

### 7.1.3 年次活動報告書（フィジー国）

#### a. 2014年度年次活動報告書

Annual Progress Report in 2014はプログレスレポート2に添付（添付資料3）

#### b. 2015年度年次活動報告書

### Annual Progress Report for FY 2015

Name: Department of Environment      Person in charge: Laisani Lewanavanua  
 Year: 2015  
 Project Output 1: National 3R strategy (National 3R policy, National SWM strategy (2011 - 2014)) has been widely implemented in Fiji.

#### Activity 1-1: Prepare the action plan for implementation of national 3R strategy

Activity 1-1-1	Work done	Achieved indicators																		
National Solid Waste Management Strategy (review)	<ol style="list-style-type: none"> <li>As per Government Process, the Government Tender Board has approved the engagement of Hydea S.p.A to review the Solid Waste Strategy, Liquid Waste Strategy and the Air-Pollution Control Strategy and develop and Integrated Waste Management Strategy.</li> <li>Draft Contract Submitted to the Office of the Solicitor General's Office for vetting and clearance.</li> <li>Due to prior commitment of Hydea, the consultancy will commence on 15<sup>th</sup> Feb, 2016. The consultancy is intended for 3 months.</li> </ol>	<p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Internal approval procedure requires much time.</li> <li>The Department does not have an existing Strategy to implement on waste management as all Waste strategies are outdated.</li> </ul> <p><b>Issues to be addressed</b></p> <p><b>Planned activities/targets for the next year FY2016</b></p> <table border="1"> <thead> <tr> <th>Work Plan</th> <th>Month</th> </tr> </thead> <tbody> <tr> <td>1. SGO approval on the Contract Agreement</td> <td>Dec 2015</td> </tr> <tr> <td>2. Signing and commencement of Consultancy (3 months)</td> <td>Feb - May 2016</td> </tr> <tr> <td>3. Submission of progress report</td> <td>Feb - May 2016</td> </tr> <tr> <td>4. Submission of Final Draft NWMS 2015 - 2020</td> <td>May 2016</td> </tr> <tr> <td>5. Submit to Minister &amp; NEC for approval</td> <td>June 2016</td> </tr> <tr> <td>6. Submit to Cabinet for approval</td> <td>July 2016</td> </tr> <tr> <td>7. NWMS Steering Committee Meeting</td> <td>Aug 2016</td> </tr> <tr> <td>8. Publish and Launch NWMS</td> <td>Sep 2016</td> </tr> </tbody> </table>	Work Plan	Month	1. SGO approval on the Contract Agreement	Dec 2015	2. Signing and commencement of Consultancy (3 months)	Feb - May 2016	3. Submission of progress report	Feb - May 2016	4. Submission of Final Draft NWMS 2015 - 2020	May 2016	5. Submit to Minister & NEC for approval	June 2016	6. Submit to Cabinet for approval	July 2016	7. NWMS Steering Committee Meeting	Aug 2016	8. Publish and Launch NWMS	Sep 2016
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Activity 1-1-2	Workdone	Achieved indicators										
National 3R Policy	<ol style="list-style-type: none"> <li>Final Draft 3R Policy submitted to the Management of the Ministry for approval.</li> </ol>	<p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Good practices and lessons learned given by the Project were reflected to 3R Policy during the consultation process.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Delay of approvals</li> </ul> <p><b>Planned activities/targets for the next year FY2016</b></p> <table border="1"> <thead> <tr> <th>Work Plan</th> <th>Month</th> </tr> </thead> <tbody> <tr> <td>Finalize 3R Policy doc</td> <td>Jan 2016</td> </tr> <tr> <td>Submit to SGO for legal approvals</td> <td>Jan 2016</td> </tr> <tr> <td>Submit to Minister &amp; NEC for approval</td> <td>Feb 2016</td> </tr> <tr> <td>Submit to Cabinet for endorsement</td> <td>March 2016</td> </tr> </tbody> </table>	Work Plan	Month	Finalize 3R Policy doc	Jan 2016	Submit to SGO for legal approvals	Jan 2016	Submit to Minister & NEC for approval	Feb 2016	Submit to Cabinet for endorsement	March 2016
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Activity1-1-3	Workdone	Achieved indicators																
<p>Home Composting Subsidy Program &amp; Clean School Program (CSP) Financial Assistance</p>	<p>1. Implementation of the Home Composting Subsidy Program and CSP: Launch and Training – Apr 2015</p> <ul style="list-style-type: none"> <li>Development and distribution of Compost Bins and Awareness Materials (including CSP guidebook) (Apr. – May)</li> <li>TV Advert and Newspaper placements for HC Promotion and Subsidy Program through co-finance between Ministry and J-PRISM (Aug. – Sep.)</li> <li>Draft MOA for the Use of the Revenue collected from the sale of the \$30 bins pending with SGs Office since August, 2015.</li> <li>Quarterly Meetings (July, Dec)</li> <li>Monitoring Site Inspection - Oct</li> </ul>	<p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Sharing of information, receiving of comments during quarterly meeting</li> <li>3R Programs (Home composting, CSP) can be promoted to national wide</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Lessons learnt in the 2015 pilot program will be improved in 2016: Home Compost Bin:                             <ul style="list-style-type: none"> <li>Rule for selling bins (one per household, target (ratepayer, rurals))</li> <li>Log book of sell of bins</li> <li>Monitoring of sold Bins</li> </ul> </li> </ul> <p><b>CSP:</b> late start, submission of Action Plan, Monitoring (More detailed information/progress, good practices, lessons learned ) will be presented)</p>																
<p><b>Planned activities/targets for the next year FY2016</b></p>																		
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Activity 1-2: Conduct training of 3R to be implemented		Achieved indicators
<b>Activity 1-2</b> Conduct training program in cooperation with DOE and Councils	<b>Workdone</b> <ul style="list-style-type: none"> <li>Home Compost Subsidy and CSP Training for the Health Inspectors of the 13 Municipal Councils-- Apr</li> </ul> [Participants]: Municipal Councils 13 Dept of Env 8 JPRISM 1 JICA 1	<b>Good practices</b> Nausori Town Council, Savusavu Town Council and Korovou RLA has started with Market Waste Compost based on lessons learnt and capacity building training conducted by SCC, JPRISM and DOE.
	<ul style="list-style-type: none"> <li>Market Waste Compost Training for workers/officers for councils in the Central and Northern Division including Korovou and Navua RLA was conducted at SCC on July.</li> </ul> [Participants] Workers/officers from Suva City Council 3 Officer from Department of Environment 2 Workers/officers from other councils in Central Division 3 Workers/officers from Savu2TC, Labasa, Korovou and Navua 4 J-PRISM expert 1	<b>Issues to be addressed</b> - Continue ongoing training on other programs such as Home Compost, CSP, eco-bag, etc.
		<b>Planned activities/targets for the next year FY2016</b> - Home Compost Training and Clean School Program for Councils and RLAs in Jan-Feb.

**Activity 1-3: Implementing action plans in selected councils through pilot projects**

(please refer to annual progress reports submitted by council counterparts)

**Activity 1-4: Monitor the progress of 3R implementation in Fiji**

Activity 1-4-1		Workdone	Achieved indicators												
Quarterly meeting	<ul style="list-style-type: none"> <li>As a result of discussion with council counterparts, the frequency of J-PRISM regular joint meeting was amended from on a monthly basis to on a quarterly basis in FY 2015.</li> <li>Department of Environment has organized two quarterly joint meeting J-PRISM counterpart councils: <table border="1" data-bbox="406 913 523 1458"> <thead> <tr> <th>No.</th> <th>Date</th> <th>Venue</th> </tr> </thead> <tbody> <tr> <td>13<sup>th</sup> meeting</td> <td>2<sup>nd</sup> - 3<sup>rd</sup> July 2015</td> <td>LCC</td> </tr> <tr> <td>14<sup>th</sup> meeting</td> <td>10<sup>th</sup> - 11<sup>th</sup> Dec 2015</td> <td>SCC</td> </tr> </tbody> </table> </li> <li>The above meetings targeted all 13 Municipal Councils as National 3R Framework (Home Composting Subsidy Program and CSP financial assistance) has been introduced to all councils.</li> </ul>	No.	Date	Venue	13 <sup>th</sup> meeting	2 <sup>nd</sup> - 3 <sup>rd</sup> July 2015	LCC	14 <sup>th</sup> meeting	10 <sup>th</sup> - 11 <sup>th</sup> Dec 2015	SCC	<p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Quarterly meetings provided good opportunities for DOE and councils to discuss about various issues, as well as providing advices for newly 3R Promotion councils.</li> <li>Various good practices and lessons learned were identified through the meeting</li> </ul> <p><b>Issues to be addressed</b></p> <p><b>Planned activities/targets for the next year FY2015</b></p> <ul style="list-style-type: none"> <li>The progress of 3R implementation will be continually monitored through the following activities <table border="1" data-bbox="694 212 770 786"> <tbody> <tr> <td>Quarterly Meetings</td> <td>May, Sep, 2016</td> </tr> <tr> <td>Monitoring site inspection by DoE</td> <td>March, June, Sep 2016</td> </tr> </tbody> </table> </li> </ul>	Quarterly Meetings	May, Sep, 2016	Monitoring site inspection by DoE	March, June, Sep 2016
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Activity 1-4-2		Work done	Achieved indicators
Monitoring template	<ul style="list-style-type: none"> <li>All councils were requested to fill in the template and submit it to DoE on a quarterly basis (Jul. 2015, Nov. 2015).</li> <li>DoE conducted the first monitoring inspection for all 13 councils in Oct, observing some examples of home compost bins and other 3R activities.</li> </ul>	<p><b>Good practices</b></p> <p>Monitoring template is very useful for:</p> <ul style="list-style-type: none"> <li>DoE to understand and easily monitor the status of council's activities.</li> <li>Easily collecting necessary information for DoE's quarterly report.</li> <li>Strengthening communication between DoE and councils. Monitoring site inspection is effective to observe the actual status implementation and exchange views with council counterparts.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>not all councils understand or know how to fill the monitoring template</li> <li>Late submission of reports by councils</li> <li>DoE can't cover all activities within the limited time (Monitoring inspection)</li> <li>DoE to improve on timely preparation of reports</li> </ul> <p><b>Planned activities/targets for the next year FY2016</b></p> <ul style="list-style-type: none"> <li>To request all councils submit a monitoring report on Apr, Oct 2016, which is one month before the Quarterly meeting.</li> <li>To conduct Monitoring based on the submission of Councils Monitoring Reports March, June, Sep 2016</li> <li>To involve DoE divisional offices in monitoring inspection works, that will enable them to follow up councils in their jurisdiction easily.</li> </ul>	




**DoE/J-PRISM Quarterly Progress Report**

Council Name: **BA TOWN COUNCIL**



Person in charge: **RONIKA MISHRA**

Implementation period: **JULY – OCTOBER 2015**

Activity	Workdone	Achieved indicators
<p><b>Home Composting</b></p> <p><small>(write works/activities done in the last three (3) months)</small></p> <ul style="list-style-type: none"> <li>10 Compost Bins given by DOE</li> <li>Sold all Bins</li> <li>Monitored 3 Compost Bins</li> <li>Log Book was not filled by the cashier therefore, hard to locate the address for monitoring (esp. outside boundary)</li> <li>Residents enquire for more Compost Bins</li> <li>Demand is high for Compost Bins</li> </ul>		<p><b>Target</b> (show target figures to be achieved. Use the number of schools you visited, number of compost bins sold and monitored based on the Action Plan)</p> <p><b>:Sold 10 Compost Bins</b></p> <ul style="list-style-type: none"> <li>5 Sold to Rate Payers</li> <li>5 sold outside Town Boundary</li> </ul> <p><b>Status of Achievements:</b>                      100 % Achieved</p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>High Demand for the Compost Bins</li> <li>Residents gained more information/ knowledge through Television Advertisement Promotion.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Log book and a form to be filled by the purchaser with required details for monitoring purposes.</li> </ul> <p><b>Planned activities/targets for the next Year</b>  <small>(include in the calendar frame target set for each activity)</small></p> <ul style="list-style-type: none"> <li>To continue with the promotion and selling of Compost Bins</li> <li>To carry out 2 rounds of monitoring per year</li> <li>Sell all 10 Bins</li> </ul>

Activity	Workdone	Achieved indicators
Clean School Program	<ul style="list-style-type: none"> <li>15 Schools submitted Action Plans</li> <li>3 Schools pulled out (left with 12 Schools)</li> <li>2<sup>nd</sup> Monitoring and Final Judging carried out</li> </ul>	<p><b>Target</b> (show target figures to be achieved, (with the number of schools you visited, number of compost bins sold and monitored based on the Action Plan)</p> <p><b>:12 Schools out of 15 were monitored and judged for CSP</b></p>
		<p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Schools have grasped the concept of CSP</li> <li>Most Schools have zero burning policies</li> <li>Some schools are integrating 3R into subjects and also are using waste generated at their school as Teaching and Learning materials.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Shortage of Resources (Staff)</li> <li>For 2016 – To start the program early and finish Final Judging by end of second term</li> </ul> <p><b>Planned activities/targets for the next three months</b>  <small>(include numeric timeline frame set targets of each activity)</small></p> <ul style="list-style-type: none"> <li>To conduct Awards function in November</li> </ul>
<b>Photos</b>		



Activity	Workdone	Achieved indicators
<p><b>Market Composting</b></p> <p><i>(include numerical indicators in the next three months)</i></p> <ul style="list-style-type: none"> <li>• Sustained market composting</li> <li>• Use of dry grass from council parks and grounds</li> <li>• Weighting of Vegetable waste and dry grass used for composting (Started from March)</li> <li>• Final products used in council Gardens</li> </ul>		<p><b>Target</b> <i>(show target figures to be achieved, like the number of schools you visited, number of compost bins sold and monitored based on the Action Plan)</i></p> <ul style="list-style-type: none"> <li>• 43.1 tones of Market waste was used for composting from March till September.</li> </ul> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>• Since small market, less vegetable waste generated therefore, market composting is manageable with few workers.</li> </ul> <p><b>Planned activities/targets for the next three months</b>  <i>(include numerical indicators in the next three months)</i></p> <ul style="list-style-type: none"> <li>• To sustain Market Composting</li> <li>• Labeling and sign boards for Compost Yard</li> </ul> 
<p><b>Recyclable Collection Centre</b></p> <p><i>(include numerical indicators in the next three months)</i></p> <ul style="list-style-type: none"> <li>• Conducted meeting with Schools and they are happy with the up-coming project as they usually have cartons, plastics, pet bottles and papers to dispose which costs them a lot of money.</li> <li>• Construction of Recyclable Collection Centre will start mid of October, 2015.</li> </ul>	<p><b>Target</b> <i>(show target figures to be achieved, like the number of schools you visited, number of compost bins sold and monitored based on the Action Plan)</i></p> <ul style="list-style-type: none"> <li>• Nearby schools and other schools taking part in CSP</li> <li>• Supermarkets</li> <li>• Printing &amp; other companies.</li> </ul> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>• Interest is shown by many schools and companies</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>• To see how effective is the program for Ba.</li> </ul> <p><b>Planned activities/targets for the next three months</b>  <i>(include numerical indicators in the next three months)</i></p> <ul style="list-style-type: none"> <li>• To complete the collection centre and start with the new project</li> </ul>	

Fiji/J-PRISM SWM/3R - Annual Plan of Operation		Councill Name: BA TOWN COUNCIL	
Name of Project Manager: Ronika Mishra		Name of 3R Project Officer: Ronika Mishra Naidu	
Implementation Term: January 2016 ~ December 2016 (1 year)		Planned date: 08/10/2015	
Outputs and Associated Activities		Indicators for Outputs	
Annual events	DOEs Monitoring Inspection Submission of Monitoring Reports to DOE Joint Quarterly Meeting	Total number of compost bins to be promoted in 2016 : 10 Resident : - 10 Businesses : - 0	
OUTPUT 1:	Home Composting	Total number of schools to be targeted in 2016 : 12	
1-1	DOEs awareness and advertisement activities 1. install a compost bin for demonstration near the office 2. prepare for awareness materials along with DOE poster/manual	Plan	Actual
1-2	Receive 10 Compost Bins from DOE	Plan	Actual
1-3	Sell all 10 Compost Bins (give an instruction at the site of a demonstration bin at the time of selling)	Plan	Actual
1-4	Monitoring of bins sold in 2015 and new bins sold in 2016	Plan	Actual
OUTPUT 2:	Clean School Program	Total number of schools to be targeted in 2016 : 12	
2-1	Select Nearby Schools	Plan	Actual
2-2	Present & Distribute CSP Action Plan Forms to the Schools	Plan	Actual
2-3	Collect Action Plan Forms	Plan	Actual
2-4	Monitor School Activities	Plan	Actual
2-5	Final Judging	Plan	Actual
2-6	Conduct Awards Function	Plan	Actual
OUTPUT 3:	Market Composting	Collect Vegetable Waste: 40 tonnes/year Use Dry Grass for composting: 10 tonnes/year	
3-1	Continue with market composting	Plan	Actual
3-2	Conduct meeting / Awareness at Market (Refresher)	Plan	Actual
3-3	Replacing of Composting Posters at the Market	Plan	Actual
3-4	Place a Sign Board near Compost Yard	Plan	Actual
3-5		Plan	Actual
OUTPUT 4:	Recyclable Collection Centre	Total number of schools to be targeted in 2016 : 12	
4-1	Construction of Recyclable Collection Centre Completion	Plan	Actual
4-2	Sign Boards Near Collection Centre	Plan	Actual
4-3	Monitoring	Plan	Actual
4-4	Collection of Recyclables on weekly basis by Recycling Company	Plan	Actual
4-5	Awareness / Promotion of Recycling Centre to Supermarkets and other Companies.	Plan	Actual






**DoE/J-PRISM Quarterly Progress Report**




**CouncilName:** Tavua Town Council

**Person in charge:** Mr. Alvin Prasheel Kumar

**Reporting Period :** Jul to Dec 9, 2015

**ProjectOutput:** (as per PO)

Activity	Workdone	Achieved indicators <small>(show numerical figures, like the number of schools you visited, number of compost bins sold/monitored, Amount of recycled/collected, etc.)</small>
Clean School Program	<ul style="list-style-type: none"> <li>• First monitoring in August: Visited 1 school</li> <li>• Second monitoring in October: Visited 3 schools</li> <li>• Kept records on the monitoring sheets</li> <li>• Could not conduct the final judging due to the difficulty of arrangement</li> </ul>	<p><b>Target:</b> At least 4 schools complete CSP</p> <p><b>No schools completed CSP in 2015: 4</b></p> <ul style="list-style-type: none"> <li>• 2 primary schools and 1 secondary school inside the town boundary</li> <li>• 1 primary school in rural (3 schools dropped out)</li> </ul> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>• One primary school in rural, Natawa Primary School, did very well, implementing waste separation and school composting, as well as beautification</li> </ul> <div style="display: flex; justify-content: space-around;">    </div> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>• In order to include schools in rural as targets of CSP, it is critical to cooperate with MoH and LRLA, sharing the monitoring tasks</li> </ul> <p><b>Planned activities/targets for the next year FY2016</b></p> <p><small>(include numerical timeframe and targets for each activity)</small></p> <ul style="list-style-type: none"> <li>• Start a preparation work in January</li> <li>• Conduct workshops at all the target schools</li> <li>• Conduct monitoring twice</li> </ul>

Activity	Workdone	Achieved indicators
Home Composting	<ul style="list-style-type: none"> <li>10 bins were sold to 3 rate payers (2 bins each)</li> <li>3 non rate payers (1 bin each)</li> <li>1 school</li> <li>Visit 2 houses inside the town boundary twice in August and September respectively</li> <li>Did not visit houses outside the town boundary</li> </ul>	<p>(show numerical figures, like the number of facilities visited, number of compost bins sold and non-binned, Amount of recyclable collected, etc)</p> <p>Target: At least 4 bins properly used</p> <p><b>2 compost bins were monitored: no regular turn-over of compost</b></p> <p>At houses which bought 2 bins each, one bin was used</p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Some of the houses continue to use the compost bins</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Without cooperation with MoH and LRLA, it almost impossible to conduct a monitoring of compost bins outside the town boundary</li> <li>Until DOE and MOH/LRLA agree to share the monitoring work, bins will be sold only to rate payers</li> </ul> <p><b>Planned activities/targets for the next year FY2015</b></p> <p>(include numerical and timeframe target for each activity)</p> <ul style="list-style-type: none"> <li>5 new bins for 3 households, 1 business and 1 school</li> <li>Prepare for materials to raise awareness and advertise the subsidy program at the office before the start of selling</li> <li>Install a bin next to Council's nursery for demonstration of home composting</li> </ul>
<b>Photos</b>	  	



