



Pacific
Community
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RESCCUE

WASTE AND WASTEWATER MANAGEMENT DIAGNOSIS AND ACTION PLAN

North Efate, Vanuatu



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Front cover photo: Primary waste sorting on a garbage disposal, North Efate, Vanuatu (R. Billé, 2015)

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Abbreviations and Definitions

NGO	Non-Governmental Organisation
RESCCUE	Project name, representing the activity of 'Restoration of ecosystem services and adaptation to climate change'
WASH	Water, Sanitation, Hygiene
WMP	Waste Management Plan

Executive Summary

Management of waste materials is a substantial problem for the communities in north Efate where RESCCUE is working. Westernisation of the economy, diet, lifestyle and the supply chain of goods leave end of life materials to be managed at the village level. However the cash income being generated is insufficient to support the infrastructure and services necessary to remove the waste materials to environmentally sound recycling and disposal points. Waste collection and disposal services operate in the immediate Port Vila area but do not as yet extend out to North Efate and the outlying islands. Consequently there are very limited and fragmented services available to the communities.

Adverse outcomes arising from poor waste disposal include littering, pollution of air, soil and water, impacts on marine life and people's health. These adverse effects contribute to the inability of communities to develop economically.

Several key factors constrain the North Efate communities as they seek to improve management of solid waste, being:

- Lack of awareness around appropriate waste management actions and the adverse consequence of current waste management practice.
- No (or very limited) storage, collection and transport infrastructure and systems for waste materials outside of the immediate Port Vila urban area.
- No locally derived and financially sustainable source of ongoing operations funding for recycling and waste management services.

RESCCUE proposes a number of actions to improve management of waste for the communities in the project area. These address the waste hierarchy of waste reduction at source, materials reuse, recycling and residual waste disposal. The lack of services and infrastructure to manage waste is recognised with several actions to raise the profile of waste management services. The RESCCUE Waste Action Plan builds upon the work being done by the Vanuatu Government, Shefa provincial government and NGOs. The Waste Action Plan has been formulated to be consistent with and to complement the Shefa Province (Draft) Solid Waste Management Plan (January 2016).

Preparatory work for the Waste Action Plan is programmed to take place through the second half of 2016 with most of the project activity at village level in the latter two years of the project (2017-2018)

1 Origin of Waste Management Issues

As is common across the Pacific, waste management issues in the rural and island communities of Vanuatu arise through westernisation of the economy, diet, lifestyle and the corresponding supply chain of goods. Typically across the Pacific, and as seen in North Efate, the trend has been for the production of local foods to decline and be substituted with imported goods, primarily rice and tinned meats. Partly this reflects the convenience of these foods but also reflects the pressure of feeding a growing population from a diminishing marine resource and finite and sometimes reducing available productive land area. At the village level this results in substitution of local biodegradable materials for food preparation, storage and building with imported non-biodegradable materials such as steel and plastics. Compounding the Waste Management issue is the waste generated from end of life consumer goods and appliances and a lack of a structured waste management system.

However village level economies are not sufficient to support the infrastructure and systems required to remove the waste materials of a modern society to environmentally sound recycling and disposal points. Consequently there is a one way flow of materials into the villages and onto the outer islands, which at end of use accumulate as litter and residual waste.

2 Current Waste Management Planning and Practices

2.1 National and Provincial Government Solid Waste Planning

At a national level the Waste Management Act No.24 of 2014 stipulates that all provinces and the three municipalities of Vanuatu should submit annual solid waste management (SWM) plans to the Department of Environment Protection and Conservation (DEPC). Shefa Province has developed a draft SWM and the Port Vila Municipality has prepared its SWM master plan.

The National Waste Management Strategy developed under the Waste Management Act sets out actions under seven thematic areas of:

- Solid Waste Management Bylaws
- Sustainable financing
- Capacity building
- Waste minimisation
- Integrated solid waste management
- Provincial coordination
- Public awareness

Following a workshop in July 2015 a conceptual SWM Plan was prepared for Shefa province (Draft Solid Waste Management Plan Shefa Province; January 2016). The draft SWM sets three levels of service based upon

population. Efate is a “Level 3” service category. This requires refuse collection services to be developed, as discussed further in the Action Plan below. The outer islands in the RESCCUE area are mainly Level 1 requiring basic services, although Nguna with over 1,000 residents does just fall into Level 2. The Shefa draft SWM adopts the same seven thematic areas as the national waste management strategy.

