



Nala Nala Raajje

Waste Awareness Resource Kit: [Retailers](#)



Prepared for Environment Research Centre, Ministry of Environment, Energy and Water
– Republic of Maldives

March 2009



LIVE&LEARN
Environmental Education

Live & Learn Environmental Education: PO BOX 3007 Male' Maldives
M: (+960) 3303585 E: livelearnmaldives@yahoo.com <http://www.livelearn.org>

Written by: Fathimath Shafeeqa, Mausooma Jaleel, Elaine Glen, Gayle Seddon, and Mariyam Shazna

Proofed by: Beverly McAloon and Ali Adam

Design and layout by: Live & Learn Environmental Education, Karen Young

Illustrations by: Mariyam Omar

Photography by: Live & Learn Environmental Education and Ali Nishan

© Copyright: Environment Research Centre and Live & Learn Environmental Education

Disclaimer: This report was prepared by consultants for ERC. The findings, interpretations, and conclusions expressed in it do not necessarily represent the views of ERC. ERC does not guarantee the accuracy of the data included in this resource kit and accepts no responsibility for any consequences of their use.



Contents

1. Introduction	5
7th National Development Plan	5
National Solid Waste Management Policy	5
Waste Awareness Program: Framework for Action 2007-2012	6
Purpose	7
Who can use this Resource kit?	7
How to use this Resource Kit	7
2. A Critical Thinking Approach	8
Why use a Critical Thinking Approach?	9
Critical Thinking Module in this Resource Kit	9
3. Message Theme 1: Waste Reduction and Minimisation	11
Introduction	11
Learning Objectives	11
Overview of Topics	11
Activities	12
<i>Activity 3.1: Waste Detective</i>	12
<i>Activity 3.2: Time line</i>	14
4. Message Theme 2: Socio-economic and Environmental Issues Associated with Poor Waste Management Practices	15
Introduction	15
Learning Objectives	15
Overview of Topics	15
Activities	16
<i>Activity 4.1: Dramatic Connections</i>	16
<i>Activity 4.2: Waste in the Sea</i>	18

5. Message Theme 3: Stakeholder Responsibility for Managing Waste Effectively	19
Introduction	19
Learning Objectives	19
Overview of Topics	19
Activities	20
<i>Activity 5.1: Taking a Stand on Waste (Values Continuum)</i>	20
<i>Activity 5.2: You are Responsible for Your Waste</i>	22
6. Message Theme 4: The Polluter Pays Principle Means that Waste Management Services in the Maldives Comes at a Cost	23
Introduction	23
Learning Objectives	23
Overview of Topics	23
Activities	24
<i>Activity 6.1: Who Manages Waste?</i>	24
<i>Activity 6.2: Waste Management Plan</i>	25
Resource Sheets	26
1. Waste Reduction Plan Templates	27
Fact Sheets	30
3. 1. Waste - We all Produce it - Let's Reduce It!	30
3. 2. Do the Right thing- Reduce, Reuse, Recycle	35
3.3. Don't be Shy- Say no to Plastic Bags!	38
4.1. Good Waste Management- Happy, Healthy, Wealthy.	40
4.2. Do the Right Thing- Recycle Right	42
4.3. Do the Right Thing – Burn Waste Correctly	44
4.4. Do the Right Thing- Mulch or Compost Organics for Your Garden	46
5.1. Nala Nala Raajje? - it's up to us	54
6.1. To be Waste Free There's a Fee	55
Glossary	57
References	57
Useful Links	58

1

Introduction

The environment in the Maldives is being placed under increasing pressure from a growing population, changing lifestyles and improvements in living standards. Waste is being generated in ever growing volumes. Without adequate treatment and disposal of the waste, the risk of polluting the environment is becoming even greater. Waste management has become one of the most pressing environmental issues in the Maldives. The Maldives, as with many other small island developing states, has unique challenges in relation to waste management including: transportation costs, lack of infrastructure, remoteness, lack of a cost recovery mechanism and appropriate technologies.

In response to this issue, the Government of the Maldives, with the support of international donors, has developed a range of policies and strategies for improved waste management in the Maldives, including the following:

7th National Development Plan

The 7th National Development Plan (2006-2010) of the Government of the Republic of the Maldives has recognized the importance of waste management at the national level. The Plan identifies the following policy objective for the waste management sector:

Policy: Enable management of solid waste to prevent impact on human health and environment through approaches that are sustainable and locally appropriate.

National Solid Waste Management Policy

In February 2008 the National Waste Management Policy was launched to provide national vision and objectives for the solid waste sector with 11 specific policies including:

- Government structure for Solid Waste Management which will distribute clearly delineated roles and responsibilities for solid waste management at island, regional and national levels will be established;
- All waste producers have a duty to manage the wastes they generate;
- Wastes will be managed and disposed as close as possible to their place of generation;
- The waste management system will accommodate the specific requirements of special wastes;
- Waste management planning will be based on verifiable facts and known effective strategies;
- The waste management system will be financially viable;
- Consolidated legislation will be introduced and supported by strong enforcement action;
- Private Sector Participation (PSP) will be facilitated where it is financially viable for both the Government and Private Sector;
- Financial incentives and disincentives will be pursued to support good waste management practices;
- Goods that are harmful to the environment or cause public nuisance and unacceptable waste activities will be discouraged;
- The community participation in and awareness about good waste management will be maximized.

