anne Prince and Jack Whelan presenting a proposed pacific hub

It was evident that differing countries have different issues with localised social and economic impacts affecting efforts to assist in the Pacific. APWC was clear that the first step is to capture and record data with integrity. This data then forms the basis of measurement for success in programmes across the entire region.

Many solutions were proposed and debated. The overlying theme was that current programmes must be based on focus areas that can be transferred successfully from countries such as Australia only if they can be adopted and thrive in the Pacific. Solutions that require major shifts in the culture and current way of life for Islanders will most likely be unsuccessful.

Tony Khoury presented to the delegation to share the history and success of the WCRA organisation for its members in NSW and the ACT. Tony explained the importance for waste and recycling operators to have an industry body that can represent them at all levels of government. The establishment of organisations similar to WCRA in the Pacific may assist in industry being able to steer and influence policy, regulation and law in the region.

WCRA members have a voice from industry to influencers and policy makers that facilitates communication and information independent of individual aspirations of its members. The delegates were impressed with the longevity and success the WCRA has delivered for its members and believed that similar bodies in the Pacific will allow industry and governments to work with PacWaste (and other associations) to achieve waste management goals and objectives. PacWaste (Pacific Hazardous Waste) is €7.85 million, a four year project funded by the European Union and implemented by SPREP to improve regional hazardous waste management across the Pacific in the priority areas of asbestos, healthcare waste, E-waste and integrated atoll solid waste management.

Anne Prince then joined Tony Khoury for a facilitated discussion on the benefits for associations from working with WCRA and shared examples. These examples were discussed with the delegation, with ideas and concepts being explored for their transferability to the Pacific region.

The delegation then welcomed Miriam Cumming, Environmental Engineer, APC Waste Consultants to present on NSW EPA Model Contracts. Following an introduction of the NSW experience, Miriam Cumming led a workshop on how these contracts may be used in the Pacific and their transferability.



Image 15: Miriam Cumming's presentation on Contracts led to healthy discussions

The workshop covered a varying list of both contracts and waste initiatives in NSW. Discussion on how these contracts may be adopted in the Pacific ensued. For successful adoption any contract must consider the objectives and outcomes that can be achieved in the relevant area of the Pacific. The delegation took away many ideas for improved contracts in their respective countries.

It was evident that the collection and recording of data with integrity would form the basis for planning and infrastructure. It was also clear that this data would be integral in the measurement of success of the varying projects. Data and the results could be compared across countries, geographies and types of ecology to identify areas of success and failure and learnings from both.

5.2.2 Day 1 – Site visits

The first of the afternoon site visits was to the Fairfield Council's Construction and Demolition (C&D) waste facility in Wetherill Park. The reason for a visit to this facility were two fold. First, this local



Image 16: Fairfield council concrete recycling facility. A jaw crusher attachment for an excavator is the most useful piece of equipment for concrete recycling

council went on a thirty year journey from small scale manual processing of building material to one of the most commercially successful C&D recycling businesses in the country. Secondly, processing of C&D material has a direct link to how disaster wastes are managed in the Pacific.

The tour, while cursory, shared many ideas with the delegates on how simple waste management may be achieved in their countries. Areas such as concrete and brick recycling into finished goods such as road-base and aggregates were of interest to the delegates. It was clear that the processing could be adopted at a macro level and then modified to create jobs. Particular attention was paid to the in-bound processes of waste segregation and the fact that although many of the Fairfield Council processes were automated, they could be adopted in a manual form in the Pacific. Disaster waste management was also a focus of this visit and the delegates seemed to take away many ideas and points for discussion from the C&D waste facility.

Sims Recycling Solutions (SRS) was the next stop on the tour. SRS is a leader in electronic waste solutions in Australia, with its Villawood site equipped with a shredding and downstream separation process for e-Waste.