Fiji/J-PRISM SWM3R - Annual Plan of Operation		COUNCIL Name: TAVUA TOWN COUNCIL											
Name of Project Manager: Temalesi Henifiro		Name of 3R Project Officer: Alvinesh Kumar											
Implementation Term: January 2016 ~ December 2016 (1 year)		Planned date: 03/12 / 2015											
Outputs and Associated Activities		January	February	March	April	May	June	July	August	September	October	November	December
Annual events	DoE's Monitoring Inspection Submission of Monitoring Reports to DoE Joint Quarterly Meeting												
OUTPUT 1:	Home Composting												
1-1	conduct awareness and advertisement activities 1. install a compost bin for demonstration near the office 2. prepare for awareness materials along with DOE poster/manual												
1-2	Receive 5 Compost Bins from DOE												
1-3	Sell and deliver Compost Bins												
1-4	Monitoring bins including sold previous year and giving instructions												
OUTPUT 2:	Clean School Program												
2-1	discuss with rural health inspector if they can cooperate with the council for school program												
2-2	Conduct workshop at each school												
2-3	Collect Action Plan Forms												
2-4	Monitor School Activities												
2-5	Final Judging												
2-6	Conduct Awards Function												
OUTPUT 3:													
3-1													
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OUTPUT 4:													
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4-2													
4-3													
4-4													
4-5													


**DoE/J-PRISM Quarterly Progress Report**

CouncilName: Rakiraki

Person in charge: Rakesh Chandra






Reporting Period :Jul to Dec 9, 2015

Project Output:(as perPO)

Activity	Workdone	Achieved indicators
Home Composting	<ul style="list-style-type: none"> <li>10 bins were sold                             <ul style="list-style-type: none"> <li>2 bins for 2 hotels each (4)</li> <li>4 bins for a farmer (4)</li> <li>1 bin for a rate payer (1)</li> <li>1 bin for a school (1)</li> </ul> </li> <li>Monitoring carried out of 2 compost bins at Tanoa Rakiraki</li> </ul>	<p><b>Target</b>(At least 4 bins are properly used).</p> <p>The number of bins properly used: 2 bins at Tanoa Rakiraki</p> <p>Status of Achievements:20%</p> <p><b>Good practices</b></p> <p>Tanoa Rakiraki manages 2 compost bins well and has a plan to arrange a garden to grow vegetables with compost</p>  <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Proper directive in regards to the sale of these bins to made</li> <li>Need to improve monitoring system through a more systematic way. MOH will be involved in this and a MOU will be drafted between.</li> </ul> <p><b>Planned activities/targets for the next year FY2016</b></p> <p><small>(include numerical and time frame target for each activity)</small></p> <ul style="list-style-type: none"> <li>10 new bins will be sold to individual house owners and within the boundary of RTC.</li> <li>RTC will assign an officer for quarterly Monitoring (requesting DOE to provide a training for the newly assigned officer)</li> <li>There will also be continued monitoring from RTC at random intervals</li> </ul>



Activity	Workdone <small>(with the work/activities done in the last three (3) months)</small>	Achieved indicators
<p><b>Data Collection Work</b></p>	<ul style="list-style-type: none"> <li>The draft of the organic waste recycling plan was made in July based on the data collected in 2011, along with the data newly collected in February and March, 2015</li> <li>The new survey on the waste generation amount at Rakiraki market was planned in August, but could not be implemented.</li> <li>The draft was finalized in November. This plan will provide basic tool of operation towards SWM Data organization and interpretation.</li> </ul>	<p><b>Target</b> <small>(show target figures to be achieved, like the number of schools you visited, number of compost bins installed, monitored based on the Action Plan)</small></p> <p>Basic strategy to promote organic waste recycling is made: Completed.</p> <p><b>Good practices</b></p> <p><b>Issues to be addressed</b></p> <p>The implementation of the plan depends on the start of the rubbish collection service by Rakiraki Town Council with our new dumper truck.</p> <p><b>Planned activities/targets for the next year FY2016</b>  <small>(include number of activities and time frame for target activity)</small></p> <p>One – Two months after the start of the rubbish collection, the preparation work start</p>

Activity	Workdone	Achieved indicators
<p><b>Clean School Program</b></p>	<p>(written works/activities done in the last three (3) months)</p> <ul style="list-style-type: none"> <li>6 schools continue CSP</li> <li>First Monitoring was done in September</li> <li>Second Monitoring was done in November together with the judging by a Rural Health Inspector and a volunteer of Peace Coerps</li> </ul> <p>Winner School: Rakiraki District School</p>    	<p><b>Target:</b> (show target figures to be achieved, like the number of schools you visited, number of compost bins sold and monitored based on the Action Plan)</p> <p>: 7 schools</p> <p>Status of Achievements: 6/7 schools completed</p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>RTC implemented CSP in cooperation with MOH and MOE,</li> <li>Lots of improvements have been seen with the schools as they become more interested into the program.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Recycling companies to be directed to Rakiraki</li> <li>More resources required in terms of posters and pamphlets</li> <li>MOU to be made between RTC and MOH Rakiraki (Ra Rural Local Authority)</li> </ul> <p><b>Planned activities/targets for the next year FY2016</b>  <small>(include number of land time frame and target of activity)</small></p> <ul style="list-style-type: none"> <li>The number of target school is 7                      4 urban                      3 periurban</li> <li>Continue to work together with MOH and MOE</li> <li>Awards ceremony for 2015 will be held in 2016 with Refresher awareness. This will also assist Head teachers in preparing their action plan.</li> </ul>
<p><b>Photos</b></p>    	<p>compost bin</p> <p>Reuse shed</p> <p>school segregation methods</p> <p>school beautification using reuse</p>	






Fiji/J-PRISM SWM/3R - Annual Plan of Operation		Council Name: Rakiraki											
Name of Project Manager: Rakesh Chandra		(Signature)										Name of 3R	
Implementation Term: January 2016 ~ December 2016 (1 year)		2016										Planned date:	
Outputs and Associated Activities		Indicators for Outputs											
Annual events		DoE's Monitoring inspection ☺ Submission of Monitoring Reports to DoE ☆ Joint Quarterly Meeting ☆											
Home Composting		Total number of compost bins to be promoted in 2016 : 10 (describe the number of bins to be distributed to each target) - Residents: 5 - Businesses: 5 - Schools: nil - Free distribution:											
1-1	assaing and train a new officer in charge	Planned											
		Actual											
1-2	distribute bins and provide an instruction on how to use	Plan											
		Actual											
1-3	conduct a regular monitoring quarterly	Plan											
		Actual											
1-4	review the result and modify the plan	Plan											
		Actual											
1-5		Plan											
		Actual											
Clean School Program		Total number of schools to be targeted in 2016 : 7 (describe the number of schools to be promoted) 1. Primary School: 7 - Urban (within city/town boundary): 4 - Peri-urban: 3 - Rural: nil 2. Secondary School: nil - Urban (within city/town boundary): nil - Peri-urban: nil - Rural: nil											
2-1	Attend/Conduct Teachers workshop/awards ceremony , refresher course on 3R and CSP	Plan											
		Actual											
2-2	Support schools to prepare for action plans 2016	Plan											
		Actual											
2-3	Monitor school activity on quarterly basis	Plan											
		Actual											
2-4	Conduct judging and ward ceremony	Plan											
		Actual											
2-5		Plan											
		Actual											


**DoE/J-PRISM Quarterly Progress Report**

CouncilName: Sigatoka Town Council Person in charge: Tulisi Ram

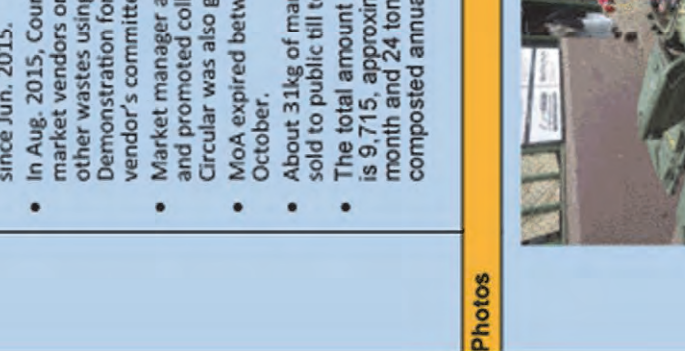
Implementation period (January---December, 2015)

Activity	Workdone <small>(write work/activity/achievement in the last three (3) months)</small>	Achieved indicators <small>Target (show target figures to be):</small>
<b>Home Composting</b>	<ul style="list-style-type: none"> <li>10 compost bins have been given by DOE to Sigatoka Town Council, in <b>May 2015</b>.</li> <li>All bins sold out by Nov. 2015.</li> <li>Sigatoka Town Council conducted 1<sup>st</sup> monitoring for 4 bins in Aug, and currently doing 2<sup>nd</sup> monitoring for 6 bins.</li> </ul>	<p><b>Target</b>: <b>10 bins</b></p> <p><b>Status of Achievements</b>                      : Sigatoka Town Council sold 10 bins</p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Regular monitoring of bins results in proper use of compost bins.</li> <li>Owners of bins start using compost in their gardens at their homes.</li> <li>Council conducted awareness workshop for market vendors, and promoted compost bins as well. Good opportunity for promotion. Big demand for compost bins!</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>More Awareness for citizens of Sigatoka Town about the importance of home composts mainly to market vendors for good yield of crops produce from their garden.</li> <li>Insufficient number of bins compared to high demand</li> <li>Rule of distribution was not clear. Due to the limited number, Council should not have sold more than one bin to the same owner.</li> <li>Some owners were not willing to accept monitoring done by the council. Application Form with Terms of Condition (ToC) for owners should be given prior to the purchase.</li> </ul> <p><b>Planned activities/targets for the next three months</b></p> <ul style="list-style-type: none"> <li>To sustain home compost promotion activities and monitoring</li> <li>20 home compost bins for 2016</li> <li>Conduct monitoring for all owners in 2016</li> </ul>
<b>Photos</b>	  	

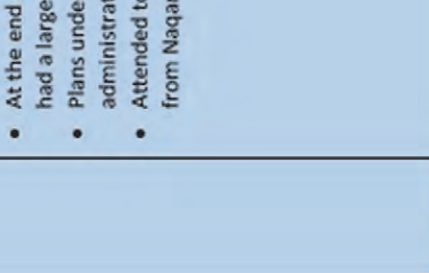



Activity	Workdone <small>(write up activities done in the last three (3) months)</small>	Achieved indicators
<p><b>Clean School Program</b></p>	<p>In the Plan, Sigatoka Town Council was supposed to implement CSP for 10 schools for FY2015. Sigatoka Town Council attended the launching ceremony in Apr. 2015, distributed CSP guidebook for all 10 schools in Apr. 2015 and requested schools for submission of Action Plans.</p> <p>However, Sigatoka Town Council was able to collect 3 action plans only by end of term 2, Aug. 2015 due to lack of human resources and following-up for schools.</p> <p>Since Aug. 2015, the attachment officer (Ms. Sala) of Sigatoka Town Council started following-up for schools, and Sigatoka Town Council received 6 action plans from the 8 participating schools as of Nov. 2015. 2 schools have pulled out from CSP this year due to tight school schedule.</p> <p>No monitoring done so far for Sigatoka Clean School Program, 2015.</p> <p>This year CSP was very late to start and difficult to complete all activities for schools and council. Therefore, those that have submitted action plans will be used for CSP next year.</p> <p>But, Sigatoka Town Council has come up with an idea for 3R Art Exposition instead of CSP 2015 in collaboration with MoE and DoE, whereby schools in the Nadroga/Navosa district are participating. The judging and awarding will be done in December, 2015.</p>	<p><b>Target</b> (show target figures to be achieved. Month number of schools you visited, number of composition sets and monitored based on the Action Plan)</p> <p><b>: 10 schools</b></p> <p><b>Status of Achievements: 0 schools</b></p> <p>However, schools in Nadroga/Navosa district participated in 3R Art Exposition.</p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Cooperative relationship between Ministry of Education and council</li> <li>Strong support of Senior Education Officer of Sigatoka Education Office</li> <li>3R Art Exposition in progress for Nadroga/Navosa schools</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Lack of human resources</li> <li>- Turnover of officers in charge.</li> </ul> <p><b>Planned activities/targets for the next year</b> <small>(include numerical and time frame target for each activity)</small></p> <ul style="list-style-type: none"> <li>Continue CSP 2016</li> <li>More awareness workshop with teachers.</li> </ul>
<p><b>Photos</b></p>		



Activity	Workdone	Achieved indicators
<p>Market wastes in collaborati on with OISCA</p>	<p>(with works activity with OISCA in the last three (3) months)</p> <ul style="list-style-type: none"> <li>3R Officer (Mr. Navatu) in charge at market manage to separate and transport market wastes to OISCA youth centre in Nasau twice a week. He started weighing of collected green waste before taking to OISCA since end of Oct. 2015.</li> <li>Since Jun. 2015, attachment officer of Sigatoka Town Council (Ms. Sala) started recording of implementation, like the number of bins taken to OISCA, collection time and transport used. 50 trips between market and OISCA made since Jun. 2015.</li> <li>In Aug. 2015, Council conducted awareness workshop with market vendors on separation of market green wastes from other wastes using 5 new bins installed at the market. Demonstration for separation was also done for market vendor's committee. Circular was also distributed.</li> <li>Market manager attended village meetings in Aug. 2015, and promoted collection of market waste for feeding pigs. Circular was also given.</li> <li>MoA expired between council and OISCA but renewed 26<sup>th</sup> October.</li> <li>About 31kg of market compost given by OISCA are being sold to public till to date and revenue of at least \$91.00</li> <li>The total amount of waste which was taken for 5 months is 9,715, approximately 2.0 ton of market is reduced per month and 24 ton of market waste is expected to be composted annually.</li> </ul>	<p>Target (shown target figures to be achieved, like the number of schools you visited, number of compost bins sold and monitored based on the Action Plan)</p> <p><b>:20% of market waste is reduced through composting and other 3R activities.</b></p> <p><b>Status of Achievements: 10.8% [average recycling rate from July – Nov, 2015]</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Strong initiative of Market Manager and 3R Officer at market.</li> <li>Close communication between Market staff and Health Department</li> <li>Understanding and cooperation of market vendors</li> <li>Data recording to access the effectiveness of the project</li> <li>Renewal of contract between OISCA and Sigatoka Council to ensure the sustainability of the project</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Transportation issue (human resources, fuel cost, road condition, limited number of driver, etc)</li> <li>More awareness to market vendors on separation of wastes into bins provided at the market</li> </ul> <p><b>Planned activities/targets for the next year</b></p> <ul style="list-style-type: none"> <li>Seek other options to increase the recycling rate (villagers for feeding their pigs, request OISCA for pick-up market waste by their truck, etc)</li> <li>More awareness to market vendors</li> <li>Displays of composts (final product) in the market for public to buy.</li> </ul>
<p>Photos</p>		



Activity	Workdone	Achieved indicators
Disposal Site Rehabilitation	<ul style="list-style-type: none"> <li>Regular landfill maintenance by using own machinery, digger, three times a week.</li> <li>Compact of wastes in landfill by the council backhoe</li> <li>Follow up with spraying with Diozaione to control flies and other insects.</li> <li>Separated space within landfill for green waste and other solid waste.</li> <li>At the end of April, 2015, the rehabilitated landfill had a large fire, counter measures taken.</li> <li>Plans underway to install a fire hydrant and administration block.</li> <li>Attended to fire which was encroaching landfill from Naqaral side in November, 2015.</li> </ul>	<p><b>Target:</b>                      :Number of fire/smoke and complaints from the citizens is decreased</p> <p><b>Status of Achievements:</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Regular inspection of the landfill</li> <li>Full time attendant</li> <li>Full time machinery allocated to landfill</li> <li>The council has taken a pro – active approach to maintain the landfill to required standards.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Landfill needs to be extended.</li> <li>Administration block (and fence for the surroundings) to be erected.</li> <li>Frequent breakdown of machinery.</li> <li>Fire by unknown person near landfill. Difficult to secure machinery during fire incidents as most private companies hesitate to release their machinery for landfill recovery works.</li> </ul> <p><b>Planned activities/targets for the next three months</b>                      (include numerical indicators where possible for each activity)</p> <ul style="list-style-type: none"> <li>Continue regular landfill maintenance works.</li> <li>Request government for expansion of landfill boundary</li> <li>Installation of fire hydrant and fence.</li> <li>Frequent spraying.</li> <li>Erection of proper admin office</li> <li>Training to landfill staff</li> <li>MOA to be made with private company to secure machinery for regular landfill maintenance and emergency response such as fire incident.</li> <li>Tight security to be placed</li> </ul>
<b>Photos</b>		

Activity	Workdone	Achieved indicators
<p><b>Hotel waste reduction</b></p>	<ul style="list-style-type: none"> <li>The pilot project for Hotel Waste Minimization was completed at Shangri – La’s Fijian Resort &amp; Spa in 2014. After this pilot project, the hotel expanded a segregation system to each guest room</li> <li>In the middle of August, 2015, the STC CEO, C/P and the JPRISM Expert (Ms Yurie Sakai) had a meeting with the new General Manager(GM), Mr Craig powell and his team managers, and discussed the future activity plans. The GM is highly conscious of the environment, so it is expected to build a partnership between Sigatoka Town Council and the Shangri – La’s Fijian Resort &amp; Spa Hotel for further environment programs.</li> <li>STC CEO attended monthly hotel chapter meeting in order to get co- operation from hotel counterpart.</li> </ul>	<p><b>Target</b></p> <p><b>3R is implemented in more than 3 hotels</b></p> <p><b>Status of Achievements</b></p> <p><b>1 hotel implement 3R activity</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Shangri- La has high motivation towards 3R activity.</li> <li>Other hotel interested with hotel waste chapter so therefore to participate in 2016.</li> <li>Constant communication between council and hotels.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Need understanding and co-operation from hotel managers</li> <li>Collaboration of waste recyclers with hotels for collection of recycling wastes.</li> </ul> <p><b>Planned activities/targets for the next three months</b></p> <p><small>(include numerical and time frame in target to be achieved)</small></p> <ul style="list-style-type: none"> <li>meeting with recycling company.</li> <li>participating monthly meeting and negotiate with hotel managers.</li> <li>introduce 3R activities to hotel which are willing to start.</li> </ul>
<p><b>Photos</b></p>		



Fiji/J-PRISM SWM3R - Annual Plan of Operation		Council Name: Sigatoka Town Council	
Implementation Term: January 2016 ~ December 2016 (1 year)		Name of Project Manager: Tuisi ram[Chief executive Officer]	
Outputs and Associated Activities		Indicators for Outputs	
Annual events	DoE's Monitoring/Inspection Submission of Monitoring Reports to DoE Joint Quarterly Meeting	January	February
OUTPUT 1:	Home Composting	March	April
1-1	Develop home composting implementation plan		
1-2	Conduct awareness of Home Composting		
1-3	Monitoring compost		
1-4	Review and improve the system		
1-5			
OUTPUT 2:	Clean School Program	May	June
2-1	Develop a implementation plan		
2-2	Conduct a teacher's workshop		
2-3	Monitor school activities		
2-4	Judging and Awarding ceremony		
OUTPUT 3:	Market Green Waste in Collaboration with OISCA	July	August
3-1	Implement a market waste composting		
3-2	Review and improve the system		
3-3	partnership with government department in order to reduced wastes		
3-4	Awareness program for market vendors and villages		
OUTPUT 4:	Coral Coast Hotel Chapter	September	October
4-1	Participate monthly hotel meeting		
4-2	Arrangement between recyclable companies and hotel		
4-3	Informing hotels not to mix rubbish that can be recycle with non-recyclable items		
4-4	monitoring of 3R activities in hotels and staff and conduct awareness		
OUTPUT 5:	Dumpsite Operation and Maintenance	November	December
5-1	Make record system of number of fire smoke spraying, complains, scavengers, monitoring fortnightly work progress		
5-2	Training of landfill staff		
5-3	Regular landfill Monitor and maintenance work		
5-4	Improvement of facilities like proper gate, fencing, fire hydrant, administration office and expansion of landfill site		
5-5	Night security to be placed		
	Total number of compost bins to be promoted in 2016 : (describe the number of bins to be distributed to each target) - Residents: - Businesses: - Schools: - Free distribution: Sale of home compost bins to 20 ratepayers/rural residents as well.		
	Total number of schools to be targeted in 2016 : (describe the number of schools to be promoted) 1. Primary School: - Urban (within city/town boundary): - Peri-urban: - Rural: 2. Secondary School: - Urban (within city/town boundary): - Peri-urban: - Rural: 3R activities are being implemented by 10 schools		
	20% of market waste reduced through composting and other 3R activities		
	3R is implemented in more than 3 hotels		
	decrease number of fire smoke and complain from citizens		