The policy provides a systematic national approach to waste management by clearly expressing a strong, consistent vision, philosophy, strategic framework and priorities for action that will address the nation's waste issues.

Waste Awareness Program: Framework for Action 2007-2012

Public awareness has been identified as a key component in improving waste management practices. A Framework for Action (FFA) for the Maldives National Public Waste Awareness Program 2007-2012 has been developed to provide a clear, consistent framework and key messages for waste awareness initiatives for all stakeholders to follow.

Program Objective: “To increase knowledge and awareness about waste management issues in the Maldives via the dissemination of key messages, to foster a more aware and informed public”.

The framework has been designed with the theme of ‘Nala Nala Raajje’ (meaning keep Maldives Beautiful). The framework outlines 4 key message themes for stakeholders to share with key target groups; 1) Waste Reduction and Minimisation, 2) Impacts of Poor Waste Management, 3) Stakeholder Responsibility and 4) Polluter Pays.

Under the framework these messages can be communicated through a variety of mechanisms, including TV, radio, posters, newspapers or resource kits, such as this one. The 4 message themes from the framework have been incorporated as specific chapters in this Waste Awareness Resource Kit- Community.



Purpose

This resource kit provides information and activities to increase knowledge and awareness of waste issues for communities in the Maldives. The kit explores the 4 message themes and the associated issues using a critical thinking approach.

This toolkit aims to:

- Promote critical thinking;
- Create positive values, awareness and responsibility towards waste management;
- Create opportunities to investigate and research waste problems;
- Provide opportunities to take positive action to address waste issues.

Who can use this Resource Kit?

This resource kit has been designed to be used by community based facilitators. These facilitators may come from many organisations including schools, scouts/environment clubs or community based organisations.

How to use this Resource Kit

Chapters 1 and 2 provide an introduction and background information that can be read prior to undertaking activities. Chapters 3, 4, 5 and 6 provide the background information to the specific messages and activities under each message theme.

Chapter

2

A Critical Thinking Approach

...What do I believe?

...What's my opinion?

...What shall I do about this?

...How does this affect me?

...What could this lead to?

...What are the alternatives?

...Do I agree with this idea?

...Is this relevant in my community?

...Who is responsible?

...Is there a hidden agenda?

...What is their motive?

Raising Awareness of Waste Issues

A Critical Thinking Approach

The focus of past environmental education approaches in the Maldives has been awareness and knowledge based. Unfortunately experience has shown that awareness alone does not change behaviour. Placing greater emphasis on action oriented environmental education is critical to success. The promotion of critical thinking and learning by doing, will provide the basis for behaviour change, which is the ultimate goal.

Why use a Critical Thinking Approach?

The ability to think critically is essential if individuals are to live, work, and function effectively in our current and changing society. Developing workable solutions to environmental problems will require choices and decisions based on a critical examination of information and opinions.

Critical thinking requires retailers to ask questions that challenge their thinking. Some examples are: Who makes decisions affecting the environment? Why are they made? Who benefits from decisions? Are the long-term consequences considered? Which decisions promote sustainable development and what opposition are these likely to encounter?

Retailers must make choices, evaluations, and judgments every day regarding

- Information to obtain, use and believe,
- Plans to make, and
- Actions to take.

Critical Thinking Module in this Resource Kit

In order for the Nala Nala Raajje campaign to reach its full potential, all stakeholders need to reflect on their own values and attitudes towards the environment and waste management. This challenges retailers to ask themselves where they stand on waste management issues and how they have formed their view.

The following diagram shows how a critical thinking model has been included in the design of this resource kit.

Activities

Figure1: A Critical thinking Model

Model

STEP 1: Consider an idea or information

Retailers are presented with a concept, idea or information to consider. These can be sourced from many different media, including a person's opinion, a question, a media article, a cartoon, artwork etc.



STEP 2: Think critically about the idea or information

- What does it mean?
- What is its purpose or agenda?
- Who is it from and what is their intention?
- Do I agree with it? Is it valid?
- Is it relevant in my community?
- What are the alternatives to this idea?



STEP 3: Investigate the idea or information

Retailers will design methods to test the information or ideas in their own community.



STEP 4: Take action on the idea or information

Retailers will critically reflect on their responsibility with respect to the information and ideas, and formulate an appropriate response.

Plan



Consider one or more of the Nala Nala Raajje waste awareness materials (posters, TV spots etc)



Think critically. Group activities based on dialogue – prompting conversations and giving opinions:
Activity 1: Waste detective
Activity 2: Time Line



Investigate

Activity 3: Dramatic connections
Activity 4: Waste in the sea
Activity 5: Taking a stand on waste
Activity 6: You are responsible for your waste



Take action

Activity 7: Who manages waste?
Activity 8: Waste management plan

Message



Waste Reduction and Minimisation

Introduction

In recent years, rapid population growth of 1.9%, changing consumption patterns, transportation difficulties and booming industries have contributed to the growing quantities of waste in the Maldives. This message theme aims to create awareness of how our consumption and lifestyle leads to increased volumes of waste that need to be managed.