In deriving the RESCCUE Waste Action Plan cognisance has been taken of the above national and provincial planning frameworks. Principally RESCCUE activities interact with the Shefa Provincial Government WMP. RESCCUE does have technical capacity to assist with tasks assigned in the Shefa WMP to DEPC, specifically around technical guidelines for local disposal sites.

2.2 Residual waste collection & Disposal

At present organised waste management services are almost entirely limited to Port Vila and its immediate surrounds. The Port Vila municipality manage a refuse collection service based on official bags (pre-paid). Residual waste is disposed of at the Bouffa landfill which is an engineered landfill site. In addition to the municipality managed collection, several private operators such as Pango Greenforce provide collection services on a commercial basis, primarily servicing businesses and resorts.

It was reported to RESCCUE that a limited refuse collection service to several of the resorts on the north coast is operating, however the extent of this has yet to be ascertained. Apart from this limited service, there is no organised refuse collection service to the North of Efate and the outer islands. Any waste that is removed from the area back to Port Vila is on an ad hoc basis by residents but is understood to be minimal.

2.3 Recycling and Materials Recovery

Organised recycling activities are limited to scrap metal and glass. RecycleCorp collect metals for recycling. A small payment is made for aluminium can but no payment is able to be made for steel can. Glass Tusker beer bottles are able to be recycled at the bottling plant.

There are some collection points around Port Vila but none we are aware of across North Efate.

2.4 Projects in North Efate

Waste management has been a focus for other projects in North Efate. The SPC/GIZ project on Nguna Pele promoted waste separation and some materials were separated. It was not clear to us whether any materials were actually removed from the island. However since TC Pam these activities had ceased and waste was no longer being effectively sorted at the disposal site we viewed (Section 4.3.1)

There is an active waste management committee on Nguna Pele, but not to our knowledge on North Efate.

2.5 Domestic Wastewater

Consideration was given to the role that RESCCUE would play in regards to domestic wastewater and sanitation. Following discussion with NGO's active in this area (Live & Learn Vanuatu, World Vision & Oxfam in particular) it was apparent that there are already WASH (Water and Sanitation Hygiene) projects operative in Efate. Composting toilets have been a focus with several demonstration sites. Therefore wastewater has not been addressed in detail in this report as it is considered the resources of RESCCUE are better concentrated on solid waste management.

3 Adverse Outcomes Arising From Current Waste Management Practices

The accumulation of waste materials at the household and village level results in a number of adverse outcomes for the communities and the environment. These adverse effects on community health and the environment contribute to the inability of communities to develop economically through:

- **Litter:** Widespread littering is a visual/aesthetic issue that is perceived poorly by tourists and does not fit with efforts to promote North Efate and Vanuatu as a destination for independent travellers and eco-tourism. There is some village level tourism with around 10-12 homestay providers on Nguna Pele and 2-3 on north Efate. Also day tours are organised from Port Vila. Plastic litter that enters marine ecosystems can also be detrimental for marine fauna, especially turtles that can swallow plastics.
- **Pollution and contamination of soil, groundwater, streams and the marine environment:** This can occur through leaching of contaminants from deposited rubbish either from adhoc dumping or the utilisation of village disposal sites. This is particularly serious where already limited water supplies (surface or groundwater) are compromised.
- **Health:** Risk to health can occur from the contamination of water supplies from waste, the creation of breeding sites for mosquitoes (e.g. cans and plastics holding water), and risk of physical injury from glass or steel litter.
- **Air pollution:** Burning of waste materials including plastics is common practice in North Efate. The acrid plastic burning smell is noticed by tourist visitors and adds to the negative perceptions they develop around waste management and environmental values.

4 Impediments to improved Waste Management

Several factors are constraining the ability of the North Efate communities to manage waste generated and its impacts. These will form the focus of RESCCUE:

- Lack of awareness around appropriate waste management actions and the adverse consequence of current waste management practice.
- No (or very limited) storage, collection and transport infrastructure and systems for waste materials outside of the immediate Port Vila urban area.
- No locally derived and financially sustainable source of ongoing operations funding for recycling and waste management services.

5 Proposed Waste Management Action Plan

5.1 Objective for Waste Management Plan Activities

At the village level of North Efate where RESCCUE is operating the impediments outlined above translate to a need for simple 'building block' actions which will create obvious changes on the ground. Success with these activities will achieve some immediate improvements in the standard of waste management but also and very importantly, develop an awareness in North Efate communities that they do have the power and ability to manage many aspects of their waste on their own. In time as other objectives which the RESCCUE project seeks to address (such as increased production of local foods, more composting, and alternative incomes) come to fruition then the goal is for communities to lift service delivery to the next level of periodic collections of recyclables and residual materials and return to Port Vila as identified as the level of service for Efate Island in the Shefa draft SWM Plan.