DoE/J-PRISM Quarterly Progress Report


Council Name: SUVA CITY COUNCIL Person in charge: SAHI ROBERT

Implementation period (01/07/2015 --- 31/10/15):


Activity 1	Workdone	Achieved indicators																
Home Composting	(with records/activities done in the last three (3) months) <b>SALE OF COMPOST BIN</b>	<p><b>Target</b> (shown/target figures to be achieved, (with the number of schools you visited, number of compost bins sold and monitored based on the Action Plan)</p> <p>: 80 HCB to be sold in 2015.</p> <p>: 20 HCB to be promoted to Primary Schools</p> <p><b>Status of Achievements:</b></p> <p><b>Good practices</b></p> <p>Target sale of HCB for 2015 is achieved. Monitoring of bins indicated that waste is reduced at source and manure produced is used in gardens -from comments received during interviews.</p> <p><b>Issues to be addressed</b></p> <p>Advice on how to install and layering of waste in HCB is still carried out to users. Target for monitoring was not archived (36%) of bins monitored.</p> <p><b>Planned activities/targets for the next three months</b></p> <p>(include number and time frame for each target of each activity)</p> <p>To continue monitoring of HCB and promote sale to residents.</p>																
	<table border="1"> <thead> <tr> <th>Month (2015)</th> <th>DOE Bins</th> <th>UNDP Bins</th> <th>Promoted Bin</th> </tr> </thead> <tbody> <tr> <td>Jan - June</td> <td>30</td> <td>41</td> <td>1</td> </tr> <tr> <td>July - Oct</td> <td></td> <td>92</td> <td>28</td> </tr> <tr> <td><b>Total</b></td> <td><b>30</b></td> <td><b>133</b></td> <td><b>29</b></td> </tr> </tbody> </table> <p>All 30 HCB for DOE has been sold and monitoring in progress. Total Bins sold and promoted (Jan - Oct 2015)- <b>192</b></p>		Month (2015)	DOE Bins	UNDP Bins	Promoted Bin	Jan - June	30	41	1	July - Oct		92	28	<b>Total</b>	<b>30</b>	<b>133</b>	<b>29</b>
	Month (2015)		DOE Bins	UNDP Bins	Promoted Bin													
	Jan - June		30	41	1													
July - Oct		92	28															
<b>Total</b>	<b>30</b>	<b>133</b>	<b>29</b>															
<p><b>MONITORING OF COMPOST BIN</b></p> <table border="1"> <thead> <tr> <th>MONTH (2015)</th> <th>NO MONITORED</th> <th>TARGET</th> </tr> </thead> <tbody> <tr> <td>JAN-JUNE</td> <td>62</td> <td>120</td> </tr> <tr> <td>JULY - Oct</td> <td>25</td> <td>120</td> </tr> </tbody> </table> <p>Monitoring of DOE sponsored bins and UNDP sponsored bin continues.</p> <p>Advertisement in the Fiji Sun for 2 days 10/7/15 - ¼ page costing \$390.00 11/7/15 - ¼ page costing \$459.00</p>	MONTH (2015)	NO MONITORED	TARGET	JAN-JUNE	62	120	JULY - Oct	25	120									
MONTH (2015)	NO MONITORED	TARGET																
JAN-JUNE	62	120																
JULY - Oct	25	120																

**Photos**


























Activity 2	Workdone	Achieved indicators
<p><b>Clean School Program</b></p>	<p>(Number of works/activities done in the last three (3) months)</p> <p>CSP presentation has been carried out to all 27 Primary Schools.</p> <p>Distribution of promotional HCB has been given to all 27 Primary Schools.</p> <p>Distribution of Waste paper bags from SPWR have been given to all 27 primary schools. All 27 have been monitored/judge for awards. Awarding of schools has been carried out with the following winners:</p> <p><b>Division 1: Environment Awareness Raising</b></p> <ul style="list-style-type: none"> <li>• Winner - Nehru Primary School</li> <li>• 1<sup>st</sup> Runner Up – Dudley Intermediate School</li> <li>• 2<sup>nd</sup> Runner up – Deenbandhoo Primary School</li> </ul> <p><b>Division 2: Team Effort by Teachers</b></p> <ul style="list-style-type: none"> <li>• Winner – Nehru Primary School</li> <li>• 1<sup>st</sup> Runner up – Yat Sen Primary School</li> <li>• 2<sup>nd</sup> Runner up – Arya Samaj Primary School</li> </ul> <p><b>Division 3: Waste Minimization Initiatives</b></p> <ul style="list-style-type: none"> <li>• Winner – Nehru Primary School</li> <li>• 1<sup>st</sup> runner up – Dudley Intermediate School</li> <li>• 2<sup>nd</sup> runner up – Gospel Primary School</li> </ul> <p><b>Overall Winner</b></p> <ul style="list-style-type: none"> <li>• Winner – Nehru Primary School</li> <li>• 1<sup>st</sup> Runner up – Deenbandhoo Primary School</li> <li>• 2<sup>nd</sup> Runner up – Arya Samaj Primary School.</li> </ul>	<p><b>Target</b> (showing past figures to be achieved, (with the number of schools you visited, number of compost bins installed based on the Action Plan)</p> <p><b>: To carry out CSP to 27 Primary Schools in Suva City Area.</b></p> <p><b>Status of Achievements: All 27 Primary Schools have been visited and CSP carried out.</b></p> <p><b>Good practices</b></p> <p>Some schools have shown interest in the CSP and have implemented the programs to Reduce, Reuse or Recycle their waste.</p> <p>Some schools have completely stopped burning waste in incinerators.</p> <p><b>Issues to be addressed</b></p> <p>Some schools have taken more time to start CSP in their schools which may indicate that they are not very keen in implementing the program or there are a lot of programs already undertaken by the school. The input of the MOE is very vital in promoting CSP in Schools.</p> <p><b>Planned activities/targets for the next three months</b></p> <p>(include some calendar frame for target of each activity)</p> <p>To plan CSP for 2016 to start the program in February 2016.</p>
<p><b>Photos</b></p>		




Activity 3	Workdone	Achieved indicators
<p><b>Data and Information Collection for SWM Master Plan</b></p> <p>(writeups/activities done in the last three (3) months)</p> <p>Data for household waste is now being inputted by Garbage and Refuse Clerks and forwarded to main office for analysis.</p> <p>Data for other waste, squatter, market, car parks collected through private contractors are forwarded to the main office on a monthly basis for analysis.</p> <p>Data for waste removed by SCC workers from market is recorded by compost technicians and forwarded to the main office on a daily/ weekly basis.</p> <p>All data received are analyzed and reported to council meetings on a monthly basis or are reported to Senior Managers for informational purposes.</p> <p>Following data are now inputted on monthly basis:</p> <p><b>Garbage Truck data</b></p> <ul style="list-style-type: none"> <li>• Fuel amount and mileage by vehicle</li> <li>• Collected amount by area</li> <li>• Average collection time by area</li> <li>• Collection amount by area by period</li> <li>• Collection amount by vehicle</li> <li>• Fuel amount by vehicle.</li> </ul> <p><b>Skip Bin data</b></p> <ul style="list-style-type: none"> <li>• Suva Market skip bin weight to landfill &amp; to compost site.</li> <li>• Squatter skip bin weight to landfill</li> <li>• minimarkets and car parks skip bin waste to landfill</li> </ul>	<p><b>Target: To complete base line data for SWM Master Plan.</b></p> <p><b>: At least 2 officers can utilize the database of municipal waste and market waste collection data and analyze the data Status of Achievements: Data collected is analyzed and shared</b></p> <p><b>Good practices</b></p> <p>Waste data is now being collected and analysed which the senior managers can use for allocation of budget and also forecast waste generation amount.</p> <p><b>Issues to be addressed</b></p> <p>To await the new Senior Volunteer to start preparation of Solid Waste Management Master Plan.</p> <p>To try and obtain data from other waste generation outlet i.e. Hospital waste, Hotels waste etc.</p> <p><b>Planned activities/targets for the next three months (including numerical timeframe targets of each activity)</b></p> <p>To continue inputting, analyzing and recording data to be used in Master Plan.</p>	<p><b>Photos</b></p> 



Activity 4	Workdone	Achieved indicators												
<p><b>Market Waste Separation &amp; composting Project</b></p> <p><small>(with works/activities done in the last three (3) months)</small></p> <ul style="list-style-type: none"> <li>Change the collection truck from CK534 to HP 006 from June 2015.</li> <li>Increase the collection frequency of market waste by running the truck twice to the market.</li> <li>Increase the number of bins per day averaging 18 – 22 bins per day from 10 – 15 bins.</li> <li>Increase no. of farmers to 6 and design collection timetable.</li> <li>Calculate the reduction rate on a monthly basis.</li> <li>Designed a work plan for the compost technician and his assistance.</li> <li>Increase the no. of workers for the compost site from 3 to 4.</li> <li>Increase the production of compost but still have not met customer satisfaction.</li> <li>Obtain new wood shredder with a larger shredding capacity compared to the previous shredder.</li> </ul>	        	<p><b>Target: To reduce 15% of Suva Municipal Market Waste to the landfill</b></p> <p><b>Status of Achievements: Varies per month from 9% to 15%. But the last 3 months have shown a reduction rate of 13% - 15%</b></p> <p><b>Good practices</b></p> <p>Vendors continue to place organic waste in the bins</p> <p>Huge demand from farmers for market waste as pig feed which allow us to increase waste collection from the market.</p> <table border="1" data-bbox="383 851 654 1030"> <thead> <tr> <th>Month (2015)</th> <th>Total waste amount</th> <th>Total Mkt waste</th> <th>Animal feed</th> <th>Compost (Mkt)</th> <th>P&amp;G waste</th> </tr> </thead> <tbody> <tr> <td>Jul - Oct</td> <td>116364.6</td> <td>113201</td> <td>103027.8</td> <td>10173.19</td> <td>2933.4</td> </tr> </tbody> </table> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>To start Saturday collection.</li> <li>To plan afternoon collection of waste.</li> <li>Vegetable season affecting the supply of quality waste as feed.</li> </ul> <p><b>Planned activities/targets for the next three months</b></p> <p><small>(include numerical and time frame in target activity)</small></p> <p>To continue collection from Monday to Friday but to increase the number of bins for collecting waste to maintain 15%- 20% reduction rate.</p>	Month (2015)	Total waste amount	Total Mkt waste	Animal feed	Compost (Mkt)	P&G waste	Jul - Oct	116364.6	113201	103027.8	10173.19	2933.4
Month (2015)	Total waste amount	Total Mkt waste	Animal feed	Compost (Mkt)	P&G waste									
Jul - Oct	116364.6	113201	103027.8	10173.19	2933.4									
<b>Photos</b>		      												

Activity 5	Workdone	Achieved indicators								
<p><b>CENTRAL COLLECTION POINT &amp; BAGASAU GREEN VILLAGE PROJECT.</b></p>	<p>(with the activities in the last three (3) months)                      Set collection day for recyclables every second Monday.                      Organize collection of recyclables from Compost site every Monday by Pacific Waste Recyclers.                      Sign post have been erected in all Total Service Station indicating collection of recyclables.</p>  	<p><b>Target: Promote waste separation to the public by placing recyclable bins in public places</b></p> <p><b>Status of Achievements: Bins are placed in Total Service Stations, Parks and Apartments.</b></p> <p><b>Good practices</b>                      Recyclables are now being collected and given to Recycling Company.                      Total weight from Jan – Oct 2015.</p> <table border="1" data-bbox="496 315 596 1037"> <thead> <tr> <th>Month</th> <th>Papers</th> <th>Cans</th> <th>Pet bottles</th> </tr> </thead> <tbody> <tr> <td>Jan – Oct 2015</td> <td>3,499.72</td> <td>32.8</td> <td>368.5</td> </tr> </tbody> </table>	Month	Papers	Cans	Pet bottles	Jan – Oct 2015	3,499.72	32.8	368.5
Month	Papers	Cans	Pet bottles							
Jan – Oct 2015	3,499.72	32.8	368.5							
		<p><b>Issues to be addressed</b>                      People are not putting the right waste into the right bin. There are a lot of mix refuse noted in the bins. More awareness is required.                      Separation bins are now damaged and need replacing.</p>								
		<p><b>Planned activities/targets for the next three months</b>                      (include numeric and time frame to get specific activity)                      To continue collecting recyclables and create more awareness to people.</p>								
<p><b>Photos</b></p>	    									



<p><b>Activity 6</b></p>	<p><b>Workdone</b>  <i>(write works/activities done in the last three (3) months)</i>                  Further trainings/workshop carried out to Correction Staff and inmates in collaboration with DOE with awards of certificate after training.                  Monitoring of compost bin issued to Correction facility.</p>	<p><b>Achieved indicators</b>  <b>Target:</b> To implement composting of organic waste at Suva Correction Services to reduce the amount of waste thrown in Correction Services skip bins.  <b>Status of Achievements:</b> 10 HCB are placed at Suva Correction Centre.  <b>Good practices</b>                  Inmates are trained in waste separation and composting which can be beneficial to them once released.                  Manure produced is now used on their farms.  <b>Issues to be addressed</b>                  Correction officers trained to monitor use of compost bins at various Correction Centers.  <b>Planned activities/targets for the next three months</b>  <i>(include numerical and time frame to target of each activity)</i>                  To continue monitoring the use of compost bins at Correction Centers.                  To delegate monitoring of Home Compost bins to relative Councils or Local Government for Correction facilities located within their boundaries.</p>
<p><b>Photos</b></p>		

<p><b>Activity 7</b> Eco Bags</p>	<p><b>Workdone</b>  <i>(write works/activities done in the last three (3) months)</i></p> <p>Eco bag training with Senior JICA Volunteer Yoshiko started with 2 sessions. Morning session is for the new students and afternoon session is for the previous students doing stage 2. Training for Inmates also continues at Korovou Correction Center.</p> <p>Eco bag labels are now being sold from the office at \$0.55 which will be used monitor the sale of eco bags.</p> <p>Awarding of certificates to ladies have been carried out in the following categories:</p> <ul style="list-style-type: none"> <li>• Phase 1: Basic techniques in eco bag design/stitching and ironing.</li> <li>• Phase 2: Advance stage in Eco Bag design.</li> <li>• Training Trainers in Eco bag Design.</li> </ul> <p>There were 3 women nominated to be trainers who were noted to be outstanding during training who can train other women groups in eco bag design. Sewing machine and iron obtained from JICA will be used by these women during training.</p>	<p><b>Achieved indicators</b></p> <p><b>Target:</b> Train women to produce good quality designed eco bags from waste material for sale.</p> <p><b>Status of Achievements:</b> Ladies are trained and producing well designed eco bags.</p> <p><b>Good practices</b></p> <p>Women attend training have commended that they learn a lot of new things in patchwork.</p> <p>Eco bag design improved after the training.</p> <p>Women trained are now conducting training on eco bag design to other women groups.</p> <p><b>Issues to be addressed</b></p> <p>To work with garment factories to supply waste material.</p> <p>To work with Ministry of Women to promote eco bag and eco bag training.</p> <p><b>Planned activities/targets for the next three months</b>  <i>(include numerical and time frame target so feasibility)</i></p> <p>To continue working with ladies in eco bag making and promote training of other lady groups using the trained trainers in partnership with the Ministry of Women.</p>
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**Photos**









Fiji-J-PRISM SWM/3R - Annual Plan of Operation		Council Name:		Name of 3R Project Officer											
Implementation Term: January 2016 – December 2016 (1 year)		Name of Project Manager: NARESH NARAYAN		ROBERT RANDOLPH											
Outputs and Associated Activities		Indicators for Outputs		January	February	March	April	May	June	July	August	September	October	November	December
Annual events	DOE's Monitoring Inspection Submission of Monitoring Reports to DOE Joint Quarterly Meeting														
<b>OUTPUT 1:</b>	<b>Home Composting</b>														
1-1	To promote and sell 80 Home Compost Bins to residents by December 2016	Total number of compost bins to be promoted in 2016 : (describe the number of bins to be distributed to each target) - Residents: 80 (UNDP Sponsored)		10 HCB	10 HCB	10 HCB	10 HCB	10 HCB	10 HCB	10 HCB	10 HCB	10 HCB	10 HCB	10 HCB	10 HCB
1-2	To monitor a total of 300 HCB for residents and 10 HCB within Correction Facilities in 2016.	- Business: - Schools Free distribution: 27 Primary, 19 Secondary Schools and 4 Special Schools		20 HCB	20 HCB	20 HCB	20 HCB	20 HCB	20 HCB	20 HCB	20 HCB	20 HCB	20 HCB	20 HCB	20 HCB
1-3	To distribute second round of 27 HCB to all 27 Primary Schools based on the success use of current HCB .			27 bins											
1-4	To promote 19 HCB to 19 Secondary Schools and 4 HCB to 4 Special Schools for CSP			10 HCB	9 HCB	4 HCB									
1-5															
<b>OUTPUT 2:</b>	<b>Clean School Program</b>	Total number of schools to be targeted in 2016 : (describe the number of schools to be promoted) 1. Primary School: 27 - Urban (within city/town boundary): - Peri-urban: - Rural: 2. Secondary School: - Urban (within city/town boundary): 19 - School for the handicap: 4													
2-1	To continue monitoring CSP in Primary Schools to strengthen the commitment of schools towards implementing the components of CSP.														
2-2	To implement and monitor CSP in all 19 Secondary Schools and 4 Special schools in Suva.														
2-3	To work with Recycling Companies to promote collecting recyclables from schools.														
2-4	Awards for Primary and Secondary Schools														
2-5	Plan for 2017 CSP program														
<b>OUTPUT 3:</b>	<b>Data and Information Collection for SWM Master Plan</b>														
3-1	To continue collection and inputting of data and information														
3-2	To analyze collected data and forward data & information to management														
3-3	To work with contractors, and other stakeholders to collect waste data.														
3-4	Start consultation and preparation of SWM Master Plan														
<b>OUTPUT 4:</b>	<b>Market Compost and Green Feed Project</b>														
4-1	To assess the frequency and amount of waste collected from the market in 2015 and plan improvement to meet demand from farmers and achieve target of 15% - 20% reduction rate														
4-2	Continue to input, calculate, record and report data and information on market waste reduction rate to management.														
4-3	To increase the compost production rate by 20% for 2016. (2015 - 5000kg produced) target production for 2016 is 6000kg. (500 kg per month)			500 kg	500 kg	500 kg	500 kg	500 kg	500 kg	500 kg	500 kg	500 kg	500 kg	500 kg	500 kg
4-4	Work with relevant stakeholders to promote use of market waste as a resource.														
4-5	Promote achievements and challenges of market waste project to counterparts through trainings or quarterly meetings.														
<b>OUTPUT 5:</b>	<b>Central Collection Points</b>														
5-1	Strengthen awareness through media on proper use of separation bins.														
5-2	Continue collection of recyclables and review current logistics and plan improvements to sustain project.														
5-3	Continue inputting, analyzing and reporting data and information on recyclables collected to management.														
5-4	Work with Recycling Companies in collecting recyclables from compost site.														