The purpose of this chapter is to develop the retailer's understanding of the link between our consumption and lifestyle and growing volumes of waste. The purpose of this chapter is also for community members to learn how to reflect critically about waste issues, and their roles and responsibilities to help reduce and minimise waste amounts.

Learning Objectives

The objectives of the chapter are to:

- Enhance awareness and understanding of issues associated with increasing waste production
- Create positive values, awareness and responsibility about the waste we all produce
- Create opportunities to investigate and research problems about waste issues
- Provide opportunities to take positive action to address waste issues

Overview of Topics

- Waste - We all produce it - Let's Reduce it
- Do the Right Thing - Reduce, Reuse, Recycle
- Don't be Shy- Say No to Plastic Bags



Activities

Activity 3.1: Waste Detective

Purpose: To understand the difference between organic, inorganic and hazardous wastes and be able to identify these wastes by examining products found in everyday situations

Time: 1 hour (group session) + individual survey work at home

Materials: Writing material, pens or pencils, Fact Sheet 3.1 Waste- We all produce it- Let's Reduce It

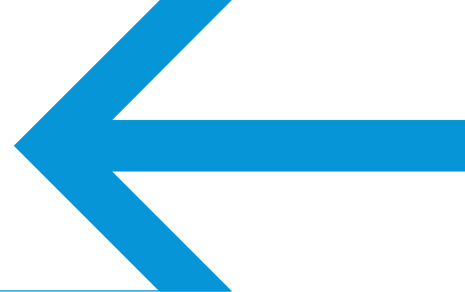
What to do:

1. Introduce the training staff to participants.
2. Use the 'Who am I' ice breaker activity for the introduction.
3. Make a series of cards with the name of one item that commonly ends up as waste clearly written on one side. E.g.: nappy, plastic bottles, margarine container, fish bones, lettuce leaves, corrugated iron, plastic bags, glass bottle, shoes etc:
4. Affix one card to the participants back. Make sure they do not read it.
5. Everyone should be standing ready to interact.

Instructions

6. Tell each person that they have a name of an object that commonly ends up as waste written on their backs.
7. Their task is to work out what it says by asking the other participants questions.
8. The answers can only be yes or no.
9. It is okay to ask, am I organic but not where do I come from.
10. Ask participants to introduce themselves when they are asking the question.
11. The activity ends when everyone has correctly guessed what is on their backs.
12. Explain the difference between 'organic,' 'inorganic,' 'residual' and 'hazardous' wastes. Read and discuss Fact Sheet 3.1
13. Ask participants to think about the types of wastes that they usually throw away in the shops. Request the group members to suggest examples of everyday wastes, and list them under the headings organic, inorganic, residual and hazardous. Which types of wastes do they think would be most common?

Activities



14. Ask the participants to make a survey of the types of waste that her/his shop throws away over a set time period (e.g. in a couple of days or one week). The wastes should be sorted under the categories of organic, inorganic, residual and hazardous. Ask participants to construct a table like the one below:

	Organic	Inorganic	Toxic
Today	Fruits and vegetables	Plastic bags, 2 chip packets, corned beef can	1 x car battery

15. After everyone has completed their survey at the work place, ask participants to work in small groups to compare what they found. Encourage participants to discuss whether they think their wastes are sorted under the correct categories.
16. Instruct participants to make a giant wall chart by writing the headings 'organic,' 'inorganic,' 'residual' and 'hazardous' and pinning examples of these wastes underneath (or attaching pictures or photographs of the waste).

Reflection and Drawing Conclusions: (Discuss the Following)

- How did the results of the survey differ from participant's predictions before the survey? Which wastes were most common?
- Which type of wastes are the most difficult to dispose of? Which ones are easiest? Why?
- Why is so much waste created today? Has it always been this way?
- How could you reduce the amount of waste that was produced during the survey?

Extension:

Undertake a survey of litter (waste that has been irresponsibly 'thrown away').

What are the most common items? What categories of waste are they?

Which items are likely to be the most damaging to the environment?

Activities

Activity 3.2: Time Line

Purpose: To critically examine the reasons for increasing waste production in the Maldives and how we can all reduce our waste production.

Time: 2 hours (group session)

Materials: Writing material, pens or pencils, TV Spot 1 from resource kit CD, large sheets of kitchen paper and cards, Fact Sheet 3.2 Do the right thing – Reduce, Reuse, Recycle, Fact Sheet 3.3 Don't be shy-say no to plastic bags

What to do:

1. Ask the group to consider their shops. What wastes are produced from the shops? Are waste volumes increasing? Ask the group the reasons why waste is increasing in their shops.
2. Write the birth year in the cards.
3. Stick the cards on a large number line pasted on the wall or kept on the floor.
4. Ask the groups to consider when they were 5-10 years old. What kinds of waste were produced in the shops?
5. Make a list on large paper; write a list of waste produced from the shops.
6. Identify any changes to the waste produced from the shops now and list.
7. Show the groups TV Spot 1.
8. Provide the groups with 3 strips of paper and write 3 reasons why waste is increasing in their own island/Atoll.
9. Introduce the waste hierarchy by getting participants to sequence the elements in the waste hierarchy. Give each group the waste hierarchy elements and the background and ask them to sequence and present.
10. Introduce the hierarchy and discuss the benefits.
11. Provide the groups with large paper and write down how waste can be reduced, reused and recycled in their shops.