RESCCUE will work with communities, SHEFA Provincial Government, NGOS and the private tourism sector to develop waste services. Actions to address this are proposed below. At a higher level a number of Vanuatu Government Departments have responsibilities in regards to aspects of waste management. These include Department of Environment Protection & Conservation, Education, Agriculture, Ministry of Health and Department of Trade. The activities planned for the RESCCUE project will be coordinated with these Departments.

5.2 Structure of the Waste Action Plan

The Waste Management Plan (WMP) activities are presented below in terms of the waste hierarchy of Reduce, Reuse, Recycle and Dispose of Residuals. Overarching considerations of management structures are then addressed. This is divided into identified problems in North Efate (e.g. plastic bags), the problems identified, actions outlined, and the identification of measures of success.

A programme is presented for the implementation of the Waste Plan activities. In some areas this has been purposefully left reasonably general. This is as the solid waste activities are just one component of the wider RESCCUE project and need to be integrated with other terrestrial and marine activities to balance demands on local providers and the communities.

5.3 Waste Reduction

5.3.1 Waste Items Targeted: Plastic Bags

Problem to be addressed by RESCCUE project:

- Plastic bags (shopping bags and general food packaging) are a significant litter item due to their high levels of use and a lack of appropriately management and disposal. Recycling (i.e. collection for reprocessing) is not currently economic or logistically feasible in North Efate. Direct action to reduce reliance and use of bags will be required and ultimately beneficial to the communities and environment in North Efate.

Activities:

RESCCUE will develop an awareness programme to promote the message of:

- first using local woven materials to collect groceries; and/or
- secondly only taking as much plastic from shops as is really necessary to carry goods purchased; and/or
- thirdly reuse bags.
- People will also be encouraged to leave unwanted packaging at point of purchase especially in Port Vila where it could be appropriately disposed of.

Implementation Plan:

- Distribute any existing and if necessary develop new posters around the theme of ‘stop the rubbish’ for distribution the North Efate villages, in bislama.
- Action play themed on “stop the rubbish”. The Wan Smol Bag theatre group has been active in the North Efate area performing plays on a variety of themes including some with a waste management theme. This activity could be usefully built upon with a play specifically on waste reduction. The RESCCUE team will investigate this further.

When:

- Collate & Develop resource material August – December 2016
- Distribute and disseminate - 2017

Where:

- Posters to be deployed in all villages in North Efate.

By Who:

- Poster Resources to be developed by the RESCCUE Project for distribution to village waste committees by Live and Learn and the Tasivanua and Nguna Pele community networks.
- Live and Learn to source and engage a suitable group (such as Wan Smol Bag) to prepare and deliver a play.

Measures of success:

- Reduced plastic bag litter count in North Efate, especially around villages; and
- Reduced the amount of plastics bags turning up at disposal points.

5.3.2 Waste Issue Targeted: Disposal of disposable nappies

Problem to be addressed by RESCCUE project:

- Disposable nappies are a major waste disposal problem in North Efate. Inappropriately disposed of nappies generate health risks and encourage pests such as flies and rats. While disposable nappy use

cannot practically be eliminated due to their convenience, their use can be minimised by promoting the use of cloth nappy alternatives and negative environmental effects minimised through employing appropriate disposal methods.

Activity:

- The RESCCUE project proposes to build upon the cloth nappy project run by Shefa Tourism. Shefa Tourism have been running a project showing mothers how to make their own cloth nappies and promoting their use.

Implementation Plan:

- To be implemented in conjunction with Shefa Tourism. The RESCCUE local implementation partner (L & L Vanuatu) will meet with Shefa tourism and visit one of the communities where the nappy project has run. Learnings from the Project will be summarised so that the project can be replicated through the waste committees at Nguna Pele and Tasivanua. One of the key messages to bring out through this project will be the problems caused by the improper dumping of disposable nappies (section 5.3.3)

Where:

- Across all villages within the RESCCUE North Efate project area.

When:

- Preparatory work with Shefa Tourism – November 2016
- Briefing of Waste management committees – Nov 2016 – March 2017. Note this activity is dependent upon progress with establishing the waste committee(s) in Tasivanua area.
- Implementation - 2017

By Who:

- Live and Learn will coordinate workshops in conjunction with Shefa Tourism at selected villages. Each workshop would be one day duration and representatives of all North Efate villages.