**DoE/J-PRISM Quarterly Progress Report**

Council Name: Nadi Town Council

Person in charge: Nafiza Ali Hakim




Implementation period (August - Dec):

Activity	Work done	Achieved indicators
Home Composting	<ul style="list-style-type: none"> <li>Home Composting and the Subsidy Program of both Council and DOE are successfully sustained.</li> <li>NTC has sold 280 bins from the beginning of project.</li> <li>Sold 30 compost bins from Department of Environment under the Subsidy Program with the awareness materials.</li> <li>Council has purchased 50 more compost bins in November.</li> <li>Monitored 72 compost bins for 2015. (school and residential)</li> <li>Advice given for improvements.</li> </ul>	<p><b>Target :</b></p> <p><b>Status of Achievements: As per PO 330 bins to be sold by end of the project- Achieved 85%</b></p> <ul style="list-style-type: none"> <li>Sold 280 compost bins</li> <li>30 DOE bins ( April-November)</li> <li>5 bins under council subsidy (November)</li> <li>Monitored 72 compost bins for 2015.</li> <li>Advice given for improvements.</li> </ul> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Most households are practicing home composting in a satisfactory manner.</li> <li>Assist the community to manage their waste properly; reduce/ stop burning of organic waste.</li> <li>Most households have produced good compost manure and have utilized it in their gardens.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Continuous and regular monitoring of the compost bins is needed. Lack of monitoring due to lack of staffs.</li> <li>Absence of residence as nobody is at home (shift workers) so unable to monitor the bins.</li> </ul> <p><b>Planned activities/targets for next year</b>  <small>(include numerical and timeframe targets of each activity)</small></p> <ul style="list-style-type: none"> <li>To sustain home compost subsidiary program and promotion activities.</li> <li>Continue with the regular monitoring of the compost bins.</li> </ul>
	   	



Activity	Work done	Achieved indicators
<p><b>Clean School Program</b></p>	<ul style="list-style-type: none"> <li>CSP was successfully implemented as per the schedule for 2015.</li> <li>Received 27 Action Plans from the schools.</li> <li>Conducted 1st monitoring of the schools from 15th June to 22nd June.</li> <li>Conducted the 2<sup>nd</sup> monitoring of the schools from 6<sup>th</sup> to 14<sup>th</sup> August.</li> <li>Advice given to schools for improvements.</li> <li>Final judging of the schools was conducted from 14<sup>th</sup> to 16<sup>th</sup> October with assistance from Department of Environment, Mamanuca Environment Society, OISCA and Lami Town Council.</li> <li>The Awards Ceremony of CSP 2015 was organized on the 13/11/15 in the Council Chambers with Special Administrator being our chief guest</li> <li>Winning schools (11) were awarded with prizes and certificates while the participating schools only received certificates.</li> <li>Continued receiving visitors from other towns/cities and Pacific Island countries to observe the 3R activities implemented in schools.</li> <li>Continued conducting training and Professional Development Sessions for the teachers and awareness rising for the students and parents.</li> <li>Continued with the dissemination of the CSP to other towns/cities and villages as well.</li> </ul>	<p><b>Target :</b> 20 schools participate in CSP.</p> <p><b>Status of Achievements: 20 schools to participate by 2016 as per PO-Achieved 135%</b></p> <ul style="list-style-type: none"> <li>CSP was successfully implemented as per the schedule for 2015</li> <li>27 schools participated this year from Nadi District.</li> <li>All the schools were monitored for 1<sup>st</sup> and 2<sup>nd</sup> monitoring and advice given for improvements followed by the final judging of the schools by representatives from NGOs, DOE and other town council.</li> <li>Approximately 64 people attended the Awards Ceremony with DOE and MOE, NGOs, other town /city councils also being part of the ceremony.</li> </ul> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Improvement in the waste management system in schools implementing CSP activities.</li> <li>Schools have successfully sustained their activities.</li> <li>The message is disseminated to the community level from schools.</li> <li>Strong support and commitment from top management (Special Administrator) and counterpart in charge.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Strengthening Council's staff capacity to conduct regular monitoring of the schools and for the smooth implementation of the CSP.</li> </ul> <p><b>Planned activities/targets for next Year</b>  <i>(Include numerical and timeframe targets of each activity)</i></p> <ul style="list-style-type: none"> <li>Prepare Schedule for CSP 2016 and implement as per the schedule.</li> <li>Increase the number of schools participating for 2016.</li> </ul>
<p><b>Photos</b></p>	 	 



Activity	Workdone	Achieved Indicators
<p>Separate Collection of Recyclables</p>	<ul style="list-style-type: none"> <li>Continued with the separate collection of Recyclables as scheduled in the calendars in the respective areas.</li> <li>Announcement before collection and during collection continues.</li> <li>Monitoring is also carried out during every collection for mixing of the recyclables with other waste and advice given accordingly.</li> <li>NTC collected 9710 kg (March-November) of recyclables FY 2015 excluding PET bottles, glass bottles and hard plastics.</li> </ul>   	<p><b>Status of Achievements:</b> As per PO Amount of Recyclables collected annually 15000kg- Achieved</p> <p><b>Output 2</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Residents are accustomed to the collection days and are seen discharging in a proper and timely manner.</li> <li>Some residents keep proper bins for discharging of recyclables.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>The participation rate is low and not all residents are discharging their recyclables. Emphasis to be placed on increasing the participation rate and strengthening the awareness raising programs to the residents.</li> <li>Still there is some mixing of the recyclables with the non-recyclables and other waste. Needs continuous monitoring and awareness.</li> <li>Turnover of staff being in charge of collection and monitoring works.</li> <li>Need to train new staff.</li> <li>Plan on expansion of Town boundary will affect ongoing system.</li> </ul> <p><b>Planned activities/targets for next Year</b> <i>(include numerical and timeframe targets of each activity)</i></p> <ul style="list-style-type: none"> <li>Prepare and distribute circular on the collection system of separate collection of recyclables for 2016.</li> <li>Create awareness house to house to the residents during circular distribution.</li> <li>To sustain the collection of recyclables services as per the calendar.</li> <li>Continue with the announcement and monitoring of mixing of recyclables with non-recyclables.</li> <li>Strengthening awareness rising to the residents to improve and increase the participation rate of discharge.</li> </ul>



Activity	Work done	Achieved indicators
Eco-bag Promotion	<ul style="list-style-type: none"> <li>Continued with the promotion and sales of Eco-bags in cooperation with the women's groups and the garment factories/ tailoring shops in Nadi.</li> <li>These Eco-bags are bought from the women's groups at a cost of \$5.00 and sold at the price of \$6.00. (\$1.00 for cost for printing of labels)</li> <li>Awareness rising on the promotion of Eco-bags continued.</li> <li>Purchased 1,500 labels for the Eco-bags this year.</li> </ul>	<p><b>Status of Achievements:</b>                      As per PO number of Eco-bags to be sold by 2016 - 3000bags .Achieved</p> <ul style="list-style-type: none"> <li>Sold 3,002 bags.</li> <li>Sold 508 bags for FY 2015</li> </ul> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>The cut pieces and the waste materials collected from the garment factories/ tailoring shops is utilized to prepare the Eco -bags.</li> <li>Environmental friendly and alternative to the use of plastic bags.</li> <li>Made by the local Women's group.</li> <li>Attractive and fashionable</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Insufficient supply of cut- pieces or the waste pieces for making bags.</li> </ul> <p><b>Planned activities/targets for next year</b>                      (include numerical and time frame targets of each activity)</p> <ul style="list-style-type: none"> <li>Continue with the promotion and sales of Eco-bag.</li> <li>Meeting with the garment factories /tailoring shops.</li> <li>Order and Purchase labels for the bags.</li> </ul>
Photos		

## Output 2

Activity	Work done	Achieved indicators
Regional Training	<ul style="list-style-type: none"> <li>July 15th -17th training on home composting and Clean School Program conducted by Nafiza for the participants from Tonga, PNG and Solomon Islands in the Council chambers.</li> <li>Upon invitation by Marshall, Conducted training for the counterparts and teachers in Ebeye Marshall Islands from 7<sup>th</sup> to 11<sup>th</sup> September.</li> <li>15<sup>th</sup> October Visit by the JICA Rep Tonga Office to NTC to meet and observe the activities implemented by NTC.</li> <li>6<sup>th</sup> November visit by the FNU / SPREP / JICA regional training on SWM by regional participants to observe activities on home composting and Clean School Program.</li> </ul>	<p><b>Status of Achievements:</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Increased motivation</li> <li>CSP has been expanded to Kiribati, Solomon Islands, Tonga, Marshall Islands and PNG .</li> </ul> <p><b>Issues to be addressed</b></p> <p><b>Planned activities/targets for next year</b>  <i>(Include numerical and time frame targets of each activity)</i></p> <ul style="list-style-type: none"> <li>NTC to continue assisting with regional initiatives</li> </ul>
Photos	 <p>The photos section contains 10 images arranged in two columns of five. The top row shows a group of people in a meeting room, a group of people in a meeting room, a group of people in a meeting room, a group of people in a meeting room, and a group of people in a meeting room. The second row shows a group of people in a meeting room, a group of people in a meeting room, a group of people in a meeting room, a group of people in a meeting room, and a group of people in a meeting room. The third row shows a group of people in a meeting room, a group of people in a meeting room, a group of people in a meeting room, a group of people in a meeting room, and a group of people in a meeting room. The fourth row shows a group of people in a meeting room, a group of people in a meeting room, a group of people in a meeting room, a group of people in a meeting room, and a group of people in a meeting room. The fifth row shows a group of people in a meeting room, a group of people in a meeting room, a group of people in a meeting room, a group of people in a meeting room, and a group of people in a meeting room.</p>	







FijiJ-PRISM SWM3R - Annual Plan of Operation		Council Name: ↑	
Name of Project Manager: Robin K Ali		(Signature)	
Implementation Term: January 2016 ~ December 2016 (1 year)		Name of 3R Project Officer: Neliza Ali Hakim	
		Planned date:	
		January	February
		March	April
		May	June
		July	August
		September	October
		November	December
Outputs and Associated Activities			
Annual events DoE's Monitoring Inspection ③ Submission of Monitoring Reports to DoE ☆ Joint Quarterly Meeting ☆			
OUTPUT 1: Home Composting			
1-1	Continue promotion of Home Composting	Planned	
		Actual	
1-2	Monitor of Home Compostors and create awareness on home composting	Plan	
		Actual	
1-3		Plan	
		Actual	
1-4		Plan	
		Actual	
OUTPUT 2: Clean School Program			
2-1	Action Plan- Submission from schools	Plan	
		Actual	
2-2	First Monitoring	Plan	
		Actual	
2-3	Second Monitoring	Plan	
		Actual	
2-4	Final Judging	Plan	
		Actual	
2-5	Awards Ceremony	Plan	
		Actual	
OUTPUT 3: Separate Collection of Recyclables			
3-1	Develop and distribute Recyclables circular	Plan	
		Actual	
3-2	Create awareness to improve participation rate	Plan	
		Actual	
3-3	Implementation and Monitor	Plan	
		Actual	
3-4	Maintenance and Repairs of MPT (as need arises)	Plan	
		Actual	
OUTPUT 4: Eco-bag Promotion			
4-1	Printing of Labels	Plan	
		Actual	
4-2	Collection of Materials from garment and Tailors	Plan	
		Actual	
4-3	Production of Eco-bags	Plan	
		Actual	
4-4	Promotion and Selling of Eco-bags	Plan	
		Actual	




**Monitoring and Reporting Mechanism for Greater Shared Progress of 3R Activities**

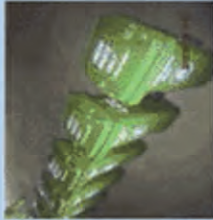

Council Name: LAUTOKA CITY COUNCIL Person in charge: SHI Shalend Prem Singh

Reporting Period : Jul to Dec 9, 2015 Project Output: (as per PO)






Activity 1	Workdone	Achieved indicators
<p>(show numerical figures, (use the number of schools you visited, number of compost bins installed and monitored, Amount of recyclable collected, etc)</p> <p><b>Separate Collection of Recyclables</b></p>	<p>(include numerical data in frame large table activity)</p> <ul style="list-style-type: none"> <li>Council had sustained this activity for Veitari Ward.</li> <li>The participation rate is low – average of 1%. Council also spends average of \$6,000/year on collection.</li> <li>South Pacific Recyclers Ltd collected paper from LCC – total 290 Kg ( 6 trips)</li> <li>Council collected recyclables from Communal recycling centre(2 collections). Collected 112 Kg of Pet bottles and 54 Kg of metals and hard plastics. ( Aug/Oct)</li> <li>Council's two attendants at the park continue to manage/monitoring/record the receiving and discharge of the recyclables.</li> <li>Council conducted 500 house visits for Simla award and distributed circulars/awareness on communal recycling center.</li> <li><b>Hospital continues to handover 1 bag of recyclable (food tin cans) every month – average 80 kg)</b></li> <li><b>Koroipita Model community continues to conduct fortnightly recyclable collections averaging 60% participation rate. Children also involved. Delivered two trips of recyclables (435 Kg) from July 2015.</b></li> </ul>  	<p>(show numerical figures, (use the number of schools you visited, number of compost bins installed and monitored, Amount of recyclable collected, etc)</p> <p><b>Target 20% Participation rate is achieved- if not achieved, council will have the option to cease Recyclable Collection Component and focus on Recycling Activity of Waste pickers in Dump site. 400 Kg of recyclables to be collected/month. Targets not achieved but average of 30 tons of recyclables is collected for recycling in LCC ( recycling centre, Veitari, CSP, Koroipita etc). This is much higher than PO target but was initially not included as indicator.</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>The new communal recycling centres gives opportunity/access to 100% Lautoka City Population and even Peri Urban Areas to participate recycling of recyclable items.</li> <li>The Centre effectively used as point of collection for Market compost after making payment at LCC.</li> <li>Koroipita involving children for recycling activities.</li> </ul>  
		<p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Low participation by citizens</li> <li>Awareness for citizens of Lautoka City about this new initiative and encourage them to bring their recyclables to this communal recycling centre.</li> </ul>
		<p><b>Planned activities/targets for the next year FY2016</b></p> <ul style="list-style-type: none"> <li>Cease service of house to house collection of recyclables from Jan 2016.</li> <li>Continue to create awareness by house to house visits and distribution of circulars to citizens about recyclable Drop Off Centre</li> <li>Cooperate and support waste pickers for recycling at VDS.</li> </ul>




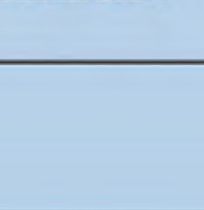

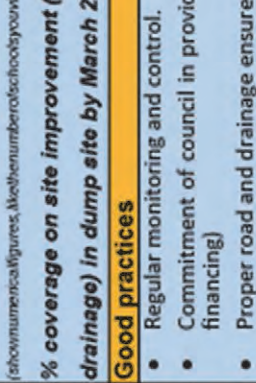
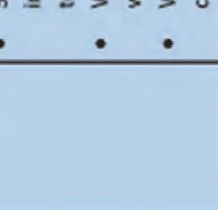
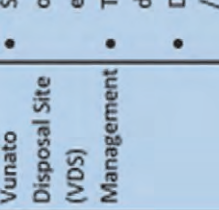
Activity 2	Workdone	Achieved indicators
<p>(as per PO)</p> <p>Home Composting</p>	<p>(with network activities during the year)</p> <ul style="list-style-type: none"> <li>• 339 compost bins will be promoted by 8/12/15. Also supplied wood chips as moisture control.</li> <li>• Monitored 78 compost bins from July.</li> <li>• Awareness for Natabua Corrections Service Centre. ( installed 5 bins at their own cost)</li> <li>• SHI Shalend submitted /Presented Action Plan on Home Composting to JICA Alumni. Approved \$2,000 budget for 44 compost bins. Training and handing over of 19 bins done for Koroipita community on 30/11/15.</li> <li>• Corrections service has allocated 5 more bins for Natabua.</li> </ul> 	<p>(show numerical figures, like the number of schools you visited, number of compost bins sold and monitored, Amount of recyclables collected, etc)</p> <p><b>At least 350 bins to be promoted by end Mar 2016. Achieved 97 %.</b>  <b>Payment is already made to council for more 7 bins. These bins will be setup/promoted upon receipt of more school fees, since that 300.00 of amount will be received by March 2016.</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>• Integrated approach e.g. Accessing JICA Alumni Funds, cooperation with Corrections Service etc for 3R Promotion</li> <li>• Sustained promotion of 3Rs by council to rural areas.</li> <li>• Financial support from DoE for Home Compost Subsidy Programme.</li> <li>• Periodical monitoring conducted to evaluate effectiveness of the use of compost bins and provide guidance.</li> <li>• Monitoring by DoE C/Ps.</li> </ul>    <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>• DoE subsidized compost bins can only be sold to rate payers.</li> </ul> <p><b>Planned activities/targets for the next year FY2015</b>  <i>(include numerical and time frame for each activity)</i></p> <ul style="list-style-type: none"> <li>• To sustain home compost promotion activities and strengthen monitoring</li> <li>• Promote home composting to PRB and HART community.</li> </ul>  

Activity 3	Workdone	Achieved indicators
<p>(as per PO)</p> <p>Market Waste and Grass Composting</p>	<p>(include numerical figures, month number or frequency you visited, number of compost bins used and monitored, Amount of recyclable collected, etc)</p> <ul style="list-style-type: none"> <li>Managed to separate, transport to compost yard and compost 969.2 tons of market green waste since 2011.</li> <li>Monitored market waste separation by market contractor and composting process at VDS.</li> <li>Conducted awareness for 500 market vendors (circulars/face to face explanation/showing compost product etc.)</li> <li>Average 1ton/day</li> <li>Sold 11.43 tons (\$3428.00) from January - Oct, 2015. (174% of 2014).</li> <li>Sold 28.16tons of compost from January 2011 worth \$8,448.00</li> <li><b>Major achievement ... already achieved target of PO.</b></li> <li>Grass composting at the botanical garden is also sustained.</li> <li>40 wheelie bins and 50 half cut drum bins purchased.</li> </ul> 	<p>More than 15 tons in total of market compost sold and revenue of at least \$4,500 to be produced by Mar 2016. <b>Sold 28.16 tones and \$8,448.00 revenue (target achieved)</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Involvement of market cleaning contractor proving to be very effective in terms of market organic waste separation and transportation to compost yard. Require stringent monitoring.</li> <li>Recyclable drop off centre effectively used as collection point for market compost.</li> <li>Steady demand for compost and regular customers established.</li> </ul> 
	<p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>A mini shredder and small shed for storage of final compost material is desirable.</li> <li>Machine unavailability at VDS due to breakdown affects composting process( turning??)</li> </ul>	<p><b>Planned activities/targets for the next year FY2015</b></p> <ul style="list-style-type: none"> <li>To sustain market waste composting activity.</li> <li>Continue with monitoring of separation at market by contractor.</li> <li>Try and increase amount of organic waste composted /month.</li> </ul>



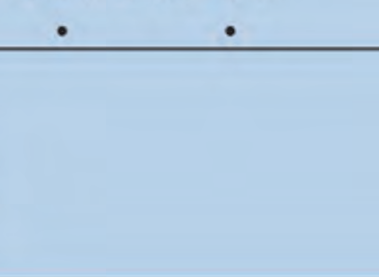



Activity 4 (as per PO)	Workdone (with the works/activities/inputs/outputs/amounts)	Achieved indicators (show numerical figures, MoH then number of schools you visited, number of compost bins sold and monitored, Amount of recyclable collected, etc)
<p>Clean School Program</p>	<ul style="list-style-type: none"> <li>● Council sustained the CSP program in 2015.</li> <li>● 31 schools (20 urban/11 rural) participated in CSP competition.</li> <li>● 2<sup>nd</sup> Monitoring completed of all schools in August.</li> <li>● Chief Guest at 2 schools for celebration of Environment day. (Hl Wally/JOCV Nozo)</li> <li>● Judging and awards function organized in October.</li> <li>● Rural /urban judged and awarded separately.</li> <li>● 2 Additional prizes.</li> <li>● \$900.00 as cash prizes.</li> </ul> 	<p><b>3R concept to be promoted for 48 schools in urban and rural areas by March 2016.</b>  <b>Invitation was sent to all 51 schools but 31 schools participated in competition.</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>● Expansion to rural schools.</li> <li>● Monitoring of all schools completed as planned except 2</li> <li>● Papers collected from 4 schools by Nambawan</li> </ul>    
	<p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>● Lack of staff a concern for monitoring.</li> <li>● Need involvement of MoH and LRLA for monitoring of rural schools.</li> <li>● Subsidy from DoE not yet received for 2014/2015.</li> </ul> <p><b>Planned activities/targets for the next year FY2015</b>  <small>(include numerical targets/amounts/inputs/outputs/amounts)</small></p> <ul style="list-style-type: none"> <li>● Sustain CSP and incorporate enforcement ( Public Health, Hygiene, Burning etc)</li> <li>● Coordinate with Nambawan Co. for collection of papers from other schools</li> </ul>	