Message



Socio-economic and Environmental Issues Associated with Poor Waste Management Practices

Introduction

As our lifestyles have changed, so too have our waste streams. Wastes are no longer just composed of organic materials; they also are made from metals, plastics and hazardous wastes. Also, we are producing a lot more waste. This means that dumping mixed waste around our islands at different places on the beach or forest, or burning it, is no longer effective in removing waste from our islands. These new wastes do not breakdown quickly, so the wastes remain on our islands for longer, potentially affecting our health, environment and livelihoods.

The purpose of this chapter is to develop the community's awareness of the **environmental, social and economic impacts** of poor waste management practices and explain why waste management is so important, by promoting the benefits of good waste management practices.

Learning Objectives

The objectives of the chapter are to:

- Enhance awareness and understanding of socio-economic and environmental issues associated with poor waste management practices
- Create positive values, awareness and responsibility about the waste we all produce
- Create opportunities to investigate and research problems about waste issues
- Provide opportunities to take positive action to address waste issues

Overview of Topics

- Good Waste Management- happy, healthy, wealthy
- Do the Right Thing- Recycle right
- Do the Right Thing - Burn Waste correctly
- Do the Right Thing - Mulch or compost organics for your garden



Activities

Activity 4.1: Dramatic Connections

Purpose: To highlight the connections between waste and impacts on social economic and environmental issues.

Time: 2 hours

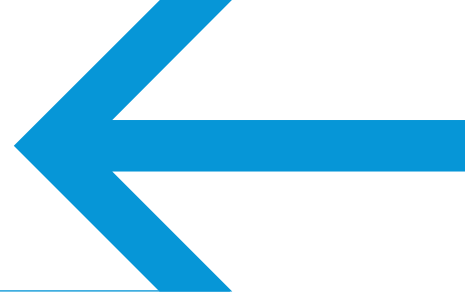
Materials needed: Fact Sheet 4.1 Good Waste Management- Happy, Healthy, Wealthy , Fact Sheet 4.2 Do the right thing- Recycle right, Fact Sheet 4.3 Do the right thing – Burn waste correctly, Fact Sheet 4.4 Do the right thing – Mulch or compost organics for your garden.

What to do:

1. Divide participants into three groups. The optimal number in the group is six, however this isn't essential. Provide each group with one of the lists from the table below.

List 1	List 2	List 3
A super market or store	A baby	A drain filled with litter
A dead marine turtle	A well	An angry headmaster or principal
A happy jellyfish	A person drinking	Very bad smell
A plastic bag	Several dirty nappies	Junk food
A person shopping	An empty rainwater tank	Happy canteen lady
A sad old man	A person with diarrhoea	Child not feeling well

2. Ask each group to prepare a short drama / role play that must include each of the six objects or people on their list. The participants are allowed to speak during the performance and may like to develop a script (this is optional).
3. Explain that the list can be arranged to tell a story that shows relationships between the environment and peoples lives. There is no right or wrong order to use the objects or people (from the list) in the drama.
4. Allow sufficient time for the groups to prepare a drama performance (e.g. 15-20 minutes), and 5 minutes for each performance.



Reflection and Drawing Conclusions:

- After each performance ask the participants: what was the message in the performance?
- Do you agree with the links that were made between people and the environment?
- Ask the performers: did you get your message across?
- What were the relationships that you were trying to show? Is this a realistic scenario in your community?

Extension:

Ask the participants to make up another drama about waste that link together social, economic and environmental issues. This time don't give them a list and have them create six of their own objects or people that will be included.

Now that participants have made connections between social, economic and environmental issues, challenge them to consider what they should do with this knowledge. Should they take some action?



Activities

Activity 4.2: Waste in the Sea

Purpose: To critically examine the relationship between poor waste management and effects of waste in the sea.

Time: 1 hour (group session)

Materials: Writing material, pens or pencils, TV Spot 2 from the resource kit CD

What to do:

1. Ask the group to consider their island and surrounding beaches and the sea. Is the sea polluted? If so by what types of waste.
2. How are you affected by poor waste management? Does it affect the life in the sea? Does it affect your health? Does it affect your livelihood?
3. Show the groups TV Spot 2.
4. Conduct a PMI on the TV Spot (you may wish to watch them several times). The PMI requires groups to write down the plus, minus and interesting aspects of the ideas contained in the advertisements (on the cards provided).
 - P= Plus: The things that you thought were good about the ideas in the advertisements
 - M= Minus: The things that you thought were negative about the ideas in the advertisements
 - I= Interesting: The ideas that were neither good nor bad but are worth noticing
5. Collate a big list of the results under the headings plus, minus and interesting.
6. Undertake a discussion about the PMI results with participation of the entire class. Ask students to think about their initial reactions to the advertisements by providing the reasons for their PMI results. *Why did you think the plus ideas were good? Why didn't you like or agree with the minus ideas? What exactly was interesting about the interesting ideas?*



Message



Stakeholder Responsibility for Managing Waste Effectively

Introduction

Traditionally we have discarded our waste either on the beaches or at sea, and due to its mostly organic nature it was not a long term problem. However as the type and volume of waste has changed and become more serious, we have begun to recognize that we now have to take responsibility for our waste. Waste management is not just the responsibility of the government, it is everyone's responsibility. Effective waste management requires everyone- government, business, households, schools and individuals- to play their part in managing waste responsibly.