Electronic waste is one of the fastest growing waste streams in the world. There are many hazardous items such as lead, mercury and other heavy metals. The opportunity for batteries to spark and feed fierce fires or pollute the environment is also a focus for Pacific waste management. SRS staff took the delegation for a tour of the facility. The reality for the delegates is that under the current and short-term future waste management strategies in the Pacific a facility such as this would not be likely to be commissioned. The opportunity for e-Waste management is in two key areas, employment and the creation of export markets for commodities. Low labour costs and the ability for operators to derive clean streams of commodities by hand dismantling e-Waste both contribute to the strong possibility that e-Waste dismantling may be successful in waste management in the Pacific.



Image 17: Visit to e-waste recycling facility

A NSW Container Deposit Scheme (CDS) “Return and Earn” collection point was the last stop on the tours for day one. Delegates were extremely interested in seeing the general public arrive at the collection point to recover their ten cents per eligible container. As with the SRS plant, the likelihood of an automated CDS collection point being commissioned in the Pacific was considered by the delegates. Delegates quickly identify that a programme such as CDS encourages the collection, compliant processing and recycling of waste.

In any form, successful CDS that rewards the collection and recycling of containers or other items is a positive opportunity for the Pacific, and this site visit at the end of day one prepared the delegates for some of the presentations planned for day two.

5.3 Summary of the Showcase experience – Day two

5.3.1 Day 2 – Seminar Series

Day two began with a presentation from Tony Khoury on workplace health and safety (WHS) and training. The benefits of policies and procedures for managing safety were shared with the delegates. Discussion on the differing cultures across the regions and the relatively relaxed approach to managing safety weighed heavily with the delegates. Concern for the timeline of implementation was a major point of discussion. Major shifts in current thinking and action would have to take place to facilitate improvements in workplace health and safety.



Image 18: Tony Khoury's opening session on Work Health and Safety in waste

Anne Prince, APWC, then presented on policy options for the Pacific. This presentation expanded on areas discussed during day one, and focused on the waste management projects that should be considered as first priority in the Pacific.

Peter Bruce, CEO Exchange for Change, and Anne Prince jointly presented on the CDS in Australia. Focus was placed on the "Return and Earn" programme in NSW and the areas of difference in Queensland and Western Australia. Exchange for Change is a Joint Venture of five of Australia's beverages companies who together sell more than three quarters of the containers eligible for a refund under the NSW (New South Wales) Container Deposit Scheme. Member companies have more than 40 years' experience managing similar refund programs within other States within Australia. It is one of three organisations responsible for running the NSW deposit scheme 'Return and Earn'.



Image 19: Peter Bruce, CEO for exchange for Change sharing the Australian journey of introduction of the Container Deposit Scheme

The delegates were interested in the concepts of manufacturers and importers being financially required to incentivise recycling. In the Pacific, monetary reward for the collection and disposal (to a compliant point) could result in significant reductions in the amount of waste entering waterways. Although the mechanics behind the schemes would most likely vary from the models in Australia, the concept and the success of the collections in Australia was encouraging for the delegates to take home and discuss.

5.3.2 Day 2 – Site tours

The site tour for day two was hosted by the team at Bucher Municipal. The team from Bucher gave a presentation prior to the tour. It was evident that in Australia (and globally) Bucher are the leaders in the manufacture of waste management collection vehicles and supporting infrastructure.



Image 20: The local ute-based truck designed for a project in Indonesia that was of high interest to the delegates

The delegates were impressed with the range of equipment, particularly when shown the smaller, more agile options. It was evident that a 20-plus tonne front-lift truck is not an option for waste management in the Pacific. In fact, the delegates shared that wheelie bins and other systems in use in Australia were also not in the short to medium plan for their countries. Generating most interest were the smaller systems that could be adapted to fit onto a 4WD cab chassis or similar small truck were of most interest.



Image 21: Bucher municipals range of equipment was appreciated by the delegates

During the tour, the delegates gravitated to the small truck that had been fitted with a simple compactor and rear-lift system. The operations teams at Bucher demonstrated the products and there was clear interest in the possibilities for adopting these systems.

On arrival back at the WCRA offices, John Homewood, CEO of Ace Waste, owner and operator of two medical waste incinerators in Brisbane and Melbourne, gave a detailed and technical explanation of the company's operations. Ace Waste is a leader in the collection, transport and compliant disposal of hazardous waste and has the capability to assist Pacific nations with difficult medical waste types such as cytotoxic human waste, out-of-date pharmaceuticals and various complex clinical waste streams.