5.3.3 Waste Items Targeted: Food Packaging

Problem to be addressed by RESCCUE project:

- The quantity of waste generated from packaging, in particular plastics and cans from imported goods, and the lack of appropriate disposal options in North Efate. Services and infrastructure to improve waste transport and disposal options are covered further in Section 5.5.2.

Activity:

- Promote use of locally grown foods over imported store brought rice and tinned goods. This is not specifically a waste activity but is a focus of the sustainable agriculture RESCCUE activities which are targeting food security, increased agricultural/horticultural production and alternative incomes.
- Ensure that the promotion of local foods and agriculture in the other RESCCUE activities in the area of food production/security also emphasises the waste reduction benefits that come from home grown produce.

Resources Required:

- No specific resources are required for this activity.

5.4 Waste Reuse

5.4.1 Waste Items Targeted: PET bottles (soft drink and water bottles), fishing nets, plastic bags

Problem to be addressed by RESCCUE project:

- Consumer plastics are a ubiquitous litter item in remote areas where there is limited or difficult access to a central processing centre for efficient /cost effectively recycled. There is currently no infrastructure or services for plastics recycling on Efate.

Activity:

- Educate North Efate communities in the manufacture and use of “bottle bricks” for construction of simple concrete structures such as bins for recyclables, chicken house floors etc. In time as experience with the technique grows and production quality increases the bottle brick construction technique can be used for house foundations and walls also.

Positive outcomes from the activity:

- Large numbers of bottles can be used in relatively small structures (for example X bottle bricks standing on end are required to make 1 m² of floor). < Note this is a work in progress with research continuing on the construction technique >
- Uses waste material otherwise not recyclable at present
- Bottle Bricks can incorporate other waste plastics (bags)
- Can be used to construct low cost structures to help with other aspects of waste management (compost bins or bins for recyclables)

Implementation Plan:

- Hold a workshop with Tasivanua and Nguna Pele committees to train in the use of this technique. A suitable project would be to build floor and walls for a recycle bin. There is also a proposal to build a resource centre (a small building) for the Tasivanua monitors. This would be a good opportunity to trial this technique, say for the floor slab or non-structural walls.

- Once familiar in the use of this technique, Tasivanua and Nguna Pele trainers can train others First group then train others in technique

Where:

- Initial workshop at Worisiviu Village on Pele with follow up workshops at selected other North Efate village(s).

Rationale for location:

- The Nguna Pele waste committee are active at Worisiviu and already have waste separation for cans and plastics in place (until tropical cyclone Pam, Photo 1). It was not clear whether materials had actually been taken back to the mainland, or just stockpiled. In any case activity had ceased after TC Pam. Provision of new bins for the waste will serve to kick-start the recycling/separation efforts again and is an acknowledgement of the efforts made to date. RESCCUE can assist with the logistics of returning the materials to the mainland and Port Vila.



Photo 1: Waste site at Worisiviu village, Pele. Waste segregation is no longer being practiced. There is no infrastructure provided to store and contain materials.

By Who:

- Initial workshop to be run by Live and Learn (after training from RESCCUE advisers).
- Nguna Pele Waste Management Committee then engaged as trainers for Tasivanua or alternatively Tasivanua members could travel to Pele to participate in the initial workshop.

When:

- Initial workshop to be held by November 2016
- Follow up training sessions in 2017

Resources:

- The initial training will require 2-3 days with Live and Learn. The workshop would be in two parts, with an initial day to illustrate making the “bottle bricks”. The community members would be then tasked to make a set number of bricks over say 2-3 months. A further workshop of 2-3 days would then be held to build a simple structure such as the recycle bins. RESCCUE would need to provide cement to the site.

Measures of success:

- Number of bottle structures built;
- Number of people undergoing training;
- Visual count of bottles as litter around villages in North Efate remaining after training.

5.4.2 Waste Items Targeted: Plastics from food packaging

Activity:

- Wastes in handcrafts. There is some (albeit limited) opportunity to use waste plastics in handcrafts, for example the colourful purses made under the Shefa Tourism programme. A large part of the value in these activities is to develop the message that waste materials can be a resource. This requires packaging materials to be separated at source and to avoid contamination of waste streams.
- Support the continuation of workshops on weaving using waste plastic wrappers, and promote throughout North Efate. Work with Shefa tourism to understand any additional support needed. Liaise with tourism operators and resorts to identify any opportunities for marketing of these products.