The purpose of this chapter is to develop the retailer's understanding that waste management is everyone's responsibility. The purpose of this chapter is also for community members to learn how to reflect critically about waste issues, and about their roles and responsibilities.

Learning Objectives

The objectives of the chapter are to:

- Enhance awareness and understanding of the responsibility of stakeholder groups, households and individuals in managing waste effectively
- Create positive values, awareness and responsibility about the waste we all produce
- Create opportunities to investigate and research problems about waste issues
- Provide opportunities to take positive action to address waste issues

Overview of Topics

- Nala Nala Raajje? – It's up to Us

Activities

Activity 5.1: Taking a Stand on Waste (Values Continuum)

Purpose: To critically think about who is responsible for waste issues, listen to and consider a range of views, and develop and express opinions about taking responsibility for waste.

Time: 1 hour

Materials needed: A sign that reads ‘strongly agree’ and one that reads ‘strongly disagree,’ Fact Sheet 5.1 Nala Nala Raajje?- It’s up to us

What to do:

1. As a group, read Fact Sheet 5.1. Discuss the ideas and issues raised in the fact sheet.
2. Write down a statement on a piece of paper that says: “the Government is responsible for fixing the waste problems on our island.”
3. At one end of the room place the sign that reads ‘strongly agree’ and at the opposite end place the sign that says ‘strongly disagree.’ Draw a line between the two signs using chalk or masking tape.
4. Present participants with the statement “the Maldives Government is responsible for fixing the waste problems on our island” and tell them that they must consider this and decide if they support it or reject it. If they strongly agree they should stand closest to the strongly agree sign, if they strongly disagree they should stand at the opposite end of the room, next to the strongly disagree sign. They can also choose to stand anywhere else on the line in-between the two extreme opinions which represents a continuum (e.g. agree to some extent), or in the middle (agree and disagree to the same extent). *NOTE: it is important to tell the participants that there is no ‘right or wrong’ answer, however they must think of reasons for their position.*



5. Ask the participants to provide their reasons for why they have decided to stand on their position on the line. If the participants are clustered in groups, you may give them time to discuss their reasons between themselves and then select a spokesperson.
6. After each participant or group speaks the others should be encouraged to ask them questions. Allow each student or group the opportunity to have their say.
7. Having considered a range of opinions, encourage the participants to change their point of view (where they stand on the line and on the issue). Explain the importance and value of considering a range of ideas and being prepared to change your mind.



Reflection and Drawing Conclusions: (Discuss the Following)

- Ask the participants: if you changed your minds, what were some of the things that made you change?
- Why is it important to hear a range of views or opinions about an issue such as waste?
- In what ways has this discussion increased your understanding about the waste issue?

Extension:

- Repeat the activity using other statements that you develop. Here are some more examples: 'Business and industry are responsible for waste,' 'Waste dumping is a more important issue than water quality.'
- Now that you have discussed who is responsible, what should you do to make sure these responsibilities are fulfilled? Work together to undertake a community action against waste

Activities

Activity 5.2: You are Responsible for Your Waste

Purpose: To critically examine the roles of stakeholders in managing waste.

Time: 1 hour (group session)

Materials: Writing material, pens or pencils, Reduce, Reuse, Recycle Poster.

What to do:

1. Ask the group to consider their shop. Who is responsible for waste produced in the shop?
2. Refer to the list that they have filled in for one day.
3. Show the groups TV Spot 3.
4. Think for yourself how this could be applied in your own situation. Give them 5 minutes to think silently.
5. Discuss with your partner on how this could be applied at your home and work.
6. Provide the groups with the poster on Reduce, Reuse and Recycle.
7. Discuss in the group and come up with a practical suggestion for your own self.
8. Note it down on paper.
9. Present to the whole group and discuss.
10. What are the actions that they can take at their own level at home and work place to contribute to improved waste management?



Message



The Polluter Pays Principle Means that Waste Management Services in the Maldives Comes at a Cost

Introduction

Unique geography poses a key development challenge for the country. The dispersion of the population across the Archipelago raises the cost of delivering services, as economies of scale are difficult to achieve in service provision.

The purpose of this chapter is to develop the community's understanding that costs associated with the provision of waste management services need to be equitably shared amongst the users of waste services. The purpose of this chapter is also for community members to learn how to reflect critically about waste issues, and about their roles and responsibilities.

Learning Objectives

The objectives of the chapter are to:

- Enhance awareness and understanding of the polluter pays principle and that waste management services in the Maldives comes at a cost
- Create positive values, awareness and responsibility about the waste we all produce
- Create opportunities to investigate and research problems about waste issues
- Provide opportunities to take positive action to address waste issues

Overview of Topics

- To be Waste Free There's a Fee



Activities

Activity 6.1: Who Manages Waste?

Purpose: To critically examine the issues associated with the polluter pays principle.