<p><b>Activity 5</b>  <small>(as per PO)</small>                  Vunato Disposal Site (VDS) Management</p>	<p><b>Workdone</b>  <small>(write works/activity/achievement/month)</small></p> <ul style="list-style-type: none"> <li>Sustained normal landfill operations under open aerobic and evaporation method</li> <li>Total of 27,505 tons of waste disposed in 2014 (~75.4tons/day). Disposed average 2,250 tons /month (average 76 tons/day) in 2015</li> <li>324,61tons of recyclables collected in from Jan - April ; Average 32.5 tons/month or 1.25tons /day</li> <li>WARM training conducted for 25 waste pickers</li> <li>Weighbridge certification/calibration done in July at cost of \$18,000.00</li> <li>Continue to receive visits</li> <li>Heavy machineries repaired.</li> </ul>  	<p><b>Achieved indicators</b>  <small>(show numerical figures, like the number of schools you visited, number of compost bins installed, amount of recyclables collected, etc)</small> <b>100 % coverage on site improvement (periphery bank, improvement of access road and drainage) in dump site by March 2016</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Regular monitoring and control.</li> <li>Commitment of council in providing funding for maintenance of machines, roads etc. (sustainable financing)</li> <li>Proper road and drainage ensures sound operation of landfill</li> <li>Waste pickers play a key role in waste minimization via informal recycling.</li> <li>Training of Waste Pickers on WARM (OHS in waste management) ensures that basic OHS issues are practiced in informal recycling at landfill. These results in significant amount of recyclables collected at no costs to council.</li> </ul>   <p><b>Issues to be addressed</b></p> <p><b>Planned activities/targets for the next year FY2015</b>  <small>(include numerical targets for each activity)</small></p> <ul style="list-style-type: none"> <li>Need to procure water quality monitoring equipment's for periodic monitoring of the water courses to ascertain water quality.</li> <li>Waste pickers need to be given incentives like proper clothing etc to ensure that they work under improved conditions.</li> </ul>  
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Activity 6	Workdone	Achieved indicators
(as per PO) <b>Eco Bag Pilot Project</b>	(unit/works/activities done in a month) <ul style="list-style-type: none"> <li>• Sustained Pilot Project on Eco Bag with initiative of JOCV Ms.Nozo.</li> <li>• Partnership sustained with Womens Group from Koroipta and initial cooperation of Tailors/Garment Factories</li> <li>• Sold 126 Eco bags from July 2015.</li> </ul>	(show numerical figures, key number of schools you visited, number of compost bins sold and monitored, Amount of recycled/eco collected, etc) <b>No set target as this is new activity.</b> <b>Good practices</b> <ul style="list-style-type: none"> <li>• Partnership approach with Koroipta Model Community</li> <li>• Source of livelihood for low income earners.</li> <li>• Reuse fabric offcuts</li> </ul>  
		<b>Issues to be addressed</b> <ul style="list-style-type: none"> <li>• Sustainable supply of off cut fabrics</li> <li>• Sustainable supply of eco bags from community is challenge due to cumbersome work in stitching.</li> </ul>
		<b>Planned activities/targets for the next year FY2015</b> (include numerical and time frame for targets of each activity) <ul style="list-style-type: none"> <li>• Sustain LCC Eco Project</li> </ul>  

<b>Activity 7</b> <small>(as per PO)</small> <b>Education and Awareness-Raising</b>	<b>Workdone</b> <small>(with works/activities done in a month)</small> Council participated or facilitated following trainings, meetings, site visits: <ul style="list-style-type: none"> <li>• Training of environment club members of Koroipita Model Community (28 kids) on 6/11/15.</li> <li>• Monitoring conducted for 32 schools participating in CSP competition.</li> <li>• HI Wally/ JOCV Nozo officiated at 2 schools as chief guest for different celebrations/events.</li> <li>• Facilitated visit JICA office staffs from Tonga. (16/10/15)</li> <li>• HI Mithun officiated as judge for Environment Sustainability Oratory Competition hosted by University of Fiji, Saweni.</li> <li>• Facilitated meeting/site visit by High Level delegation ( member of parliaments, JICA resident rep, Ambassador of Japan, Minister of LGHE) – 26/10/15</li> <li>• Facilitated site visit/presentation for participants of regional SWM training organized by FNU. (6/11/15)</li> <li>• Facilitated site visit/awareness for students of USP (10/08/15)</li> <li>• Facilitated site visit/awareness for students of Sabeto Primary School (6/7/15)</li> <li>• Conducted awareness with JOCV/contractor for 500 market vendors ( circulars, face to face discussions, showing sample of compost)- 4 days</li> <li>• Joint monitoring/site visits with DoE staffs from Suva on HCSP/CSP, landfill, market waste composting, Eco Bag, recycling etc. (7/10/15)</li> </ul>	<b>Achieved indicators</b> <small>(show numerical figures, if the number of schools visited, number of compost bins sold and monitored, Amount of recycled waste collected, etc.)</small> <b>Good practices</b>	<b>Issues to be addressed</b> <ul style="list-style-type: none"> <li>• Lack of staffs within health department (2 vacancies) hinders awareness and 3R Promotion works.</li> </ul> <b>Planned activities/targets for the next year FY2015</b> <small>(include numerical indicators if applicable to each activity)</small> <ul style="list-style-type: none"> <li>• Sustain awareness raising activity</li> <li>• Continue to create awareness for market vendors with help of JOCV for improved market waste separation.</li> </ul>
   	 		



Activity 7 (as per PO)	Workdone (with brief activity with additional information)	Achieved indicators (show numerical figures, the number of schools you visited, number of compost bins sold/monitored, Amount of recycled waste collected, etc) – no set target
<p><b>Education and Awareness-Raising</b></p>	<p>Council participated or facilitated following trainings, meetings, site visits:</p> <ul style="list-style-type: none"> <li>• Terminal Evaluation conducted on Aug 14.</li> <li>• JOCV participated in NTC CSP awards – November 13, 2015.</li> <li>• SHI Shalend Presented Action Plan for Composting/Recycling to JICA Alumni – 22/10/15. Funding approved for \$1995.00 for 44 compost bins and 15 recycling bags (23/11/15)</li> <li>• Hosted 13<sup>th</sup> JPRISM Bi Monthly meeting.</li> <li>• Facilitated site visit/awareness for students of Tailevu Primary School (26/11/15)</li> <li>• Conducted training on home composting for Koroipita (about 60 citizens) and handed over 19 compost bins funded by JICA Alumni</li> </ul> 	<p><b>Good practices</b>                  Sharing of good practices</p>   <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>• Lack of staffs within health department (2 vacancies) hinders awareness and 3R Promotion works.</li> </ul> <p><b>Planned activities/targets for the next year FY2015</b></p> 

Output 2 <small>(as per PO)</small> Regional Training on 3R Promotion / SWM / WARM etc	Workdone <small>(write work/activities done in a month)</small>	Achieved indicators <small>(show numerical figures, (with number of schools you visited, / number of compost bins sold and monitored, Amount of recycled bottles etc) fed, etc)</small>
	<ul style="list-style-type: none"> <li>MHS Rouhit facilitated as trainer of WARM/OSH training in Marshall Islands for 5 days ( November 6 – 16, 2015)</li> </ul>	<p><b>No target as this is new activity.</b></p> <p><b>Good practices</b></p> <ul style="list-style-type: none"> <li>Sharing of good experiences/practices / challenges to the region.</li> </ul> <p><b>Issues to be addressed</b></p> <ul style="list-style-type: none"> <li>Lack of staff is a challenge for the council in conducting such trainings.</li> <li>Release of staffs for training on a timely manner is also an issue of concern.</li> </ul> <p><b>Planned activities/targets for the next year FY2015</b> <small>(include numerical and time frame in a target box for each activity)</small></p> <ul style="list-style-type: none"> <li>Sustain 3R Promotion/SWM/WARM capacity building training within Fiji and the Region</li> </ul>



Fiji/J-PRISM SWM3R - Annual Plan of Operation		Council Name: Lautoka City Council		Planned date:											
Name of Project Manager: Jonu Nakaravava		Name of 3R Project Officer: Shalenev Prun Singh and Wally Auililo													
Implementation Term: January 2016 ~ December 2016 (1 year)		Planned date:													
		January	February	March	April	May	June	July	August	September	October	November	December		
<b>Outputs and Associated Activities</b> DOE Monitoring Inspection Submission of Monitoring Report to DOE Joint Quarterly Meeting															
<b>Annual events</b> 1-1 Strengthen Awareness Activities (RR display booths, home compost demo at VDS and LCC for visitors, City Star, CSP, Lautoka Ratepayers Association etc) 1-2 Purchase 30 more Composters. DOE to subsidize additional 30 bins. 1-3 Strengthen Monitoring Process 1-4 Selling used bag compost bins upon purchase by citizens - supply 1 bag of wood chips (City Awareness)															
<b>OUTPUT 1: Home Composting</b> Total number of compost bins to be purchased in 2016 : 36 (describe the number of bins to be distributed to each target) - Residents: 29 - Businesses: 0 - Schools : 2 - Free distribution: 5															
<b>OUTPUT 2: Clean School Program</b> 2-1 Distribution of circulars to schools for 2016 CSP and Action Plan Submission 2-2 Monitoring school progress - incorporate hygiene/cleanliness and enforcement and high to take lead role for monitoring of rural schools 2-3 Conduct Judging 2-4 Award Ceremony															
<b>OUTPUT 3: Separate Collection of Recyclables</b> 3-1 Strengthen Awareness Activities through house-to-house visit, Clean School Program and Media 3-2 Involve other stakeholders (Lautoka City Ratepayers Association, FNU, Schools etc) to promote Communal Recycling Centre (CRC) at IYC Childrens Park 3-3 Monitoring and evaluation 3-4 Cease separate collection from Village Ward 3-5 Support recycling by Waste Pickers including facilities, OSH etc															
<b>OUTPUT 4: Market Waste and Grass Composting</b> 4-1 Work in partnership with contractor, JCCV, market vendors to strengthen Awareness Activities for vendors on organic waste separation 4-2 Strengthen Monitoring Process - separation by vendors and contractor 4-3 Conduct regular turning of market compost heaps, and enhance record keeping ( record of organic waste composted, compost sales, dates of turning compost etc) 4-4 Promote sale of market compost and continue to sell compost from communal recycling centre 4-5 Seek funding for a mini shredder and composting shed from donor agencies e.g. Japanese Embassy															
<b>OUTPUT 5: Green Waste Chipping and Recycling</b> 5-1 Work in partnership with council horticulturist on schedule of pruning of green waste from public places and carry out On-site chipping 5-2 Use wood chips for mulching on council gardens, supply for use as base material for home compost and use for market waste composting 5-3 Carry out On-site chipping of green waste disposed separately at VDS															
<b>OUTPUT 6: Vintalo Disposal Site Operations and Management</b> 6-1 Improve facilities (Re-construct open shed near office damaged by cyclone, Even, sign board of VDS layout, wash bay) 6-2 Maintenance of Access Road, drainage, buffers, enclosures/emergency banks, dividers & Special Waste Area 6-3 Maintenance of Weighbridge & Heavy Machinery including weighbridge annual calibration 6-4 Promoting Recycling with Waste pickers (include new signboard and awareness) 6-5 Procure water quality monitoring equipments and conduct monitoring															
<b>OUTPUT 7: Lautoka Eco Bag</b> 7-1 Work in partnership with tailors and garment factories for supply of cut fabrics 7-2 Work in partnership with Koroleva (NGO), tailors and other women's group for sewing of eco bags 7-3 Promote sales of eco bag from LCC front office and busy shops.															
<b>OUTPUT 8: WARM (Occupational Health and Safety in Waste Management)</b> 8-1 Conduct training (Refresher New) for Waste Pickers, garbage collection workers and other Waste Management Contact workers addressing Occupational Health and Safety issues 8-2 Work in partnership with stakeholders eg. ILO for improvement of facilities for waste pickers ( proper protective clothing, sanitary facilities and lunch area)															







# OPERATION AND MAINTENANCE MANUAL FOR LANDFILL SITE AT SIGATOKA TOWN IN FIJI

(Version 1, October 2014)

**DRAFT**



**J-PRISM**

In cooperation with JICA Experts Team



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## 1 Introduction

There are several serious issues concerning the current small size landfill site conditions in Fiji. Mitigation of environmental pollution, the first issue, is urgently needed at most of the small size existing landfill sites. However, the necessity of mitigation has not been recognized because the investment for the improvement of existing landfill sites does not produce any output. Furthermore, as improvement technologies are not known to the relative authorities in charge of solid waste management, few improvement projects of existing landfill sites have been implemented. Therefore, showing the effect of the improvement of an existing landfill site through the pilot project at the Sigatoka Town landfill site implemented by Sigatoka Town Council and Japan International Corporation Agency (JICA) in 2014 is very useful not only for the transfer of technology but also for raising awareness of the necessity of mitigation

In order to not only operate and maintain properly the improved landfill site in Sigatoka Town and but also introduce the idea of the improvement of existing landfill site in Fiji, this Operation and Maintenance manual is described.

## 2 General of Landfill

The safe and reliable long-term disposal of solid waste residues is an important component of integrated waste management. Solid waste residues are waste components that are not recycled, that remain after processing at a material recovery facility, or that remain after the recovery of conversion products and/or energy. Historically, solid waste has been placed in the soil in the earth's surface or deposited in the oceans. Although ocean dumping of municipal solid waste was officially abandoned in some countries in 1930's, it is now argued that many of wastes now placed in landfills or land could be used as fertilizers to increase productivity of the ocean or land. It is also argued that the placement of waste in ocean trenched where tectonic folding is occurring is an effective method of waste disposal. Nevertheless, landfilling or land disposal is today the most commonly used method for waste disposal by far. Disposal of solid waste residues in landfills is the primary subjected of this chapter.

Historically, landfills have been the most economical and environmentally acceptable method for the disposal of solid waste throughout the world. Even with implementation of waste reduction, recycling, and transformation technologies, disposal of residual solid waste in landfills still remains an important component of an integrated solid waste management strategy. Landfill management incorporates the planning, design, operation, closure, and post closure control of landfill.

### 2.1 Definition of terms

Landfills: Landfills are the physical facilities used for the disposal of residual solid wastes in the surface soils of the earth. In the past, the term sanitary landfill was used to denote a landfill in which the waste placed in the landfill was covered at the end of each day's operation.

Sanitary landfill: Sanitary landfill refers to an engineered facility for the disposal of MSW designed and operated to minimize public health and environment impacts.

Landfilling: Landfilling is the process by which residual solid waste is placed in a landfill. Landfilling includes monitoring of the incoming waste stream,

placement and compaction of the waste, and installation of landfill environmental monitoring and control facilities.

**Cell:** The term cell is used to describe the volume of material placed in a landfill during one operating period, usually one day. A cell includes the solid waste deposited and the daily cover material surrounding it.

**Daily cover:** Daily cover usually consists of 6 to 12 inch of native soil or alternative materials such as compost that are applied to the working faces of the landfill at the end of each operating period. The purpose of daily cover are to control the blowing of waste materials; to prevent rats, flies, and other disease vectors from entering or existing the landfill; and to control the entry of water into the landfill during operation.

**Lift:** A lift is a complete layer of cells over the active area of the landfill. Typically, landfills are comprised of lifts.

**Bench:** A bench (or terrace) is commonly used where the height of the landfill will exceed 50 to 75 ft. Benches are used to maintain the slope stability of the landfill, for the placement of surface water drainage channels, and for the location of landfill gas recovery piping.

**Final lift:** The final lift includes the cover layer.

**Final cover layer:** The final cover layer is applied to the entire landfill surface after all landing operations are complete. The final cover usually consists of multiple layers of soil and /or geomembrane materials designed to enhance surface drainage, intercept percolating water, and support surface vegetation.

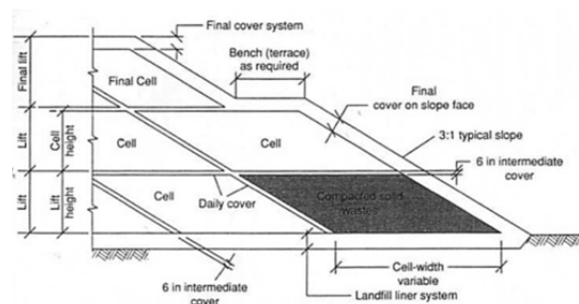


Figure 1: Section view of sanitary landfill

**Leachate:** The liquid that collects at the bottom of a landfill is known as leachate. In deep landfills, leachate is often collected at intermediate points. In general leachate is a result of percolation of precipitation, uncontrolled runoff, and irrigation water into the landfill. Leachate can also include water initially contained in the waste as well as infiltrating groundwater. Leachate contains a variety of chemical constituents derived from the solubilization of the materials deposited in the landfill and from the products of the chemical and biochemical reactions occurring within the landfill

**Landfill gas:** Landfill gas is mixture of gases found within a landfill. The bulk of landfill gas consists of methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>), the principal products of the anaerobic decomposition of the biodegradable organic fraction of the Municipal Solid Waste in the landfill. Other components of landfill gas include atmospheric nitrogen and oxygen, ammonia, and trace organic compounds.



**Landfill liners:** Landfill liners are materials (both natural and manufactured) that are used to line the bottom area and below-grade side of a landfill. Liners usually consist of layers of compacted clay and/or geomembrane material designed to prevent migration of landfill leachate and landfill gas.

**Landfill control facilities:** Landfill control facilities include liners, landfill leachate collection and extraction system, landfill gas collection and extraction system, and daily and final cover layers.

**Landfill closure:** Landfill closure is the term used to describe the step that must be taken to close and secure a landfill site once the filling operation has been completed.

**Post closure:** Post closure care refers to the activities associated with the long-term monitoring and maintenance of the completed landfill (typically 30 to 50 years).

## 2.2 Landfill Classification and Landfilling Methods

### 2.2.1 Classification of landfills

Although a number of landfill classification systems have been proposed over the years, the classification system adopted by the state of California in 1984 is the most widely accepted classification system for landfills. In this system, reported below, three classifications are used:

Table 1: Classification of landfill

Classification	Type of waste
I	Hazardous waste
II	Designated waste
III	Municipal solid waste

Designated wastes are non-hazardous waste that may release constituents in concentrations that applicable water quality objectives or those wastes which have been granted a variance by government. Note that this classification system focuses primarily on the protection of surface and groundwater rather than landfill gas migration or air quality.

### 2.2.2 Landfilling methods

The principal methods used for the landfilling of MSW are (1) excavated cell/trench, (2) area, and (3) canyon.

#### (1) Excavated Cell / Trench Method

The excavated cell / trench method of landfilling (Figure. 2) is ideally suited to areas where as adequate depth of cover material is available at the site and where the water table is not near the surface. Typically, solid wastes are placed in cells or trenches excavated in the soil. The soil excavated from the site is used for daily and final cover. The excavated cells or trenches are usually lined with synthetic membrane liners or low-permeability clay or a combination of the two to limit the movement of both landfill gases and leachate. Excavated cells are typically square, up to 1000 ft in width and length, with side slopes of 1:1.5 to 2:1. Trenches vary from 200 to 1000 ft in length, 3 to 10 ft in depth, and 15 to 50 ft in width.

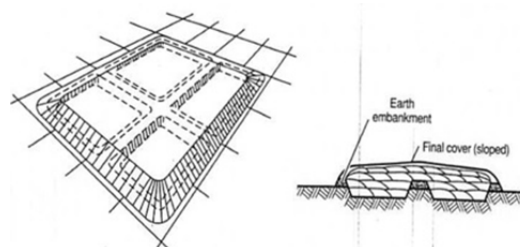


Figure 2: excavated cell / trench method of landfilling

## (2) Area Method

The area method is used when the terrain is unsuitable for the excavation of cells or trenches in which to place the solid wastes (Figure.3). High-ground water conditions necessitate the use of area-type landfills. Site preparation includes the

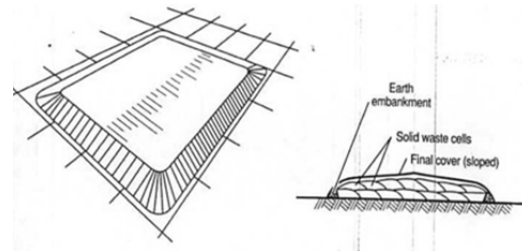


Figure 3: Area Method of Landfilling

installation of a liner and leachate control system. Cover material must be hauled in by truck or earthmoving equipment from adjacent land or from borrow-pit areas. As noted above, in locations with limited availability of material that can be used as cover, compost produced from yard wastes and MSW has been successfully used as intermediate cover material. Other techniques that have been used include the use of movable temporary cover materials such as soil and geomembrane. Soil and geomembrane, placed temporarily over a completed cell, can be removed before the next lift is begun.