Discussion centred on the relative lack of success in projects such as incineration across the Pacific. Concerns for the delegates included factors such as the lack of power and fuel, the long time frame for storing clinical waste and the vast distances over which waste had to be transported.

Engaging a processor such as Ace Waste would be an exceptional option for the Pacific. However, with the population spread over many thousands of kilometres, logistics and sanitary control of storing waste are issues that must first be addressed.

Mark Pobje, NSW Business Development Manager, Paintback Limited (PBL), then presented on the Paintback product stewardship scheme in Australia. PBL is a voluntary product stewardship scheme established by the manufacturers of paint in Australia. PBL is funded by a fifteen cents per litre fee for each litre of paint sold in Australia. The objective of PBL is to provide Australians with a drop-off site close to their home to enable them to dispose of residual paint. PBL then collects and processes this paint in a compliant manner in line with best practice in Australia.

PBL has had considerable success, with more than 100 collection points servicing 17.5 million Australians. PBL invests considerably in research and development to work collaboratively with the liquid recycling and treatment facilities to identify areas where processing can be improved. During 2017–2018 PBL collected over 4.3 million kilograms of paint and paint packaging across its network, successfully surpassing the collection rate of 1.9 million kilograms in the previous and maiden year of the scheme in 2016-2017.

The delegates were (as with the CDS) interested in the mechanics and possibilities of adopting similar EPR tariffs or fees to fund programmes across the Pacific.

Bradley Nolan from SPREP then summarised the next iteration of the PacWaste Plus Project in the Pacific. Brad outlined the new funding model and objectives for SPREP and its team. This project has recently been established and funded. Objectives have grown to incorporate more waste streams and major focus will be on disaster waste, asbestos management, plastics, e-waste and medical/clinical waste.



Image 22: Bradley Nolan from SPREP presenting the availability of funds through the PacWaste Plus program

The final session of day two at WCRA was a chance for the delegates and presenters to discuss a wide variety of issues relevant to waste management in the Pacific Islands. Discussion and debate was varied across all areas covered in the first two days.

5.4 Summary of the Showcase experience – Day three

A full-day site visit was conducted on day three of the training. Established in 1974, Kimbriki resource recovery centre is a former landfill site. The day started with hands-on demonstration of composting, worm farming, wicking beds and a range of other activities. Based on the feedback, this session at Kimbriki and the visit to Bucher Municipal with local solutions specific to the Pacific were a highlight of their three day visit to the Best Practice Showcase.



Image 23: Delegates getting their hands dirty learning small scale composting and wick bed preparation

The EcoHouse and Garden provides a hands-on approach to education and behaviour change through tangible methods of demonstrating material reuse. The building is constructed from recovered materials from the Kimbriki site and has become an information and education centre targeting all ages and users. Peter Rutherford, senior eco-gardener at Kimbriki, conducted the tour that included hands on demonstration of the following:

- Composting;
- Worm-farming;
- Wicking beds (self-watering gardens);
- Small-scale organic vegetable gardening;
- Organic horticulture for tradespeople;
- Natural food preserving;
- No dig gardening.

The tour started with Peter Rutherford taking everyone on a musical journey introducing the concept of “ecology”; of preserving and caring for the environment in everything you do and everywhere you go.

The delegates were enthralled by the idea and were very impressed by the communication strategies used by the team at Kimbriki. Of note was the comment that the delegates would like to be able to use music to connect people to the environment given music is an integral part of the Pacific way of life.



Image 24: Musical introduction to composting



Image 25: Worm farming demonstration

The afternoon was devoted to visiting the rest of the Kimbriki site and was lead by Mark Winsor, the CEO of Kimbriki.

This high diversion rate at kimbriki is achieved through the various channels that waste is received and then sorted. Materials are separated for drop-off (Figure 11), and then further reviewed and sorted by staff. This contributes to the large volume of waste that is diverted from landfill and is reused or

recycled. It also directs goods towards the BuyBack centre so that any items of value are available for purchase by the public.