When:

- Liaise with Shefa Tourism – August – December 2016
- Workshops 2016 -2017

5.4.3 Waste Items Targeted: Organic materials from food preparation/consumption, gardening and packaging (cardboard)

Problem to be addressed by RESCCUE project:

- Burning and uncontrolled disposal of organic materials is a waste of potential organic resource for garden plots via composting. Presently in North Efate food waste disposal is not appropriately managed, missing an opportunity to utilise this resource. Additionally poor waste management practices are causing potential health risks as organic waste is known to attract rats and other pests around villages.

Activity:

- Promotion of composting and education/demonstration of the benefits of compost in the garden plots.

Positive outcomes from the activity:

- All waste organic materials from gardens and food preparation (and marine activities, fish waste, crown of thorns) can be collected and used for composting. Cardboard and paper can also be included in compost (if not burnt). Garden plots are short in nutrients and good compost is valuable to add nutrients. Plant based mulch can also be used to suppress weeds and retain soil moisture. Composting is already practiced and well understood at a number of locations e.g. Nguna Pele. The focus for RESCCUE will be to build on this experience and transfer other communities in North Efate.

Implementation:

- Work with Nguna Pele community groups to provide workshops on making good compost to Tasivanua and North Efate communities
- Support construction of compost cages/bins
- Tie in with Agricultural components on how to make best use of compost
- Poster resources (if not already available), to check with Department of Agriculture and FSA (Vanuatu Farmers Support Association).

Location:

- North Efate villages outside Nguna Pele.

By Who:

- Implemented by Nguna Pele Waste Committee with technical support from the RESCCUE team, specifically Live and Learn.

When:

- Background work – 2016 4th Quarter
- Implementation - 2017

Resources:

- A workshop on compost should take one day. Poster materials (in bislama) are also required.

Measure of Success:

- Uptake of composting by North Efate communities;
- Number of compost projects operating after 3 years; and
- Absence of organic matter at waste sites.

5.4.4 Waste Issue Targeted: Reuse of Disposable Nappies through Composting

Problem seeking to address:

- Disposable nappies are a major litter problem. Littered nappies provide health risks. Disposable nappies will continue to be used due to their convenience and so an environmentally sound and public health safe method needs to be promoted for their disposal.
- Currently disposal options are limited to:
 - dumping at communal waste pits (unsatisfactory as attract rats, pollute groundwater)
 - individual washing, drying and burning (burning of plastics)
 - Individual burying in bush/garden plots (leaves plastic litter in ground)
 - Burying in large pits (pollution of groundwater, legacy of buried plastic)

Activity:

Currently RESCCUE are researching disposal/composting techniques appropriate to rural and island locations without refuse services. This is being followed up also with manufacturers of disposable nappies being sold in Vanuatu.

5.5 Waste Recycling

5.5.1 Waste Issue Targeted: Aluminium can, steel can

Problem to be addressed by RESCCUE project:

- Opportunities for return of packaging waste for commercial recycling from the more remote areas and in particular the offshore island communities are limited to aluminium can, steel (tin) can and possibly glass (tuskier bottles).
- Aluminium can is recyclable and a small return can be made (at time of writing 40Vt/kg paid by RecycleCorp in Port Vila). The return from cans is small, but is an incentive to recycle. It would not justify a special trip back to Port Vila from North Efate but can be tied in with other business/shopping in town.
- Steel can is recyclable but with the current low world steel scrap price no money is paid.

Activities:

- Construct bins for recyclables, using local waste materials (e.g. 'bottle bricks' as in 4.3 above);
- Note consideration was given to providing a can crusher, being a simple lever device to minimise can volume. However following discussion with RecycleCorp they advise against this as the crushed cans are more difficult for them to sort and bale for export, which would presumably reflect in what they could pay for can delivered to them.

- Develop logistics for return of materials to Port Vila. This return of materials to the mainland (eg the wharf at Emua) and thence to Port Vila is a major issue to work through and requires considerable input on the ground in North Efate to find a solution. Some possible avenues would be the building supplies company that delivers cement, timber and steel to the Emua wharf (delivery is not charged we understand). The truck is probably returning to Port Vila largely empty and so there could be opportunity to backload sacks of cans. Other possible partners in this activity could be the resorts on the north Efate coast, who similarly would have vehicles delivering goods from Port Vila.

When:

This activity will follow on from establishing the centralised disposal points for each village (activity WD1). Investigation of materials logistics can be undertaken in the 3rd Quarter of 2016.

Positive Outcomes from the Activities:

- Ensures steel cans do not become a breeding ground for mosquito;
- Minimise volume for transport making it more economical;
- By providing a tidy, contained site for materials instil pride in recycling and waste separation efforts;
- Reduce litter adding to areas visual appeal for tourism.