## (3) Canyon/Depression Method

Canyons, ravines, dry borrow pits, and quarries have been used for landfills. The techniques to place and compact solid waste in canyon/depression landfills vary with the geometry of the site, the characteristics of the available cover material, the hydrology and geology of the site, the type of leachate and gas control facilities to be used, and the access to the site.

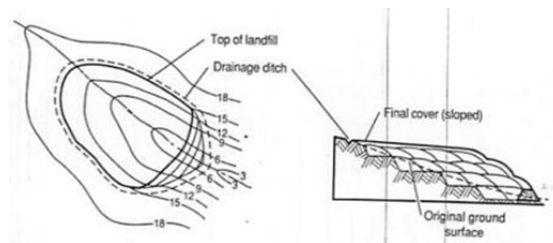


Figure 4: Canyon / Depression method of landfilling

Control of surface drainage often is a critical factor in the development of canyon/depression sites. Typically, filling for each lift starts at the head end of the canyon and ends at the mouth, so as to prevent the accumulation of water behind the landfill. Canyon/depression sites are filled in multiple lifts, and the method of operation is essentially the same as the area method described above. If a canyon floor is reasonably flat, the initial landfilling may be carried out using the excavated cell/trench method discussed previously.

A key to the useful use of canyon/depression method is the availability of adequate material to cover the individual lifts as they are completed and to provide a final cover over the entire landfill when the final height is reached. Cover material is excavated from the canyon walls or floor before the liner system is installed. Borrow pits and abandoned quarries may not contain sufficient soil for intermediate cover, so that cover material may have to be imported. Compost produced from yard waste and MSW can be used for the intermediate cover layers.

### 2.3 Landfill Operation

The development of a workable operating schedule, a filling plan for the placement of solid wastes, landfill operating records and billing information, and site safety and security plans are important elements of landfill operation plan. Other factors that must be considered in the operation of a landfill are reported in following Table.



Table2: Important factors that must be considered in the operation of landfill

Factors	Remarks
Days and hours of operation	Usual practice is 5 to 6 day per week and 8 to 10 hours per day
Communications	Telephone for emergencies
Employee facilities	Restrooms and drinking water should be provide
Equipment maintenance	A covered shed should be provided for field maintenance of equipment
Litter control	Use movable fences at unloading areas; crews should pick up litter at least once per month or as required
Operation plan	With or without the codisposal of treatment plant sludge and the recovery of gas
Operational records	Tonnage, transactions, and billing if a disposal fee is charged
Salvage	No scavenging; salvage should occur away from the unloading area
Scales	Essential for record keeping if collection trucks deliver wastes
Security	Provide locked gates and fencing; lighting of sensitive areas
Spread and compaction	Spread and compact waste in layers less than 60 cm tick to achieve optimum compaction
Unloading area	Keep small, generally under 30 meter on a side; operate separate unloading areas for automobiles and commercial trucks

### 2.3.1 Landfilling Operating Schedules

Factors that must be considered in developing schedules include (1) arrival sequences for collection vehicles, (2) traffic patterns at the site, (3) the time sequence to be followed in the filling operations, (4) effects of wind and other climatic conditions, and (5) commercial and public access. For example, because of heavy truck traffic early in the morning, it may be necessary to restrict public access to the site until later in the morning.

### 2.3.2 Solid Waste Filling Plan

Once the general layout of the landfill site has been established, it will be necessary to select the placement method to be used and to lay out and design the individual solid waste cells. The specific method of filling will depend on the characteristics of the site, such as the amount of available cover material, the topography, and the local hydrology and geology. Details on the various filling methods were presented in “2.2.2 Landfilling method”. To assess future development plans, it will be necessary to prepare a detailed plan for the layout of the individual solid waste cells. The filling sequence should be established so that the landfill operations are not impeded by unusual weather or adverse winter condition. A typical example of such a plan is shown in following Figure.

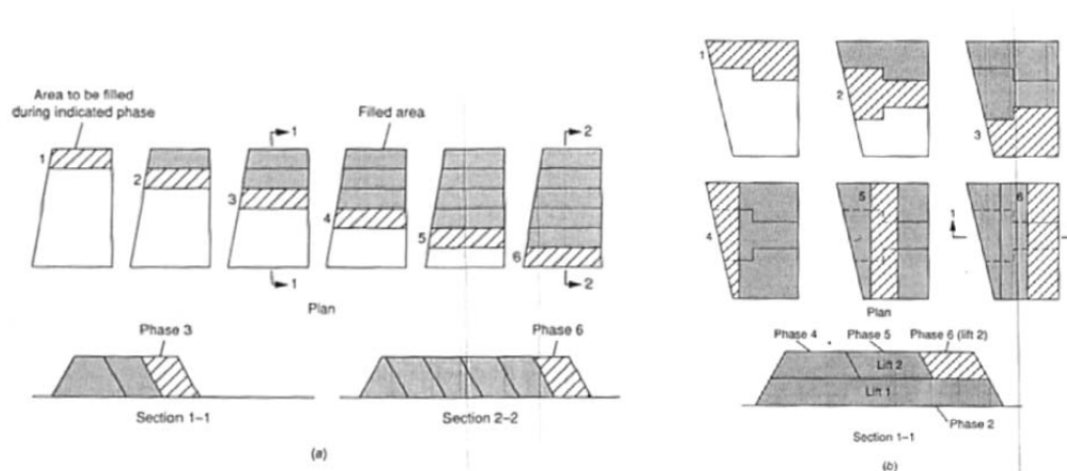


Figure 5: Typical example of solid waste filling plans:  
 (a) filling plan for single-lift and (b) filling plan for a multi lift landfill

### **2.3.3 Landfill Operation Records**

To determine the quantities of waste that are disposed, an entrance scale and gatehouse will be required. The gatehouse would be used by personnel who are responsible for weighing the incoming and outgoing trucks. The sophistication of the weighing facilities will depend on the number of vehicles that must be processed per hour and the size of the landfill operation. Some examples of weighing facilities are shown in following Figure. If the weight of the solid wastes delivered is known, then the in-place density of the wastes can be determined and the performance of the operation can be monitored. The weight records would also be used as a basis for charging participating agencies and private haulers for their contributions.

### **2.3.4 Public Health and Safety**

Public health and safety issues are related to worker health and safety and to the health and safety of the public.

#### **(1) Health and safety of workers**

The health and safety of the workers at landfill is critical in the operation of a landfill. Attention must be given to the types of protective clothing and boots, air-filtering head gear, and puncture-proof gloves supplied to workers.

#### **(2) Safety of the Public**

Safety concerns and the many new restrictions governing the operation of landfills have forced landfill operators to re-examine past operational practices with respect to public safety and site security. As a result, the use of a convenience transfer station at the landfill site, to minimize the public contact with the working operations of the landfill, is gaining in popularity.

### **2.3.5 Site Safety and Security**

The increasing number of lawsuits over accidents at landfill sites has caused landfill operators to improve security at landfill sites significantly. Most sites now have restricted access and are fenced and posted, with no trespassing and other warning signs. In some locations, television cameras are used to monitor landfill operations and landfill access.

## **2.4 Landfill Closure**

Landfill closure and postclosure care are the terms used to describe what is to happen to a completed landfill in the future. To ensure that completed landfills will be maintained 30 to 50 years into the future, the operators of landfill are required to put aside enough money so that when the landfill is completed the amount of money that has been set aside will be sufficient to maintain the closed site into perpetuity.

### **2.4.1 Development of long-Term Closure Plan**

Perhaps the most important element in the long-term maintenance of a completed landfill is the availability of a closure plan in which the requirements for closure are delineated clearly. A closure plan must include a design for the landfill cover and the landscaping of completed site. Closure must also include long-term plans for the control of runoff, erosion control, gas and leachate collection and treatment, and environmental monitoring.

#### **(1) Cover and Landscape Design**

The landfill cover must be designed to divert surface runoff and snowmelt from the



landfill site and to support the landscaping design selected for the landfill. Increasingly, the final landscaping design is based on local plant and grass species as opposed to non-native plant and grass species.

## **(2) Control of Landfill Gasses**

The control of landfill gases is a major concern in the long-term maintenance of landfills. Because of the concern over the uncontrolled release of landfill gases, a gas control system is now installed before most modern landfills are completed. Older completed landfills without gas collection systems are being retrofitted with gas collection systems.

## **(3) Collection and Treatment of Leachate**

As with the control of landfill gas, the control of leachate discharges is another major concern in the long-term maintenance of landfills.

## **(4) Environmental Monitoring System**

To be able to conduct long-term environmental monitoring after a landfill has been completed, monitoring facilities must be installed. The monitoring required at completed landfills usually involves (1) vadose zone monitoring for gases and liquids, (2) groundwater monitoring, and (3) air quality monitoring

### 3 Operation of Landfill Site at Sigatoka Town

#### 3.1 Procedure of Solid Waste Discharging by Collection Vehicles at Landfill Site in Sigatoka Town

##### 3.1.1 Sequence of solid waste discharging at landfill site in Sigatoka Town

The collection vehicles record properly their entering and discharging solid waste. The garden waste, bulky waste and separated bottles must be discharged at the designated area to avoid the tyre puncture of digger heavy machine and the difficulty of handling discharged waste. After discharging the solid waste, the collection vehicles are washed and cleaned to avoid the waste scattering in the town. Discharged solid waste is moved, lifted, spread and compacted by digger heavy machine daily. The discharged solid waste is covered by soil regularly by rented bulldozer. The sequence of solid waste discharging is shown as following figure;

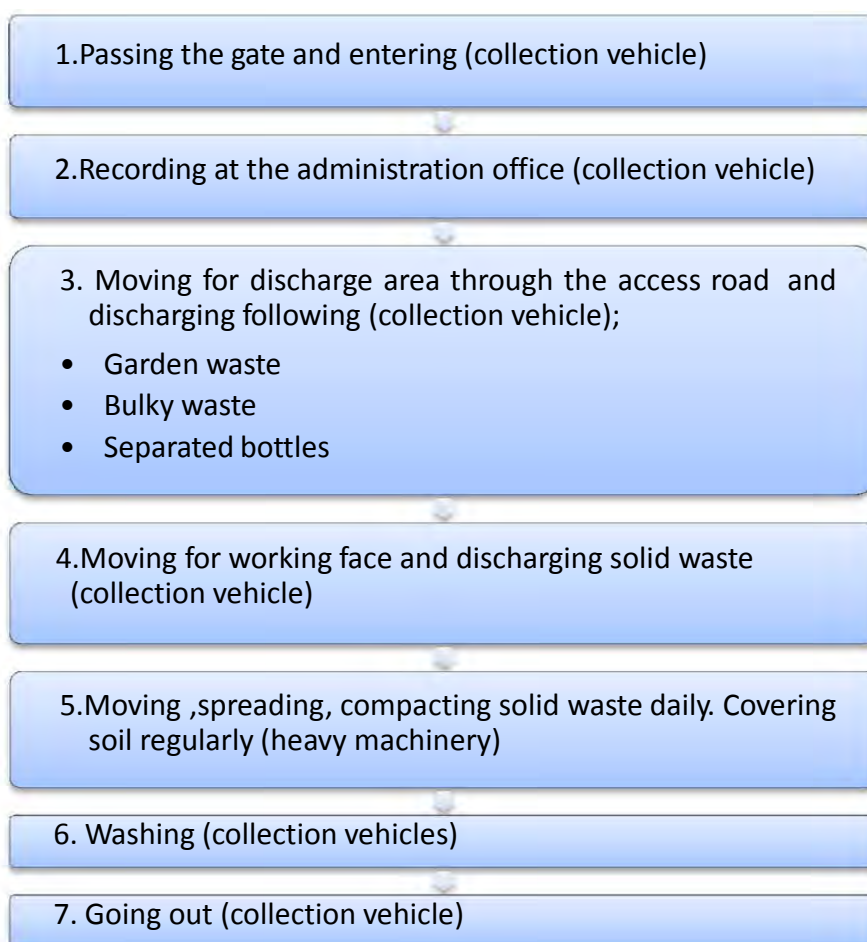


Figure 6: Sequence of solid waste discharging

#### 3.2 Layout and Main facility at Rehabilitated Landfill Site in Sigatoka Town

The rehabilitated landfill site at Sigatoka town comprises the area in which the discharged waste is filled as well as an additional area for support facilities. The following facilities are located within the site:



- Area filled with discharged waste
- As support facilities
  - ✓ Embankment
  - ✓ Access road
  - ✓ Rainwater earth drain
  - ✓ Administration office
  - ✓ Car washing area
  - ✓ Fence
  - ✓ Gate
  - ✓ Car parking
  - ✓ Buffer zone

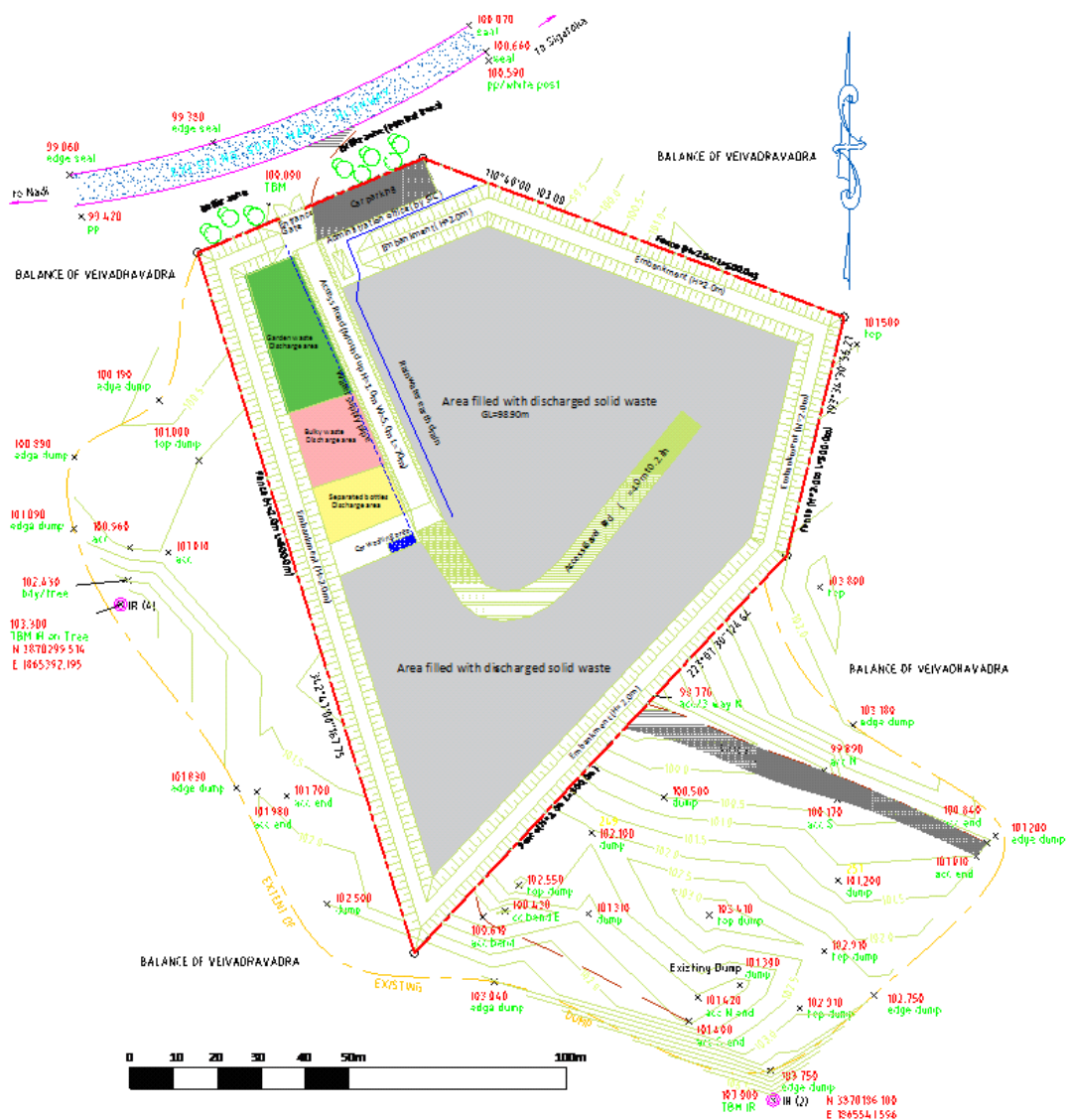


Figure 7: Layout of rehabilitated landfill site at Sigatoka Town

### 3.3 Operation and Maintenance at Landfill Site in Sigatoka Town

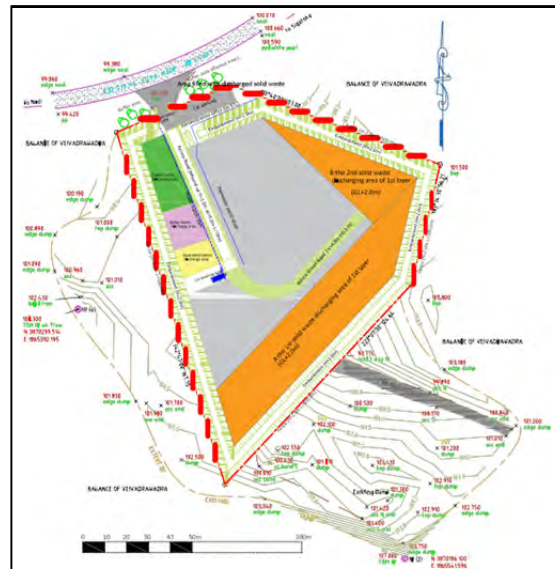
#### 3.3.1 Area filled with discharged waste

##### (1) Solid waste filling plan

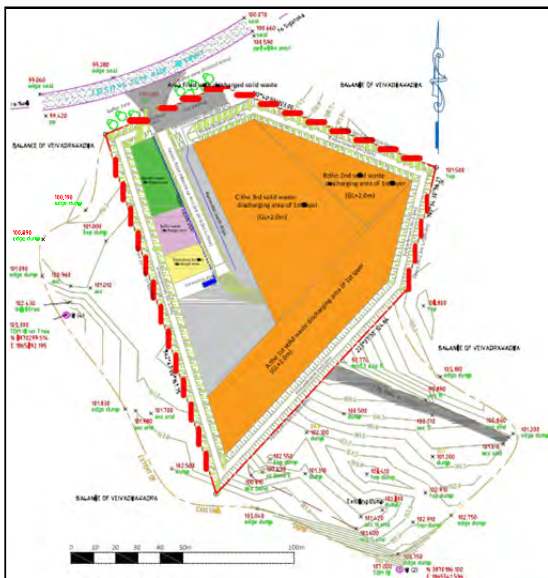
The plan for “a multi lift landfiling” (refer to 2.3.2) is applied at landfill site at Sigatoka town. The sequence of placing solid waste at the landfill site is shown as following figure;