Operating from Kimbriki, Australian Native Landscapes recycles vegetation and wood waste. A variety of loose, bulk and bagged products are available for sale, including mulches, composts and other garden-suitable organic mixes. Similarly, Concrete Recyclers accepts waste concrete, brick and roof tiles to produce road bases, aggregates and sands of varying grades suitable for construction and landscaping use.

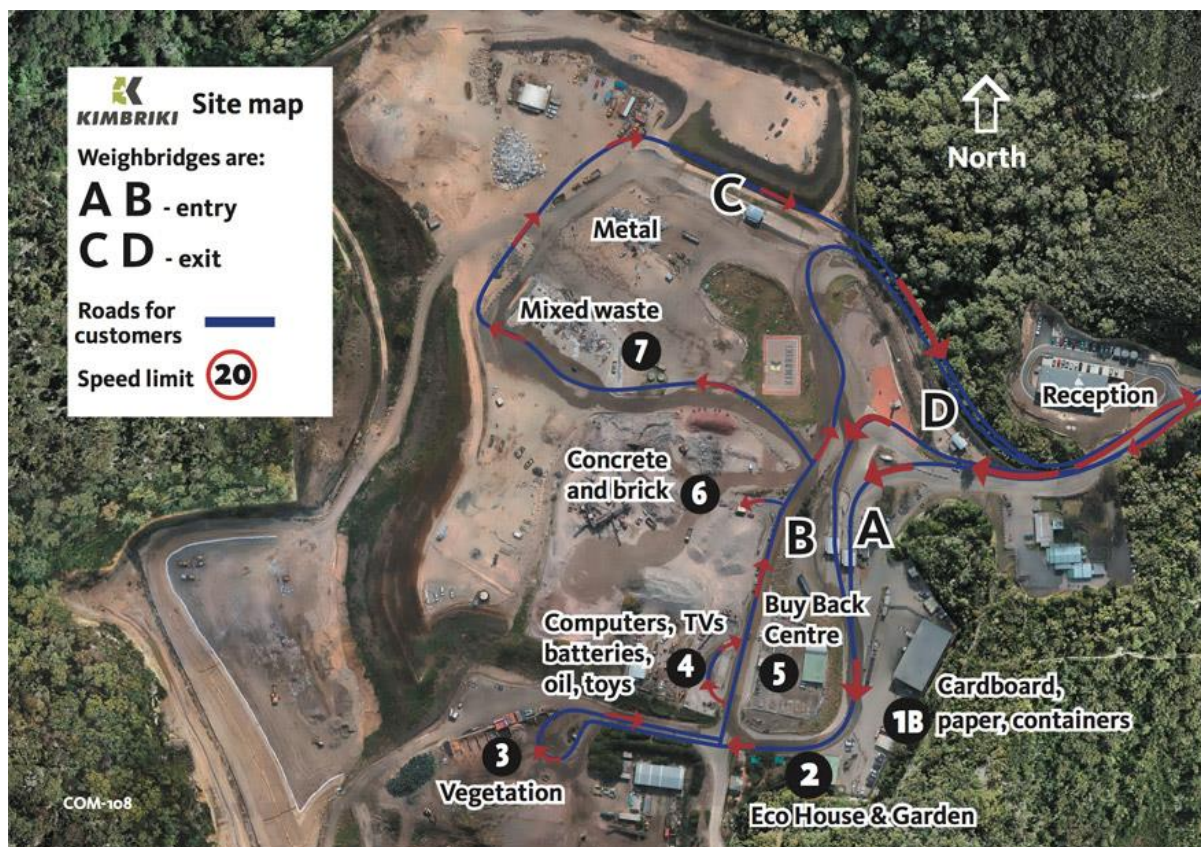


Figure 11: Site map of the Kimbriki resource recovery centre

During the visit, the delegates took in the following:

- Community drop-off of materials that are hand sorted to recover all recyclable and reusable materials
- All re-usable materials are available for re-use and sold back to the community generating income for the facility a concept that was of great interest to the delegation
- Community drop-off of metal, TV, computers, batteries, oils and even toys that are reused.