Measure of Success:

- Visual assessment of use of collection points
- Cans in litter around village and on foreshore

5.5.2 Glass Bottles

The predominant glass bottle in the waste stream is the Tusker (beer) bottle. These are recyclable at the brewery/bottlers in Port Vila (bottle deposit unknown). Recovery should be encouraged by providing bins at disposal/collection sites. However for the offshore islands the logistics of recycling glass are most likely such that more energy is consumed in returning the waste glass to source than is used in making new bottles providing limited positive environmental outcomes. In these instances, the most appropriate course of action would be to collect the bottles separate from other refuse at the village waste depot, have the bottles rinsed, and then dispose of the glass into a landfill pit not located over fresh groundwater resources. Glass is inert and leaching from its disposal is unlikely to generate significant adverse environmental impacts. The priority should be to reduce glass as a litter item on the foreshore/reef and ensure it does not break and become a hazard to people.

A possibility may be to crush the glass and reuse the crushed glass as a filler for concrete. This is a possible activity RESCCUE can investigate further.

5.5.3 Corrugated Iron

Unwanted corrugated iron from roofing (often rusted out or cyclone damaged) is currently left to accumulate around the villages in North Efate. At some locations attempts are made to stockpile it, however, it is often left scattered where it can become a hazard, especially during tropical cyclones.

An appropriate way to manage such iron would be to encourage its collect it at a central disposal location (beside recycle bunkers) and securely stockpile it for possible future collection. It would appear that the opportunities to collect waste iron and return it to Port Vila are limited, largely by the current low steel price. Unless an external party is willing to fund a scrap steel collection then disposal on site is likely to continue as the most practical option in the medium term.

5.6 Residual Waste Disposal

5.6.1 Centralise Disposal for each Village

Problem to be addressed by RESCCUE project:

- Within North Efate there is a proliferation of ad hoc and uncontrolled waste disposal sites around most villages. This creates visual untidiness, health hazards, and attached animal and insect pests providing food, and places to breed.

Activity:

- Centralise waste disposal for each village by agreeing on one location for collection of recyclables, and their temporary storage before collection. This is as per the level 1 and 2 service levels as proposed in the draft Shefa WMP. Ultimately for North Efate Island these locations could become local transfer areas when a collection service is implemented and so the activity is consistent with the Level 3 waste collection service level objective for Efate.

Implementation steps:

- Develop and agree site criteria (not over any groundwater used for drinking, convenient access to boat landing places for removing wastes, above cyclone wave run up, etc.)
- Discuss with Chief(s) in North Efate villages.
- Place signage and posters.
- Inform community.
- Construct bins (Activity 4.3).

Location:

If amenable to chief and villages, a suitable site will need to be investigated.

By Who:

- Site criteria to be initially developed by RESCCUE technical adviser Waste Management with input from Nguna Pele Waste committee (being the only currently active waste committee). This activity will also assist DEPC who are noted in the Shefa WMP as being assigned to develop disposal site guidelines.
- Live and Learn to undertake implementation steps. Nguna Pele committee could provide comment on their experience with benefit of having one site.

When:

- By end of 2016

Measure of success:

- Number of villages/locations agreeing to one disposal/recycle location

5.6.2 North Efate Collection Service

Problem to be addressed by RESCCUE project:

- The longer term waste management objective for North Efate needs to be the development of a financially sustainable residual waste collection service to North Efate and its offshore islands with residual waste returned to Bouffa landfill for disposal. The economics of recycling and the nature of the waste stream are such that there will continue to be a residual waste component that would be best managed by disposal in a properly engineered landfill site. This is recognised in the Shefa WMP with a service level 3 of refuse collection assigned to Efate.

Activity for RESCCUE:

Already there is the nucleus of a waste service with residual waste from several of the larger resorts on North Efate (Havannah Bay Resort) being removed back to Port Vila. In time this should logically develop into a round the island collection run with several small local transfer stations. Implementing such a service is a significant project in itself and is beyond the capacity of RESCCUE. However there is feasibility stage work that RESCCUE can undertake:

- Establish scale and economics of existing service
- Develop model for collection logistics (e.g. local transfer stations)
- Define infrastructure costs
- Develop a funding model that is sustainable for ongoing operational costs
- Seek funding partners in private industry and provincial government

This work will be of assistance to Shefa province in implementing the level 3 service for Efate (refer Section 5.2 "Introduce Collection" of the Shefa WMP).

By Who:

- This is work that needs to be undertaken by the RESCCUE technical advisors with support from Live and Learn for local information on costs and existing activities. In depth economic analysis is required to justify the option recommended.