A: 1<sup>st</sup> Solid waste discharging area of 1<sup>st</sup> layer



B: 2<sup>nd</sup> Solid waste discharging area of 1<sup>st</sup> layer

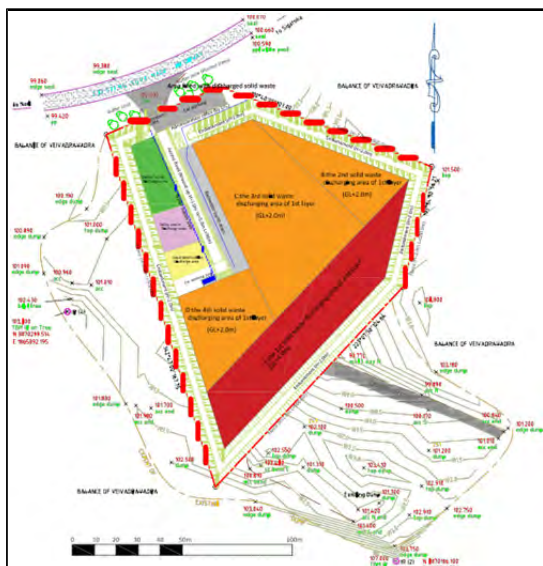


C: 3<sup>rd</sup> Solid waste discharging area of 1<sup>st</sup> layer

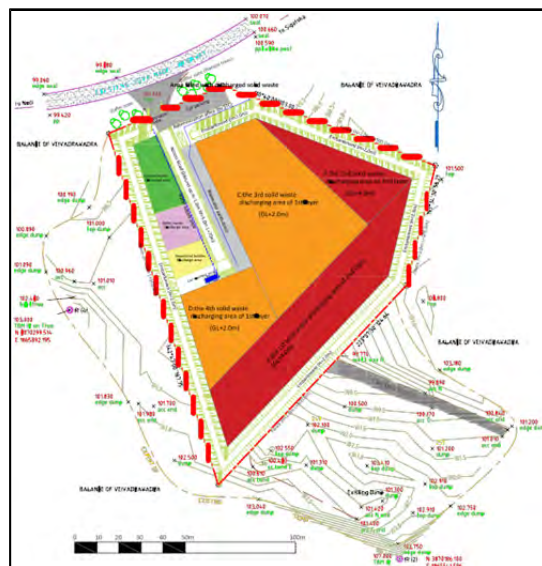


D: 4<sup>th</sup> Solid waste discharging area of 1<sup>st</sup> layer

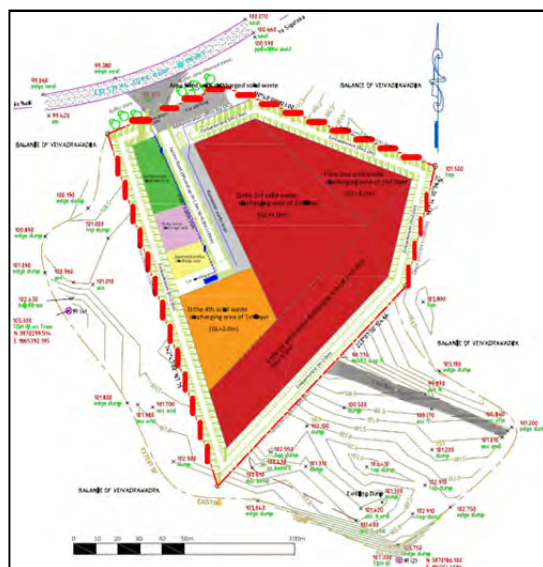
Figure 8: The 1<sup>st</sup> layer solid waste filling plans of landfill site at Sigatoka Town



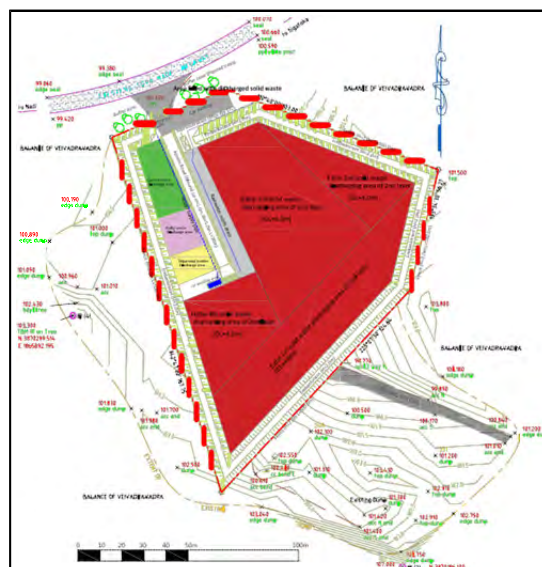
E: 1<sup>st</sup> Solid waste discharging area of 2<sup>nd</sup> layer



F: 2<sup>nd</sup> Solid waste discharging area of 2<sup>nd</sup> layer



G: 3<sup>rd</sup> Solid waste discharging area of 2<sup>nd</sup> layer



H: 4<sup>th</sup> Solid waste discharging area of 2<sup>nd</sup> layer

Figure 9: The 2<sup>nd</sup> layer solid waste filling plans of landfill site at Sigatoka Town

## (2) Working face

During the landfilling process, the working face shall be clearly demarcated and the area of working faces shall be maintained as small as possible.

Securing a good working face is of utmost importance for landfilling works. By maintaining a clearly defined working face and restricting the working area to the smallest possible, it will be able to eliminate the problems of air born litters, achieve better control of waste pickers, and increase the efficiency in the application of soil cover and waste compaction. The maintenance of the smallest possible working faces a highly effective measure to reduce the leachate generation.



### (3) Spreading / Compaction

Solid waste shall be spread and compacted in layers with repeated passages of the landfill equipment to minimize voids within the cell and maximize compaction. The loose layer shall not exceed a depth approximately 0.6 meters or two feet before compaction. Spreading and compacting shall be accomplished as rapidly as practicable.

The push up method to the slope at Sigatoka landfill site is selected for spreading and compaction of soil by heavy machinery.

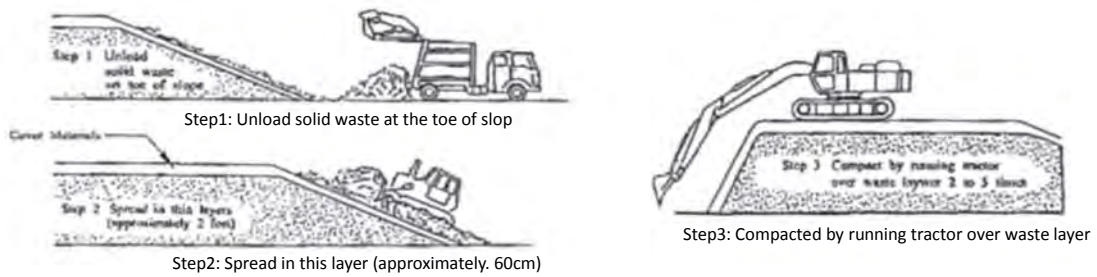


Figure 10: Steps of spreading and compaction

### (4) Lifting up

After completion of the filling the solid waste at the 1<sup>st</sup> layer the solid waste is discharged as lifting up the 2<sup>nd</sup> layer. Both thickness of the 1<sup>st</sup> and 2<sup>nd</sup> layers are approximately 2.0m and slop gradient is 1:1.5.

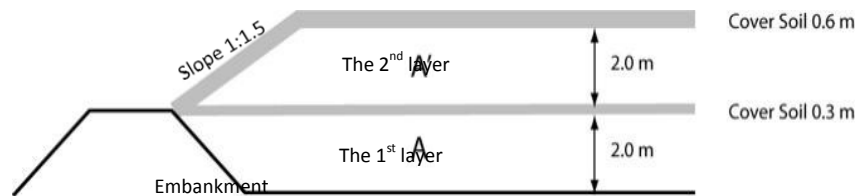


Figure 11: Cross Section of the 1<sup>st</sup> and 2<sup>nd</sup> layers of discharged solid waste

### (5) Soil Covering

The soil cover is the most important work in sanitary landfilling because it prevents various negative environmental impacts. In addition, it improves the accessibility and workability of vehicles in the landfill site.

If a large amount of cover is used, the capacity of landfill becomes lesser and it also reduces the permeability of the landfill site and subsequently reduces the waste decomposition rate. Therefore, the thickness of cover soil shall be minimal.

Intermediate soil cover (consisting 0.3 meters) is laid as the landfill works progress. The function is more on providing foundation for roads for the collection vehicles as well as draining the rain water away from the landfill sites which are to be left for considerably long period.

The final cover shall consist of from bottom to top, the foundation layer (consisting of 0.6 meters thick soil layer including interim cover), a final cap with an equivalent permeability as that of its liner system. Installation of final cover shall be completed within six (6) months from the last receipt of waste.

**a Regular soil cover material**

Permeable and porous sand types are suitable for the regular soil cover. The availability of cover materials depend on the location of the landfill site and the financial capability of the operator. If cover soil material is not available, old landfilled waste buried for about 3 to 6 months can be utilized effectively as soil cover.

**b Final soil cover material**

The final soil cover shall be resistant to erosion by rain water, low permeability and suitable for plants.

**3.3.2 Support facilities**

**(1) Embankment**

Embankment supports heavy machine to easily spread and compact discharged solid waste, and avoid the waste scattering. The embankment is constructed with existing discharged solid waste. In case that embankment is damaged, it must be repaired immediately by heavy machinery, levelling equipment and scale.

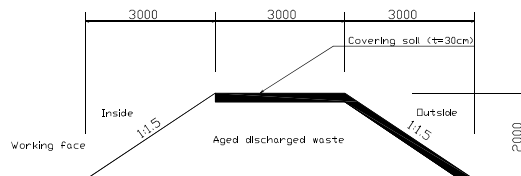


Figure 12: Cross section of embankment



(a) Measuring the height (2m) with scale



(b) Checking slope gradient (1:1.5)

Figure 13: Maintenance of embankment

**(2) Access road**

Provision of a good access road is very important for a landfilling operation because many waste collection vehicles have to access the disposal area even on wet days. In case that access road is damaged, it must be repaired immediately by heavy machinery. The cross section of access road is shown as following figure

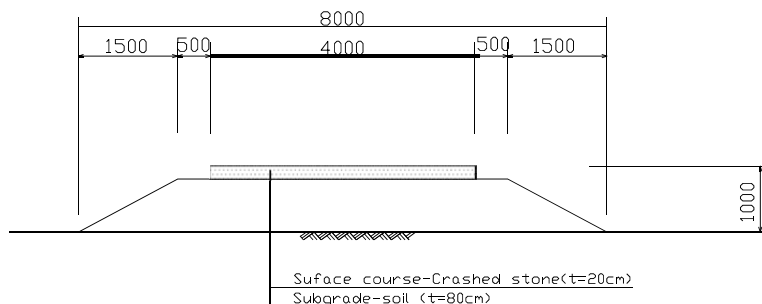


Figure 13: Cross section of the access road

### (3) Rainwater earth drain

The rainwater earth drain in the landfill is installed and maintained for the following purposes:

- ✓ To minimize leachate generation by intercepting runoff water into the site.
- ✓ To avoid bad condition at working face due to flood

The rainwater earth drainage should be shifted by heavy machine in accordance with the solid waste filling plan.

### (4) Administration office

A new site office is built to provide a proper space for administrative work, a rest space, store space for tools, materials, safety goods, and a sanitary facility for employees in the landfill site.



Figure 15: Administration office

### (5) Car washing area

The tires and body of collection vehicles are washed in order to remove any attached waste or mud after discharging waste. The supplied water at care washing area contributes to

### (6) Fence

A fence is constructed to control the entry of outsiders and livestock to the site and to avoid waste scattering.

### (7) Entrance gate

A gate functions to control the entry to the site. It should be closed to avoid the illegal dumping except for working hours.

### (8) Buffer zone

A buffer zone along the boundary is established to mitigate offensive odour, unsightly view, flies, waste scattering and so on. Trees are planted and the width of buffer zone is approximately 2 to 3 meters



Figure 17: Entrance gate



### 3.4 Required Resources for Operation and Maintenance at Landfill Site in Sigatoka

#### Town

The required resources for operation and maintenance are as follows:

- Manpower
  - ✓ Works supervisor :1
  - ✓ Site Manager: 1
  - ✓ Operators of heavy machinery (Digger): 1
  - ✓ Worker: 1
  - ✓ Guard: 2 (daytime:1 and night time 1)
- Heavy machinery and vehicle
  - ✓ Digger : 1
  - ✓ Bulldozer for covering soil: 1 (at least for 1week every 4 months)
  - ✓ Excavator for covering soil:1 (at least for 1week every 4 months)
  - ✓ Dump truck for covering soil: 1(at least for 1week every 4 months)
  - ✓ Diesel and lubricant oil for a digger

The bulldozer should be procured as soon as possible for daily operation.

### 3.5 The remained life span of the landfill site in Sigatoka Town Council

Approximately 5 years is estimated as the life span of landfill site based on two layers of discharged waste at each waste discharge area.

Table 3: Life Span of Landfill Site

Waste discharging area	Area (m <sup>2</sup> )	Height (m)	Volume (m <sup>3</sup> )	Density (ton/m <sup>3</sup> )	Daily waste discharge Amount		Life span (month)
					(ton/day)	(m <sup>3</sup> /day)	
A	2,775	2.0	5,550	0.8	15.7	19	10.0
B	1,014	2.0	2,028	0.8	15.7	19	3.6
C	3,408	2.0	6,816	0.8	15.7	19	12.0
D	1,341	2.0	2,682	0.8	15.7	19	4.8
E	2,775	2.0	5,550	0.8	15.7	19	10.0
F	1,014	2.0	2,028	0.8	15.7	19	3.6
G	3,408	2.0	6,816	0.8	15.7	19	12.0
H	1,341	2.0	2,682	0.8	15.7	19	4.8
Total			34,152				60.8
							>5years

### 3.6 Operation cost of landfill site in Sigatoka Town

The operation costs with Bulldozer for daily operation and without Bulldozer are shown as follows;

Table 4: The operation cost without Bulldozer at landfill site in Sigatoka Town

Items	Unit cost(FJD)	Qty.	Unit	Monthly Cost (FJD)	Remark
<b>1. Heavy machinery &amp; vehicle</b>				<b>2,750</b>	
1.1 Digger fuel	2	1,000	Litter x days/month	2,000	50liter x 20days/month
1.3 Maintenance of Digger	750	1	unit	750	9,000/12months
<b>2. Staff for operation of landfill site</b>				<b>2,959</b>	
2.1 Manager	755	1	person/month	755	8,232.95FJD*1.1/12month
2.2 Digger operator	1,250	1	person/month	1,250	15,000FJD/12months
2.3 Worker	604	1	person/month	604	6,585.64FJD*1.1/12months
2.4 Security	175	2	person/month	350	1,910.18FJD*1.1/12months
<b>3. Maintenance of facility</b>				<b>300</b>	
3.1 3% of facility	25	12	unit	300	100,000FJDx0.03/12
<b>4. Administration cost</b>				<b>200</b>	
<b>Total</b>				<b>6,209 FJD/month</b>	

Table 5: The operation cost with Bulldozer for daily operation at landfill site in Sigatoka Town

Items	Unit cost(FJD)	Qty.	Unit	Monthly cost (FJD/monthly)	Remark
<b>1. Heavy machinery &amp; vehicle</b>				<b>6,300</b>	
1.1 Digger fuel	2	400	Litter x days/month	800	50liter x 8days/month
1.2 Bulldozer fuel	2	2,000	Litter x days/month	4,000	100liter x 20days/month
1.3 Maintenance of Digger and Bulldozer	750	2	unit	1,500	9,000/12months
<b>2. Staff for operation of landfill site</b>				<b>2,959</b>	
2.1 Manager Digger and Bulldozer operator	755	1	person/month	755	8,232.95FJD*1.1/12month
2.2 operator	1,250	1	person/month	1,250	15,000FJD/12months
2.3 Worker	604	1	person/month	604	6,585.64FJD*1.1/12months
2.4 Security	175	2	person/month	350	1,910.18FJD*1.1/12months
<b>3. Maintenance of facility</b>				<b>300</b>	
3.1 3% of facility	25	12	unit	300	100,000FJDx0.03/12
<b>4. Administration cost</b>				<b>200</b>	
<b>Total</b>				<b>9,759 FJD/month</b>	

### 3.7 Appropriate management of waste pickers

The appropriate management of waste pickers consist of following policies.

- 1) Registration
- 2) Implement waste picking policies
- 3) Developing daily log book
  - ✓ Entry /Exit
  - ✓ Number of waste bag taken out
  - ✓ Safety wears
- 4) Complaint form/ Injury form

### **3.8 Monitoring of landfill site operation**

#### **3.8.1 The objectives of the monitoring**

There are two objectives of monitoring of landfill site.

- ✓ Empowerment : To continuously ensure the good landfill site operation.
- ✓ Accountability : To prove the good landfill site operation to citizens.

#### **3.8.2 Establishment of monitoring committee and execution of monitoring**

The monitoring committee members shall jointly monitor and evaluate the landfill operation every six months based on the check list. The check list consists of following category A and category B;

- ✓ Category A : Environmental effect (Before and after construction)
- ✓ Category B : Function of facilities

The result of monitoring shall be publicized as the monitoring report.

#### **3.8.3 Monitoring committee member (Sample)**

1. STC Representative (can be CEO?)
2. The Works Supervisor, STC
3. The Health Inspector, STC
4. The Ministry of Health
5. The Department of Environment
6. Nadroga Navosa Provincial Council
7. National Trust of Fiji
8. OISCA
9. Shangri-La's Fijian Resort & Spa (representing the Coral Coast Chapter )





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Luis F, George M, Clarence G. “Solid Waste Management for Economically Developing Country” Ca Recovery incorporated ISWA.

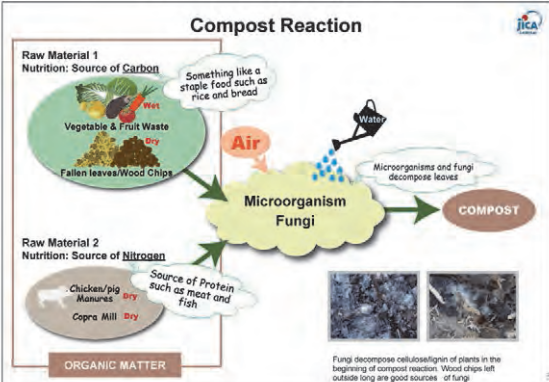

Project report on “The study on improvement of solid waste management in secondary cities in SriLanka” (2003). Japan International Cooperation Agency (JICA), Ministry of Home Affairs, Provincial Councils and Local Government, Sri Lanka.





## 7.1.8 研修テキスト 市場ごみコンポスト事業計画立案

### (1) 発表資料 1 : How to Make a plan of Market Compost Project

<p style="text-align: center;">How to Make a plan of Market Compost Project</p> <p style="text-align: center;">June 18, 2015</p> <p style="text-align: right;">1</p>	<p style="text-align: center;">Presentation</p> <ul style="list-style-type: none"> <li>■ Introduction of 3 market compost projects in Fiji             <ul style="list-style-type: none"> <li>□ Features of each market compost project</li> <li>□ Critical factors for success of each project</li> </ul> </li> <li>■ Necessary data for formulating the plan</li> <li>■ How to select the most suitable method</li> </ul> <p style="text-align: right;">2</p>
<p style="text-align: center;">What's Compost?</p>  <p style="text-align: right;">3</p>	<p style="text-align: center;">Compost &amp; Leaf Mold</p> <ul style="list-style-type: none"> <li>■ Compost             <ul style="list-style-type: none"> <li>□ Decomposed organic matter</li> <li>□ Rich in nutrients</li> <li>□ Used as fertilizer &amp; soil conditioner</li> <li>□ Good for farming and gardening</li> </ul> </li> <li>■ Leaf Mold             <ul style="list-style-type: none"> <li>□ <u>Partially</u> decomposed leaves</li> <li>□ Low in nitrogen for bacterial decomposition</li> <li>□ Used as soil conditioner</li> <li>□ good for gardening (need to take some measures to use for farming)</li> </ul> </li> <li>■ Manure             <ul style="list-style-type: none"> <li>□ organic matter, mostly derived from animal feces</li> </ul> </li> </ul> <p style="text-align: right;">4</p>
<p style="text-align: center;">Final Product of Market Compost Project</p> <p>Features of manure made by market compost project</p> <ul style="list-style-type: none"> <li>● without animal dung (Lautoka, Suva, Ba)</li> <li>● the size of compost heap is not large (Suva, Ba)</li> </ul> <p>It is difficult to keep the compost reaction long</p> <p>Final product of Suva Market Compost Project</p>  <ul style="list-style-type: none"> <li>✓ It's more like between Leaf Mold and compost.</li> <li>✓ It's still good for gardening</li> <li>✓ If farmers want to use it in order to increase harvest, they need to take additional measures.</li> </ul> <p style="text-align: right;">5</p>	<p style="text-align: center;">Market Compost Projects in Fiji</p> <p style="text-align: right;">6</p>



### Lautoka Market (1)

**Waste Generation Amount**

- ◆ 706 ton/year (1.9 ton/day) in 2014 (an actual measurement by the weighbridge at Vunato)
- ◆ 1,200 ton/year in 2008 (estimated by WACS)

**Number of vendors**

- Regular: 1,038 (all types of vendors)
- temporary from Thursday to Saturday: 1,000

There is not enough space to treat waste inside the market compound.