5.5 Delegate Evaluation of the Best Practice Showcase

Feedback was collated at the end of each day to evaluate the success of the Showcase's objectives against the expectations of the delegates, as well as to inform any similar programmes that may be

delivered in the future. The results in Figure 12, Figure 13 and Figure 14 below show a high level of enthusiasm for the learning and development opportunity the Showcase provided. There was a constant theme during discussions and within the formal feedback that the content and best-practice examples needed to be transferrable to the Pacific communities and their current cultural, social and economic realities. Given the long-term nature of waste management decision making and investments, insights into contemporary practices laid a solid groundwork for delegates to envisage the future of waste management in their representative nations.

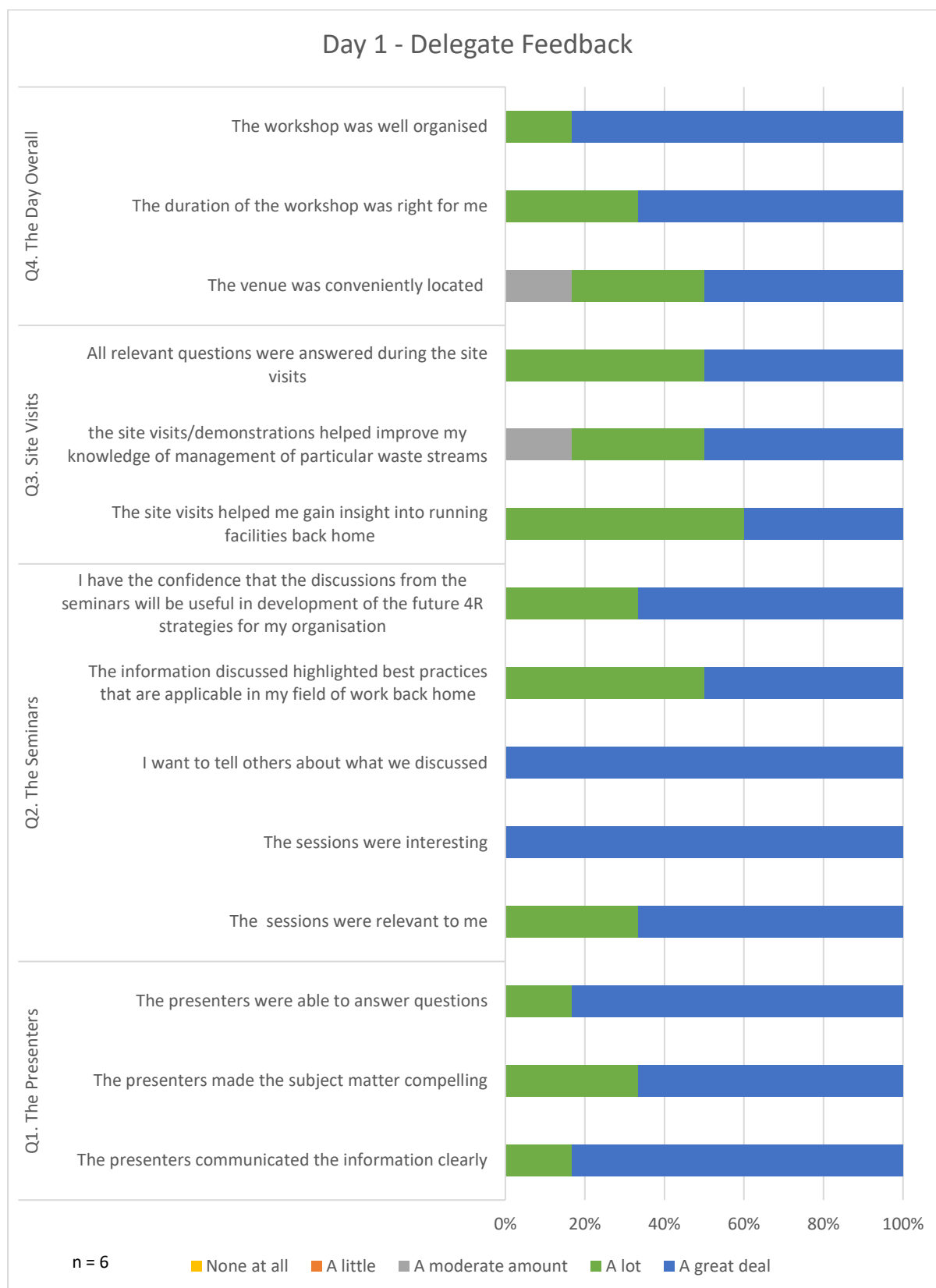


Figure 12: Delegate evaluation of Day 1

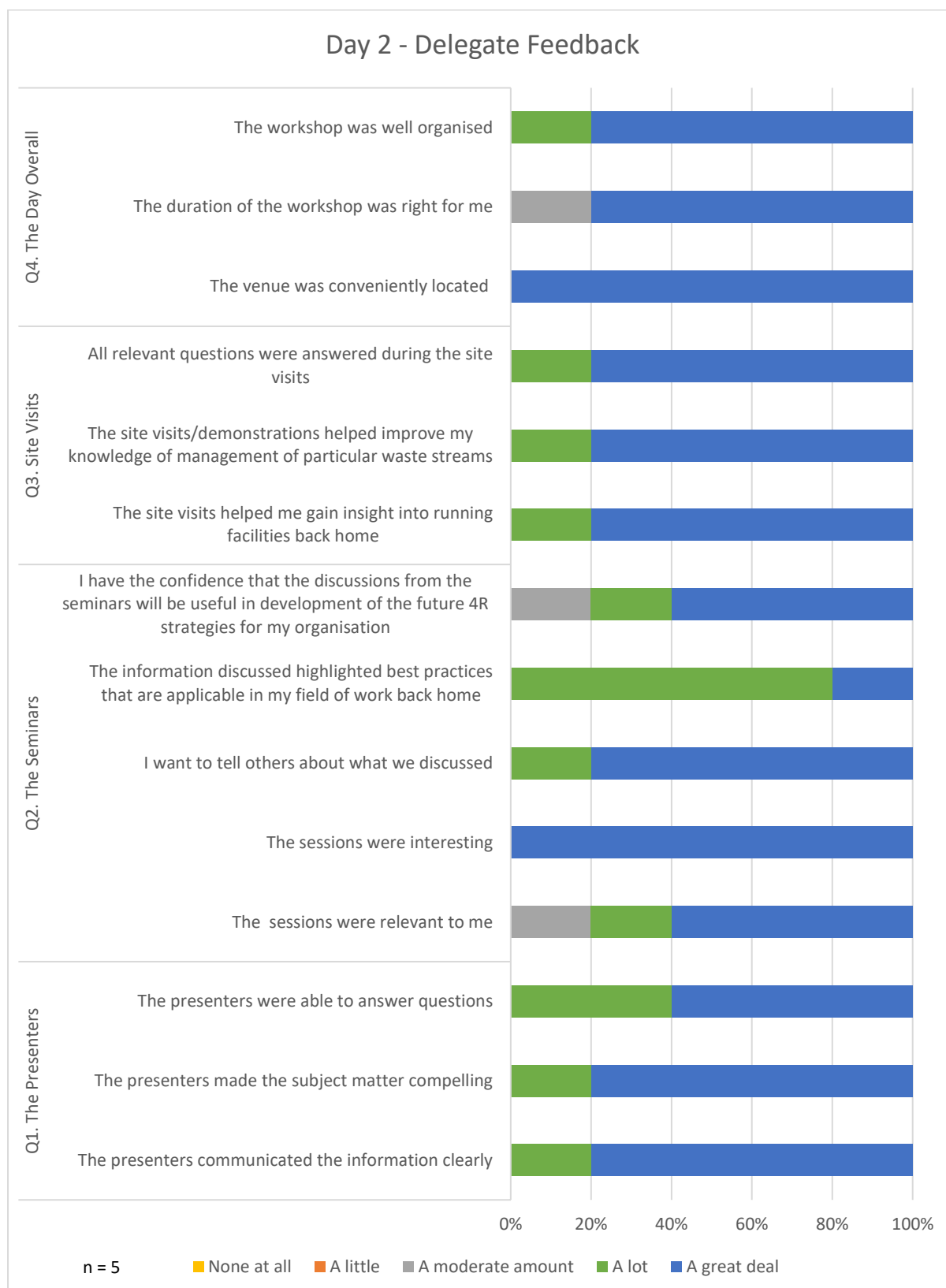


Figure 13: Delegate evaluation of Day 2

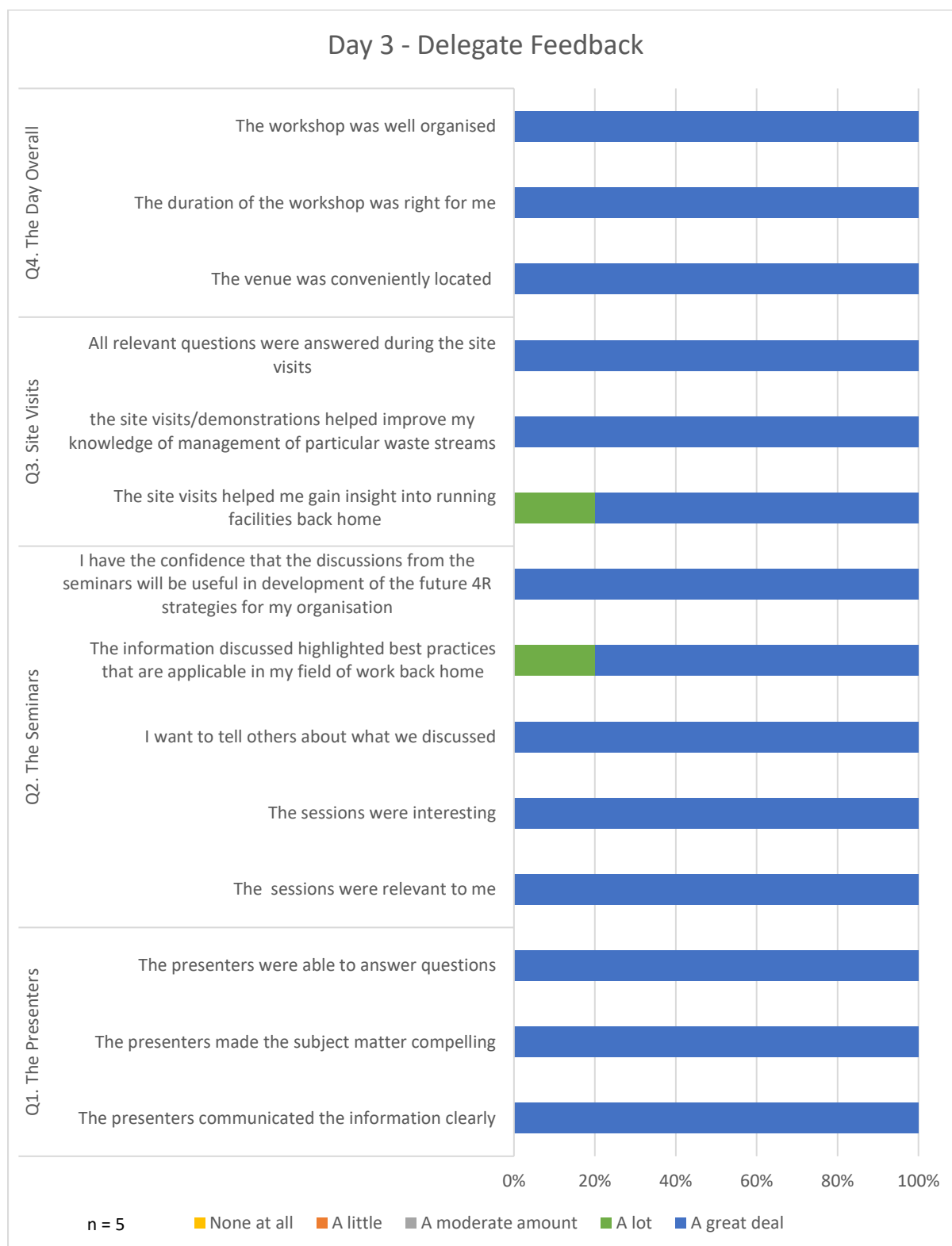


Figure 14: Delegate evaluation of Day 3

Delegates were asked whether it had proven difficult to obtain a visa to attend the seminar. Although this was part of a commonwealth project with full UK, Solomon island and Vanuatu support, visas were denied by Australia. This was the basis of asking this question. Half answered it had not, while the remainder responded in the affirmative. Delegates were also asked to nominate which sessions they thought were the most useful and which areas could be improved. These results for both days are in Figure 14.