When:

- Establish existing activities Aug – Sept 2016
- Develop model for collection logistics October 2016
- Define infrastructure costs Oct-Nov 2016
- Develop funding model Jan-Feb 2017
- Consult with stakeholders 2nd Quarter 2017

Residual Waste Disposal:

- Note that RESCCUE does not support establishment of a new landfill specifically for the North Efate area. There is good road access back to Bouffa landfill and the distance is moderate. There would not be sufficient funds or expertise to support a financially sustainable and environmentally sound landfill operation on the North Efate coast

5.7 Hazardous Wastes

Problem to be addressed by RESCCUE Project:

Small quantities of hazardous waste materials will be present in the residual waste being disposed of at the North Efate village level disposal areas. While no specific assessment has as yet been made by RESCCUE, we expect the principal items to be batteries and waste oil. There may also be small amounts of horticultural sprays, however given the cost of these this is not anticipated to be large.

Activity for RESCCUE:

- Scope extent of hazardous waste present;
- Provide collection facility for batteries at village disposal area;
- Investigate logistics for returning collected batteries to Port Vila.

Positive outcomes from the activity:

- Reduction of constituents in the waste stream that may leach metals to the marine environment.

Implementation plan:

- Conduct survey of a typical village by interview with householders to determine types and quantities of potentially hazardous waste materials being dumped.
- Set up collection facility in conjunction with centralised waste collection sites (Section 4.5)

By Who:

- RESCCUE waste advisor to provide survey form
- Live and Learn Vanuatu to survey

When:

- Scope wastes present Nov-Dec 2016
- Establish collection sites for batteries – as centralised sites established (Activity WD1)

Measures of Success:

- Number of sites where hazardous waste included in waste facility
- Quantity of materials (eg batteries) returned for disposal in Port Vila

5.8 Management and Systems

5.8.1 Waste Committees at Village/Area level

Problem to be addressed by RESCCUE project:

- To ensure waste management issues are kept in focus among the many competing health and development priorities a structure is required. The Waste Committee on Nguna Pele is a good model to replicate but to our knowledge is the only one in the Project area. The Committee provides an effective vehicle for dissemination of information, implementation of projects at the village level and monitoring of outcomes.

Activity:

- Where not already in place a waste committee should be formed for each village/ group of villages/island as appropriate to local Kustom. Functions of the committee would be to:
 - Agree and promote use of the designated disposal and collection point
 - Arrange return of recyclable materials to Port Vila
 - Monitor progress in reducing littering and burning
 - Have authority to report to chief people who repeatedly flout agreed disposal points and litter
 - Liaise with adjoining committees to arrange for transport of materials

Location:

- At North Efate as appropriate, or divide into sub areas of North West, North, Emau and North East.

By Who:

- Live and Learn with Nguna Pele committee to provide mentoring to new waste committees.

When:

- This is a priority issue which should ideally precede many of the specific actions above. As such implementation through 2nd half of 2016 would be appropriate.

Measure of success:

- Percentage of RESCCUE area serviced by an active Waste Committee after 3 years

6 Next Steps

Table 1 below summarises the action plan and timelines. In general the second half of 2016 will be required to complete feasibility work, consultation and resource preparation for the project activities. The bulk of the implementation will take place through 2017-18. The timelines proposed are provisional at this stage. There are a number of solid waste activities programmed in this document with consequent demands upon the local RESCCUE service provider and the village communities. The solid waste activities need to be integrated with other terrestrial and marine aspects of RESCCUE.

Appendix 1 : Waste Management Action Plan Summary

Waste Reduction						
	Waste Issue	Activity	Programme	Outputs	Success measures	Comment
WR1	Littering of plastic bags and plastic packaging (wrappers).	Awareness programmes on waste reduction:	4 th Quarter 2016 – preparatory 2017 – Distribute and disseminate	<ul style="list-style-type: none"> Posters Action plays 	Reduced litter counts	
WR2	Disposable nappies	Build upon and extend cloth nappy project run by SHEFA tourism	4 th Quarter 2016 – preparatory 2017 – Distribute and disseminate	<ul style="list-style-type: none"> Workshops Training to Waste committees 	Uptake of cloth nappies	Cloth nappies as alternative to disposables. Disposable nappies addressed under waste reuse and disposal (item REC3)
WR3	Food packaging waste	Promotion and development of locally grown foods	Specific activities to be programmed when Agricultural Action Plan developed	To be developed with Agriculture Plan	Increased use of locally grown foods	Not a specific waste management activity but is a beneficial outcome to waste management from the Agriculture components of the terrestrial work stream
Waste Reuse and Recycling						
	Waste Issue	Activity	Programme	Outputs	Success measures	Comment
REC1	PET Plastic bottles as litter	Demonstration projects on use of plastic “bottle bricks”	Workshop on Nguna Pele 4 th Quarter 2016 Follow up training sessions other areas in 2017	Demonstration project using bottle bricks to build bins for waste recyclables, Tasivanua resource building or possibly chicken house floors	<ul style="list-style-type: none"> Reduction in plastic bottles as litter items Number of bottle brick structures 	Construction technique can also incorporate other waste materials such as fishing net and plastic bags
REC2	Organic materials from food preparation &	Education on composting	4 th Quarter 2016 – preparatory	Workshop in Tasivanua area, run by	<ul style="list-style-type: none"> Uptake of composting 	Work closely with Department of Agriculture and FSA