Time: 30 minutes (group session)

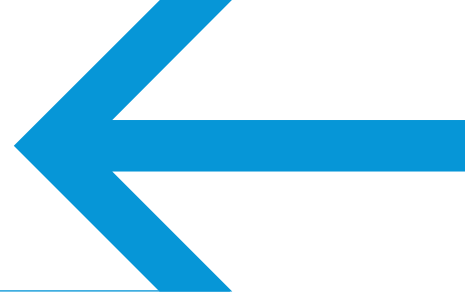
Materials: Writing material, pens or pencils, TV Spot 4 from the resource kit CD, different coloured cards.

What to do:

1. Ask the group to consider their shop. Who pays for waste management on the island? Who should pay for the collection and disposal of waste? Make a list on large paper.

Who manages waste at the shop now?	Who should pay for the waste?	Who is responsible in your shop to organize the waste management activities?

2. Show the groups TV Spot 4.
3. Provide the groups with card paper to write on and at the end paste on the big structures sheet.
4. Provide the groups with the case study from N. Holhudhoo to give them an idea of how 'polluter pay' is introduced and implemented on this island.
5. Ask groups to think of how such a system could be implemented on their island. Discuss.



Activity 6.2: Waste Management Plan

Purpose: To critically think about how waste could be managed at island level and draft a waste management plan.

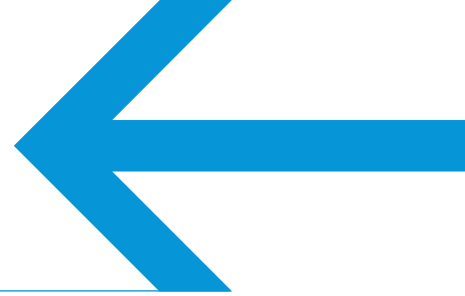
Time: 2 hours

Materials needed: Island Waste Management Guidelines by ERC in resource kit, sheets of paper, markers and pencils

What to do:

1. Prior to the start of this activity, read and discuss the fact sheets about types of wastes and the 4Rs – reduce, reuse, refuse and recycle.
2. Ask participants to bring their lunch along to the activity.
3. Organise the participants into small groups. Ask each group to carefully examine their lunches and identify those products that will become solid wastes. For example plastic wrappers, aluminum cans, glass bottles, paper etc.
4. Challenge the participants to find a way to have a waste free lunch. This can be achieved by any of the following methods:
 - *Reduce:* choosing to purchase or consume less of a certain product
 - *Reuse:* find another use for the item so that it is no longer considered waste (e.g. a water bottle can be refilled and used again)
 - *Recycle:* turn the used product into something else that can be used again (e.g. give the aluminum can to a recycling company, or compost green waste into soil)
 - *Refuse:* refuse to purchase or consume something that contains waste by substituting it for an alternative
5. Ask each group to report back to the main group with their findings.
6. Encourage the participants to bring their lunches to the next session and challenge them to make it a waste free lunch! Alternatively design a lunch / morning tea or catering for a workshop or community event that does not create waste.
7. Provide the group with the guidelines to develop a waste management plan at their own level.

Resource and Fact Sheets



1. Waste Reduction Plan Templates (Make copies for all the groups)

Individual Actions:

- What each organisation/retailer can do
- Actions we can take on our own

1. Go through the guidelines with the participants and highlight the important points.
2. Provide the groups with a big sheet of paper and ask them to note down the important points for their island.
3. Present the draft plan.

Actions to **REDUCE** the amount of waste:

Actions we will take	Time frame/date	Who is responsible?	What are our targets? How will we know it is successful?
E.g. Encourage shoppers not to use plastic/ask shoppers if they need a bag			- Number of plastic bags purchased



Resource Sheet 1

Actions to **REUSE** waste:

Actions we will take	What are our targets? How will we know it is successful?

Actions to **RECYCLE** waste:

Actions we will take	What are our targets? How will we know it is successful?

Resource Sheet 1



Collective Actions: Actions we can take as a group.

Actions to **REDUCE, REUSE & RECYCLE:**

Actions we will take	What are our targets? How will we know it is successful?

Fact Sheet 3.1

Waste – We all Produce it – Let's Reduce it!

Waste is anything that is left over or can no longer be used. We all produce waste as a part of everyday living but we do not normally think too much about it. We just put our waste in the Island Waste Management Centre every week or arrange for someone to pick up the waste and take it away. Until a few generations ago, waste was not a major problem in Maldives, mainly because people did not produce much waste and whatever produced was mostly organic in nature. In the past:

- People utilised resources much more efficiently. For example the coconut palm was used extensively, traders carried goods like vegetables in hand-woven containers.
- Things were made and packaged with organic materials. Now many things are made from imported materials, such as plastic.
- Products were made to last. Now we are becoming a 'disposable society' with products made to be replaced.
- The Maldives population was smaller than it is now.

However, we all have to start thinking about the things we throw away because waste is being generated in ever growing volumes. Without adequate management, the risk of polluting the environment is becoming even greater. The Environment Research Centre has been tracking the increase in waste. In 2001 the average rate of generation of waste in Male' was approximately 1.1kg per person per day, in the atolls it was 0.7kg per person per day and at the resorts it was 3.5kg per person per day! Every year this volume is estimated to be increasing by 4%, so in 2007, it is estimated that 233,000-248,000 tonnes of waste will be generated across the country (enough waste to fill our National Stadium 50 times each year) and in 2020 this figure will be over 300,000 tonnes. That's a lot of waste and it is a real challenge for us here in the Maldives. In the Maldives we need to think about the amount of waste we are producing and where it is going, so that we can manage it better.