### Lautoka Market (2)

**Waste Management System**

- Two types of bins, green wheelie bins for organic waste and half cut bins for rubbish, are placed throughout the market
- Market vendors put their waste in bins near their stalls
- There is a waste loading place, where waste bins are collected & emptied at the back of a collection vehicle.
- The daily frequency of waste collection is 1-3 times per day, on average 2 times a day
- The collection, transportation and cleaning work is contracted out. 8 workers are assigned for collection & cleaning work along with waste separation work.

Loading place

### Lautoka Market (3)

**Waste Separation Method**

**2 Step approach**

1. First Step
  - To install 2 types of bins, green wheelie bins for vegetable waste and half cut plastic drums (blue) for rubbish, throughout the market
  - a lot of rubbishes are mixed with vegetable waste in green bins
2. Second Step
  - To separate rubbish from vegetable wastes in green bins at the time of loading work
  - waste separation work is a part of contracted works

Rubbish is placed in the front side of the loading platform and green waste is at the back side.

### Lautoka Market (4)

**Amount of Collected Vegetable Waste**

- Result of separate collection in 2014  
340 ton/year (930kg/day)  
(48% of the total waste generation amount)
- In 2015, LCC started a strict monitoring on waste separation
- Result of separate collection in May, 2015  
daily average: 662 kg  
total monthly amount: 17,220kg  
33% of the total waste generation amount

Mixture rate of rubbish is relatively high. In order to increase the collection amount of vegetable waste, it is necessary to decrease the mixture rate.  
 LCC uses all the collected vegetable to make compost...

### Compost Yard at Vunato

- 2km from the Lautoka Market (relatively near)
- There is a large space
- To use an excavator to turn over compost  
→ it is possible to make the heap large enough to retain the generated heat
- No need to take additional measures to prevent environment problems such as leachate odor treatment
- to use wood chips, which are left long, as moisture controller and source of fungi  
The volume of chips used for composting is roughly 10% of vege waste
- 3 workers are assigned for the work at compost yard (on average, spending 1 day in total per week)

### Result of Compost Project

- Amount of collected vegetable waste used for compost in 2014  
340 ton/year,
- Sales of compost in 2014 (10kg/bag, \$3.00/bag)  
711 bags (FJD 2,133)

**Keys to the successful result**

- ✓ Waste separation work is a part of contracted work (LCC succeeded in minimizing the cost of waste separation)
- ✓ No additional cost of transportation for vegetable waste
- ✓ Compost method is simplified, taking advantages of the large space of the compost yard and a heavy vehicle, used for disposal work

**Issues to be solved**

- ✓ Need to improve waste separation system (LCC can increase the capacity of compost production)






### Suva Market

**Waste Generation Amount**

- ◆ No data available (no breakdown from the Naboro data)
- ◆ 1,500 ton/year (4 ton/day) only from vendors inside the building (estimated by an interview survey) **unreliable data**
- ◆ The size of the market is not large, but the waste generation amount per vendor is quite large

**Number of Vendors**

- Regular vendors: Around 400



### Suva Market (2)

**Waste Management System**

- 4 skip bins are placed outside the main building (during the weekend, the number of bins is increased)
- Vendors are required to bring and put their waste in these skip bins.

**It's a hard work for vegetable, fruit, crop vendors (different situations from Lautoka)**

- Skip bins are replaced with new bins when they are full



### Suva Market (3)

**Waste Separation Method**

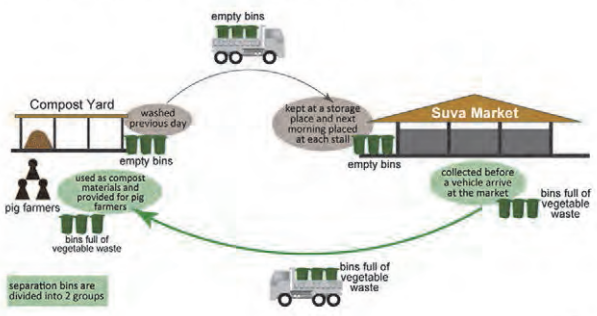
- Select target vendors which generate vegetable, fruit, and crop waste (no waste bins are placed at the public areas)
- Place vegetable waste bins inside stalls
- Collection workers are moving around stalls to collect waste directly from vendors

**For vendors, It is easier than bringing green waste to skip bins**



### Suva Market (4)

**Waste collection/Transportation Method**



### Suva Market (5)

**Amount of Collected Vegetable Waste**

- Result of Separate Waste from April 2014 to March 2015  
 200 ton/year (550 kg/day)  
**(very low mixture rate)**  
 not calculate the reduction rate yet


Need to increase the collection amount by increasing the number of bins or increasing the frequency of collection/transportation (at present, only once a day)

- Around 90% of collected vegetable waste is provided for pig farmers  
 It is impossible to use all the vegetable waste because the production capacity is limited.



### Compost Yard

- 5km from the Suva Market
- The space is limited
- Workers turn over compost manually  
 →it is difficult to make the heap large
- Input materials are shredded by a vegetable shredder
- 3 workers are assigned for the work at compost yard



### Result of Compost Project

- Sales of compost in 2014 (5kg/bag, \$2.50/bag)  
 497 bags (FJD 1,242.5)

**Keys to the successful result**

- ✓ Waste separation system works well in cooperation with separate collection system, vendors can minimize their waste discharge work
- ✓ SCC can assign enough number of workers
- ✓ Cooperation with pig farmers

**Issues to be solved**

- ✓ Need to increase the amount of collected vegetable waste (demand for vegetable waste is high and a large amount of waste is still left uncollected at the market)

### Ba Small Scale Market Compost Project






### Ba Market (1)

**Waste Generation Amount**

- ◆ 290 ton/year in 2012 (estimated by a survey in July 2012)
- ◆ 246 ton/year in 2014 (estimated by a survey in December 2014)

**Number of Vendors**

- Regular vegetable/crop vendors: 220
- temporary from Thursday to Saturday: 340





There is a large space behind the market building

### Ba Market (2)

**Waste Management System**

- Two types of bins, green wheelie bins for vegetable waste and half cut bins for rubbish, are placed throughout the market
- There is a waste discharge place between the market and compost yard, and waste is kept there until a collection vehicle comes

### Ba Market (3)

**Waste Separation Method**  
**2 Step approach**

1. First Step
  - To install 2 types of bins, green wheelie bins for vegetable waste and half cut bins for rubbish, at throughout the market
  - difficult to implement waste separation in the first step
2. Second Step
  - To separate rubbish again from vegetable waste in front of the compost yard
  - Separated rubbish is easily brought to a discharge place



### Ba Market (4)

**Amount of Collected Vegetable Waste**

- Result of Separate Waste from March 2015 to May 2015  
 12.8 ton/3 months (140 kg/day)  
 data collection system was established in March 2015, even though BTC resumed compost production in October  
 25% of the total waste generation amount
- All the collected vegetable waste is used for composting
- 860kg of dry grass was used as moisture controller for 3 months

### Compost Yard

- Just behind the market (**biggest advantage**)
- There is a large space, but it is necessary to set the limit of the production capacity because it's near the market (need to minimize problems such as odor and breeding of vermin)
- Workers turn over compost  
 →it is difficult to make the heap large
- 2 workers are assigned for the work at compost yard  
 1-2 hours/day  
 it is easy to work at the compost yard, because the compost yard is near the market




Size of Compost Yard: 6m x 4.5m

### Result of Compost Project

**Keys to the successful result**

- ✓ The locations of the market, compost yard, and waste discharge place are near each other  
 This makes it easy for the council to transport waste and to assign workers
- ✓ The location of waste discharge place make it possible to separate waste easily  
 No need to spend too much time for awareness activities

**Issues to be solved**

- ✓ It is difficult to enhance the compost reaction during the rainy season  
 A vegetable shredder could solve this problem

### Making a Plan

### Necessary Steps

1. To know/estimate the total waste generation amount at each market
2. To examine how much amount of waste is used for composting, and look for other uses of vegetable waste if necessary
3. To examine the waste separation, collection & transportation method
4. To examine the location of the compost yard, the possible number of assigned workers, a vehicle used for the transportation of vegetable waste
5. To examine the compost method, according to the conditions

Step 1

## Waste Generation Amount

- An Actual Measurement (by a weighbridge)
- An Estimation
  - Need to get the data every day for one week
  - Need to consider the seasonal fluctuation

Waste Generation Amount for one week at Lautoka Market (kg)

18/05/2015	19/05/2015	20/05/2015	21/05/2015	22/05/2015	23/05/2015
Mon	Tue	Wed	Thu	Fri	Sat
2,180	1,140	840	1,040	2,360	1,420

Monthly Waste Generation Amount in 2014 at Lautoka Market (ton)

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
80.4	61.0	79.9	82.6	61.6	72.0	45.2	47.4	45.3	38.5	36.8	55.1


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Step 1

## Waste Generation Amount

Estimate the volume of waste

- If waste bins are used
  - To count the number of bins
  - To calculate the total volume
- If there is a discharge place
  - To level the waste and to measure the length, width and height, before a collection vehicle comes




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Step 1

## Waste Generation Amount

Convert from the Volume to the Weight of waste using Apparent Specific Gravity (ASG), a kind of density of solid waste

- Examples of ASG
  - 0.39 kg/liter (WACS at the Lautoka market under the 3R project in 2008)
  - 0.27 kg/liter (market waste survey at the Ba market in 2012)



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Step 1

## Amount of Green Waste for Recycling

- Result of the market waste survey at the Ba market
  - 85 % of the total waste is green waste
- How much of the green waste can be separated from rubbish?
  - A certain percent of green wastes is mixed with rubbish and cannot be recycled

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Step 2

## Amount of Recycled Green Waste

- How many percent of the green waste is used?
- How to use the green waste?
  - Composting
  - Providing for pig farmers as feed
  - Providing for farmers as compost materials
- What amount of green waste is used as compost materials?

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Step 3

## Waste Separation Method

- Prepare for bins for green waste
- Need additional measures to make sure of waste separation (it is extremely difficult to implement waste separation among vendors and shoppers)
  - Two step approach: Lautoka and Ba
  - No bins for green waste at common places (all the bins are under strict control of collection workers): Suva

Health Inspectors are too busy to spend long time for awareness activities

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Step 4&5

## Capacity of Compost Production

- The amount of green waste available
- The size of the candidate site of the compost yard
- The environment of the candidate site of the compost yard
- The method of turning over, manually or using a machine
- The number of workers

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Step 4

## Other Input Materials

- Moisture Controller
  - Wood chips (source of fungi)
  - Sawdust
  - Dry grass (if the reaction temperature is low, this could be a source of weeds)
  - Copra Mill (if the price is low enough)
- Manures (manures could increase the reaction temperature, but you need to control the temperature in order to kill bacteria such as e-coli, parasites, insect pests, and so on)
- Boosters of compost reaction
  - Molasses, Rice bran,

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**(2) 発表資料 2 : スバ市場ごみコンポスト事業紹介**

<p>Training for Suva Market Waste Separation and Composting project.                  18/6/2015.</p>  <p>Robert Randolph                  SAHI/3R Project Officer</p>	<p><b>OUTLINE OF PRESENTATION</b></p> <ol style="list-style-type: none"> <li>1. Project Brief</li> <li>2. Investment Cost of Suva Market waste Separation and Composting Project.</li> <li>3. Operation Cost of Suva Market waste Separation and Composting Project.</li> <li>4. Results</li> <li>5. Challenges.</li> </ol>
<p><b>Project Brief - Suva market</b></p> <ul style="list-style-type: none"> <li>• Suva market Consist of different Section:  <u>Main Market – Monday to Saturday</u> <ol style="list-style-type: none"> <li>1. Top Floor – sale of dried goods</li> <li>2. Ground floor – sale of vegetables, fruits and root crops.</li> </ol>                     Market vendors – 400 vendors &amp; 1200 tables  <u>Market car park area – Thursday to Saturday</u>                      No. of vendors                      Thursday – 600 vendors                      Friday – 800 vendors                      Saturday – 1200 vendors.</li> </ul>	<p><b><u>Project Brief – Waste management in market</u></b></p> <ul style="list-style-type: none"> <li>• Approximately – 200 ton/month (Yao 2007)</li> <li>• Waste storage/carting by Carpenters Shipping. <u>9m<sup>3</sup>containers</u>                      average weight of waste – 1.5 to 2.5 ton/bin                      Rental Charge - \$3.00/day                      Cartage Cost - \$100.00/cartage                      Dumping fees - \$25.19/ton</li> </ul> 
<p><b>Project Brief: Suva Market Waste Generation</b></p>  <p><b>Approximately – 200 ton per month (Yao 2007)</b>  <b>70% organic and 30% Inorganic.</b></p>	<p><b>Project Brief – Waste Reduction Plan</b></p> <ul style="list-style-type: none"> <li>• Aim: <u>To reduce 15% of Organic waste to the landfill.</u></li> <li>• <u>Calculating waste reduction</u>  <math>0.7 \times 200 = 140\text{ton/month}</math>                      Reduction rate – <math>0.15 \times 140 = 21\text{ton/month.}</math></li> </ul>

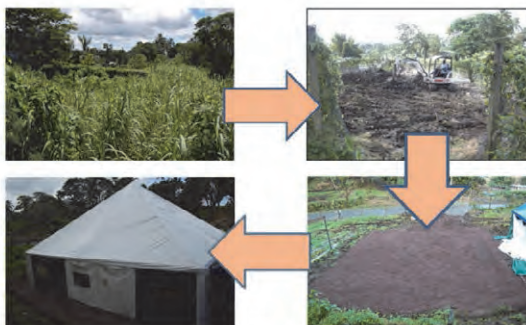


## PART 1: INVESTMENT COST OF SUVA MARKET COMPOST PROJECT

- Development of compost site
- Procurement of shredding machines

### Compost Site development - 2007 (Katsua Yao) Pilot project funded by SCC

Goal: Confirm the practicability of composting at the municipal level.



### Future Direction (Yao 2007)

#### Market waste collection

- Use of wheelie bins – Collection 2 – 4 times per month (up to 4 tons)
- 5 – 10 wheelie bins should be placed next to the designated vendors
- Cleaners in the market assist in collection of the bins and accumulate in the certain area
- Collection of the bins from the market to the Depot can be set as routine work for flying gang.

### Compost Facility upgrading

- Preparing funds for constructions (Funds from the central government, donor agencies)
- Building the proper concrete structures e.g. cost for 10 X 15m structure is about \$15,000, receivable capacity up to 16 tons per month
- Hiring 3 – 4 workers for actual composting
- Constant logistics for collecting waste needs to be set up
- Provide compost to the consumers constantly

### Improvement to compost site – 2014 funded by Japanese Embassy - \$FJD 89,000.00



### Procurement of Shredding machine

#### Vegetable Shredder

Model: APO-1200  
 Cost - \$FJD5,880.00  
 Sponsored by JICA  
 Vat \$882.00 paid by SCC  
 Procurement through  
**B.Kantilal & Co.**



#### Wood Chipper

Model: New Vermeer BC  
 1000XL Wood Chipper.  
 Cost - \$FJD145,000.00  
 Paid by SCC  
 procured by **Niranjans**



## PART 2

### OPERATION COST OF EACH PROCESS OF SUVA MARKET COMPOST PROJECT

1. MARKET LOGISTICS
2. TRANSPORTATION LOGISTICS
3. COMPOST SITE LOGISTICS.

Operation Cost of Suva market Composting project –  
market Logistics

A. Waste Separation Bins

Waste Separation Bin Size	Cost for 1 bin	No. ordered	Total cost
240 liters	\$249.00	40 bins	\$9,960.00
120 liters	\$129.00	4 bins	\$516.00
<b>Total</b>		<b>44 bins</b>	<b>\$10,476.00</b>



Operation Cost of Suva market Composting project –  
man power

- 1 worker is allocated in the market from 7am – 12.00pm
- One driver to drive truck
- 2 more workers to assist in loading bins onto truck



Suva Market Waste Separation and Composting process logistics.

Officer	7am	8am	9am	10am	11am	12am
Assistant Compost technician	Arrives in market. Places bin in areas	Monitor bin & does awareness			Start removing filled bins to collection point	Loading to truck and goes with truck to compost site.
Driver	Drive for Depot				Collect empty bins from Compost site to market.	Drive truck back to compost site
Assistant Compost Technician	Compost site				Goes with the truck to mkt Assist in loading empty bins	
Mkt Cleaner	Mkt work				Assist in loading	

Operation Cost of Suva market Composting project -  
Waste transport

- Vehicle for waste transport
- Council has allocated CK 820 a 5 ton truck to be used in market run.



- In case of breakdown:
- Truck HP006, or van FJ084/FJ085 for transportation.

Truck Route



Operation Cost of Suva market Composting project –  
Awareness Material

Type of awareness material	Donor Agency	No. ordered	Total Cost
Flyers			
Posters			
Drop down banners	JPRISM		\$3,174



Compost Site

- Compost site workers – 3
- Workers consist of
- Compost technician
  - 2 Assistant Compost technician

Suva Compost Site logistics

Worker	7 – 10am	10 – 12pm	12 – 1pm	2 – 4pm
Compost Technician		Check temperature Turn windrow Sieve/packing compost Pack recyclables	Assist in Unloading bins Assist in recording weight	Construct new windrow. Work with pig farmers.
Assistant Compost technician		Assist Compost technician	As above	Clean bins & compost site Assist above.
Assistant Compost Technician		Market	Unload bins Record weight	As above

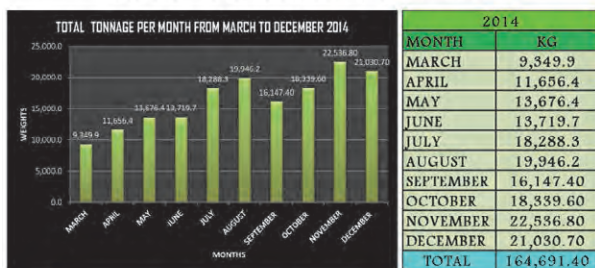


### Pictures of compost activity



### RESULT/ARCHIEVEMENTS FOR 2014

#### Market Waste Removal 2014



About 10 – 11% achievement rate  
 Target – 15%

#### Compare Use of market Waste

Month	Green Feed (kg)	Compost (kg)	Total (kg)
March	7,046.7	2,303.20	9,349.9
April	8,189.8	3,466.60	11,656.4
May	11,803.9	1,872.50	13,676.4
June	12,722.1	997.6	13,719.7
July	16,871.5	1,416.8	18,288.3
August	19,137.7	808.5	19,946.2
September	14,445.9	1,701.50	16,147.4
October	17,581.6	758	18,339.6
November	14,601.5	7,935.30	22,536.8
December	18,283.3	2,747.4	21,030.7
<b>Total</b>	<b>140,684.0</b>	<b>24,007.4</b>	<b>164,691.4</b>

#### Compost Sale 2014.

Month	No. Of Bags	Weight (kg)	Sale (\$)
January	47	234	117.50
February	15	75	37.50
March	99	495	247.50
April	69	345	172.50
May	Nil	-	-
June	60	300	150.00
July	62	310	155.00
August	68	340	170.00
September	59	295	147.50
October	31	155	77.50
November	Nil	-	-
December	73	365	182.50
<b>Total</b>	<b>583</b>	<b>2,915</b>	<b>1457.50</b>



#### Estimated savings for 2014

- (Estimated) Dumping fees - \$25.19/ton  
 $164.69\text{ton} \times \$25.19 = \$4148.60$
- (Estimated) Cartage & Rental - \$100.00 cartage and \$3.00/day. (Estimated 2.5 ton fills up skip bin)  
 Cartage:  $164.69/2.5 = 65$  trips for 2014  
 $65\text{trips} \times \$100 = \$6,500.00$

#### CHALLENGES IDENTIFIED WITH SOLUTIONS

1. Cooperation of all stakeholders
  - Vendors (know them to convince them)
  - Different sections within SCC (Share same goal)
  - MoA (Sell the idea)
  - Pig Farmers. (convince them of the math's & benefit)
2. Amount of waste collected vs area of composting site. (Proper planning and explore other ways to use market waste)
3. Damages to collection bins. (Plan how to prevent damages to bin)
5. Collect and analyze Data. (Change reporting system)

#### CHALLENGES IDENTIFIED WITH SOLUTIONS

- Break down of truck. (one truck & van available)
- Staff absent. (2 staff trained to work in project)
- Smell nuisance (use of brown grass)

#### CHALLENGES

- Collection on Saturday
- Collect 21 ton per month of market waste.
- Training of staff in composting techniques.
- Leachate problem.