	consumption and gardening	techniques and use of compost materials in garden plots	2017 – Distribute and disseminate	Nguna Pele committee with assistance from L&LV	<ul style="list-style-type: none"> • Number of compost projects operating • Absence of organic matter at waste sites 	
REC3	Disposable nappies					Work in progress : Opus are researching viable village level techniques for the reuse of disposable nappies
REC4	Aluminium and steel can	Construct bins for collection of cans at village waste disposal area Develop logistics for return of cans to mainland from islands	Workshop on Nguna Pele 4 th Quarter 2016 Extend to Tasivanua area 2017	Tidy and user friendly site for can storage	<ul style="list-style-type: none"> • Cans separated at source • Cans removed for recycling • Reduction in cans in litter counts 	Consideration was given to providing simple manual can crushers to reduce bulk for transport, however following discussion with RecycleCorp this is not favoured as crushed cans are more difficult to process and bale for export
REC5	Corrugated iron	Collection at designated village waste management area, weighted to prevent movement in cyclones	Implemented as part of Centralised waste management (activity WD1)			Understanding of logistics and market for light gauge steel scrap is that collection for recycling not economic from outer islands
REC6	Glass	Collect glass at designated village waste site	As per activity WD1	Tidy and user friendly site for glass storage & disposal	Absence of glass items as beach and village litter	Glass probably not worth recycling (except “Tusker” bottles), collect for burial or possibly future crushing for building sand
	Residual Waste Disposal					
	Waste Issue	Activity	Programme	Outputs	Success measures	Comment



WD1	Centralise waste management activities for each village	Develop and agree site criteria Work at village level to agree on one site for waste management activities. Construct simple infrastructure (eg bottle brick walls)	Site criteria 4 th Quarter 2016 Implement in Tasivanua 1 st and 2 nd Quarter 2017	Agreed site criteria Signage	<ul style="list-style-type: none"> Number of villages/locations designating one waste management area. 	
WD2	North Efate Waste collection service	Undertake feasibility work into a possible service: <ul style="list-style-type: none"> Establish any existing activities Develop model for collection logistics Define infrastructure costs Develop a funding model and consult with stakeholders 	<p>Aug – Sept 2016</p> <p>October 2016</p> <p>October-November 2016</p> <p>1st Quarter 2017</p>	Proposal for a collection service that can be circulated to all stakeholders	Economically viable collection service model identified	Implementation of a waste collection service is beyond the capacity of RESCCUE, however RESCCUE can assist with the feasibility stage and so be the catalyst to setting up of a future service.
WD3	Hazardous wastes	Scope extent of hazardous wastes present	Scoping 4 th Quarter 2016 Implement in conjunction with centralised waste	Characterisation of hazardous wastes	Waste identified Collection points for batteries	Quantities of hazardous wastes in the north Efate waste stream are anticipated to be relatively low and principally limited to batteries, oil



		Provide drop off point and collection service for batteries	management facilities (village level) activity WD1			and automotive parts, but needs confirmation
	Management and Systems					
	Waste Issue	Activity	Programme	Outputs	Success measures	Comment
WS1	Provide community level structure for waste management issues to ensure it remains a focus of activity	Form waste committee for each village/group of villages/island as appropriate. Use Nguna Pele committee as model and mentors	Priority action for undertaking second half of 2016: Propose waste committee structure: 3 rd Quarter 2016 Establish committees: 4 th Quarter 2016 and 1 st Quarter 2017	<ul style="list-style-type: none"> • Model structure for committee • Programme for forming committees 	<ul style="list-style-type: none"> • Coverage of study area 	An active waste committee, as at Nguna Pele is a pre-requisite to most of the other waste management initiatives