Fact Sheet 3.1

Waste – We all Produce it – Let's Reduce it!



پلاستک
Plastics



فلزات
Metals



ساخت و تخریب
Construction and Demolition Waste



آلی
Organics



باقی‌مانده
Residuals



خطرناک
Hazardous Waste

Types of waste

Some types of waste are easier to manage than others. Some wastes can be recycled, others burnt or composted. Some types of waste are also more harmful to the environment and human health than others. Therefore different types of waste need to be managed in different ways.

Inorganic waste

Inorganic waste is made from materials that do not come from plants or animals (e.g. plastics, metals etc). This waste does not readily break down (decompose). Other examples are; demolition waste such as building rubble, bricks, concrete, plastics, metals and glass.

Organic waste

Organic waste comes from plants and animals. Organic waste includes household food waste, green waste (leaves, twigs etc) cardboard, paper and certain wastes arising from commercial and industrial sources (e.g. sawdust from carpentry). Some kinds of organic waste (called putrescible waste) will easily decompose and breakdown (e.g. kitchen waste). However organic wastes such as paper and cardboard will take longer to decompose.

Residual waste

Residual waste is inorganic waste that can not be recycled or reused and which must be disposed of. These include plastic packets and containers, such as primary packaging.

Hazardous waste

Medical wastes, that is, wastes generated at medical facilities, can be infectious, toxic, and/or radioactive. Though they may have hazardous characteristics, they are not regulated as hazardous wastes. Some medical wastes are sterilized, disinfected, or incinerated, especially infectious wastes. Recycling and landfilling are also used to dispose of them.

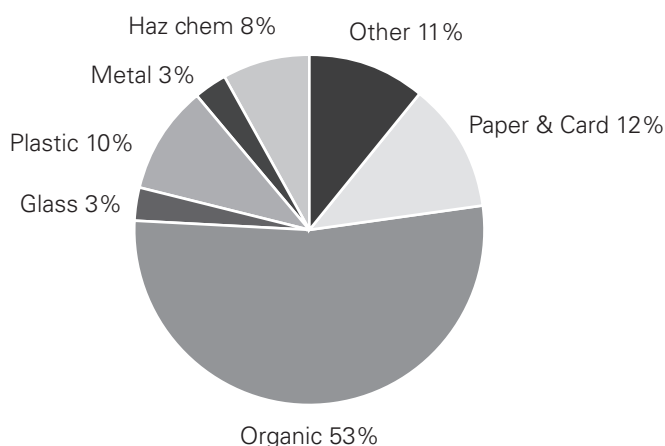
Fact Sheet 3.1

Waste – We all Produce it – Let's Reduce it!

Waste in Male' and the Atolls

In 2008 the Environment Research Centre conducted a waste audit in Male'. The results from this waste audit show that in Male' more than half the waste is organic, with 12% paper and cardboard and 10% plastic. The majority of plastics recorded were from primary packaging (22%) and PET containers (plastic bottles) (29%).

Waste composition in Male' households 2008

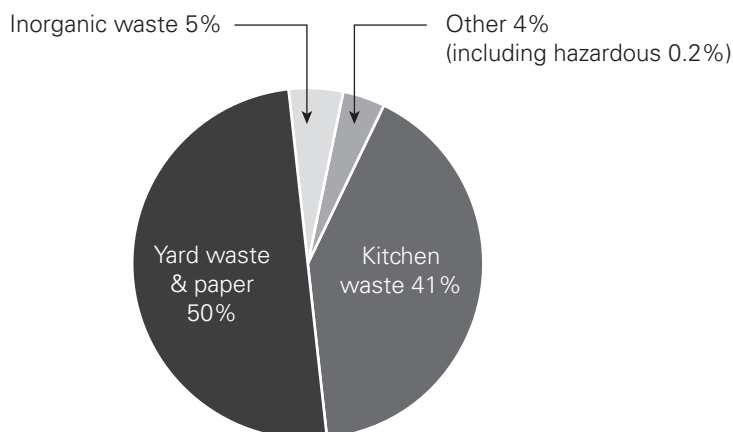


Source: Environment Research Centre 2008

Waste in the Atolls

Most of the waste in the Islands is also organic, including kitchen wastes and green waste (e.g. leaves and branches). The following graph shows the composition of wastes from typical household in the Atolls:

Waste composition for households on inhabited islands



Source: MLD Regional Development Project (Phase II), Solid Waste component.

Fact Sheet 3.1

Waste – We all Produce it – Let's Reduce it!

Packaging can be defined as materials used for the containment, protection, handling, delivery, and presentation of goods. Packaging can be divided into three broad categories:

- **Primary packaging** is the wrapping or containers handled by the consumer.
- **Secondary packaging** is the term used to describe larger cases or boxes that are used to group quantities of primary packaged goods for distribution and for display in shops.
- **Transit packaging** refers to the wooden pallets, board and plastic wrapping and containers that are used to collate the groups into larger loads for transport, which facilitates loading and unloading of goods.

The most common types of material used for packaging are paper, cardboard, plastic, glass, steel and aluminium.