Table 4: Free text feedback provided by delegates to inform future programmes

Q6	What was the best aspect of the session?
DAY 1	• Common discussion of each topic best practice in waste management • Contract management is key issue in my responsible country and so the contract session was most impressive to me. Of course, all other sessions contents are precious information • Site visits • Field visit and session on contracts and the proposal for the regional hub • The work contract • Hearing about recycling refunds
DAY 2	• Bucher Municipal site visit • All the sessions considered 'applicability' which was the best point, I think • The history of WC and RA by Tony Khoury. Visit to Bucher Municipal and their presentation • The CDL Presentation. Presentation and visit to Bucher Municipal • Looking at the different CDS systems and the set up of the association
DAY 3	• The best session for me was the home composting. To try and encourage people to do composting at source. The worm farm was really interesting as well • 1. The organic farm - presentation • 2. The site visit in landfill site – very impressive • The home composting part is the best aspect of the session • The practical composting and the lessons learnt from Peter Rutherford • Compost demonstration was the most impressive session. I really like the way Peter Rutherford explains the method

Q7	What aspect of the sessions needs improvement? What would you like have heard more about?
DAY 1	• For presenter to allow more questions • For site visits, if we could get any flow chart of facility that would be also helpful • Happy to learn more about CDL • Directly applicable techniques rather than 'Best Practice'
DAY 2	• Otherwise keep the presentation simple – depends on the target audience. Also good information are shared at informed discussion • The CDS and Return Method • Presentation that more applicable to our situation • I would like a bit more information on the CDS or the stewardship programme. The conversion and how to calculate the amount to be included in the levy
DAY 3	• I would like more information on the wicking bed. Maybe some trial/pilots. Would be useful for places that have limited water like in the smaller atolls. Supporting climate change with food security. • 1. Policy makers and legislators, decision makers. 2. Technical people in the island who work in the landfill be part of the team visit. 3. Visiting the waste collection point before taken to the landfill site is also worth exploring • If possible to help develop an action plan or project proposal to get fund particularly to address main issue or problem that each country we're facing at the moment • Maybe if we could have more time to develop some ideas based on the knowledge from training would be nice. I guess it will be done in-country training

6 Lessons learned

6.1 Visa Issues

APWC issued invitations to six staff members from each country (Vanuatu and Solomon Islands) were invited to attend the Best Practice Showcase and arrangements were made for their flights and stay. However only two delegates from each country and two from the pacific regional organisations of SPREP were able to attend. Delegates found it difficult to obtain a visa within the timeframes available to them for attendance at the seminar series.

Unfortunately, due to the requirements of the project, APWC was not able to move the dates of the Sydney showcase to allow in-country staff to have visa to attend the showcase.

In future, any project that requires movement of people between countries that require a visa should have at least three months lead time to allow an appropriate time for visa processing and staff availability.

6.2 Ongoing support

It was noted by most delegates during discussions that there are various learnings that they can take away from the Best Practice Showcase and apply to their country context. However, they do not have the expertise to ensure that the project goes well from inception to completion and they will need ongoing support to ensure the success of such projects.

APWC notes that the PacWaste Plus program will offer support to local governments in both Vanuatu and Solomon Islands. The details of the funding program were presented at the showcase by Bradley Nolan, Project Manager for PacWaste.

6.3 Nation-specific examples

The Best Practice Showcase has paved the way for tailored in-country training to take place. Within the Vanuatu this was held in February 2019 and concentrated on areas highlighted by the delegates that they needed further support.

APWC will provide a further report detailing the in-country training methodology, areas of focus and evaluation.

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