So why do we Need Packaging?

There are four main reasons:

- to keep goods fresh
- to prevent contamination
- to make handling and storage easier
- to make goods look appealing

So what is the Problem?

The problem is that so much packaging is being thrown away when it could be avoided, reused, reused or recycled. Much of the packaging is only used once and then thrown away.

Ref: www.wasteonline.org.uk



Fact Sheet 3.2

Do the Right Thing- Reduce, Reuse, Recycle

Waste comes from many different sources such as households, businesses (stores and offices), industry (fish processing, boat building, etc), street cleaning (municipal waste), agriculture and resorts. Waste in the Maldives is increasing at an alarming rate as we continue to import products to sustain our growing population and booming economy. The products we import all come with associated packaging and increasingly we are purchasing goods that have a one off use and are disposable, this adds to the problem of increasing waste.

Under the new Solid Waste Management Policy, one of the principles adopted is the Waste Management Hierarchy (as shown below). If we follow the Waste Management Hierarchy it is always preferable to Avoid, Reduce, Reuse and Recycle waste rather than dumping, burning or burying it.

So how can we all help to reduce waste? Some of the key benefits of minimising waste are:

It conserves valuable resources including:

- Minerals – used to make many useful materials (e.g. bauxite is used to make aluminium)
- Energy – used in mining, harvesting, manufacturing and transporting.
- Forests – used to make some types of paper and other wood products
- Petroleum – used to make plastics
- Landfill sites – the life of existing sites is extended

It saves money. Cutting waste can save money in many different ways:

- If you waste less, you get more out of what you buy and waste disposal costs are reduced. Businesses become more efficient.
- Household incomes stretch further

It reduces the impact on the environment:

- Fewer areas need to be affected by resource extraction (e.g. mining), harvesting or solid waste disposal
- Less fossil fuel needs to be burnt for energy, thus reducing the release of greenhouse gases and other pollutants

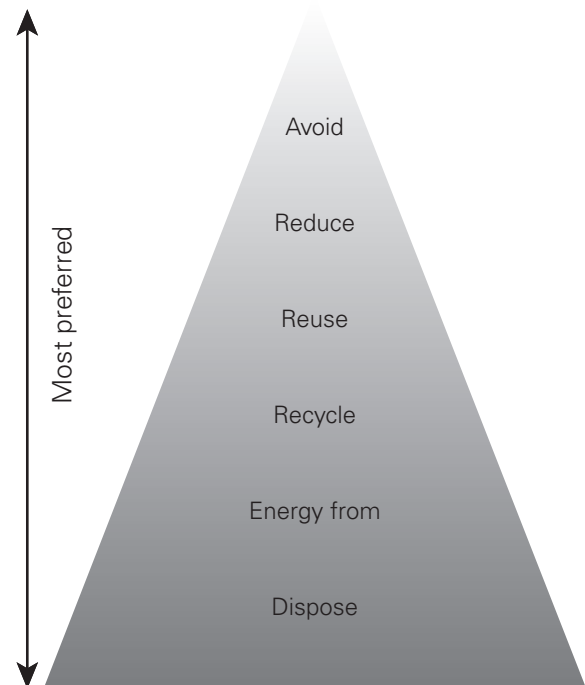


Figure 1: Waste Management Hierarchy

Fact Sheet 3.2

Do the Right Thing- Reduce, Reuse, Recycle

Trying to **Reduce** the amount of waste we create is often the least expensive and most environmentally friendly way to manage waste, for example:

- Shopping more carefully by looking for products with minimal packaging.
- Use a shopping list. Try not to buy things on impulse. Buy only what you really need.
- Buying products in large quantities reduces the number of containers.
- Avoid goods that have excessive packaging.
- Buy fruit and vegetables loose, not wrapped. Avoid products that are individually wrapped, or with multiples layers of packaging (e.g. biscuits in a cardboard box which is also wrapped in plastic; bars of soap individually wrapped in plastic).
- Choose products that come in concentrated form (e.g. kitchen detergent) or that have refills (e.g. certain ballpoint pens, some laundry detergents).
- Using cloth bags instead of plastic to carry groceries home.
- Hiring, sharing and borrowing things rather than buying new ones where possible.
- Choosing re-usable items rather than disposables.
- Looking after items so they last a long time.
- Using disposables carefully so that you do not waste them.
- Maintaining and repairing clothes, tools, appliances rather than replacing them with new ones.
- Making foods at home instead of buying takeaways or convenience foods.
- Avoiding cooking more food than is required. Placing excess food in the refrigerator and reusing it at a later time.
- Making gifts and cards for family and friends, rather than buying them.
- Growing your own vegetables and flowers.
- Putting leaves, small branches and other organic matter collected when sweeping streets under shrubs and trees as a mulch or compost to improve the soil.
- Using large branches, logs or coconut tree stems to line the edge of paths.
- If you have a home computer, reduce the use of paper by proof reading your work from the screen before printing a hard copy.
- Give old clothes, toys, furniture and appliances to those who need them.



Fact Sheet 3.2

Do the Right Thing- Reduce, Reuse, Recycle

Reusing objects over and over saves the energy and resources that would have been used to make a new product and means that the waste product is delayed from disposal. There are many examples of reuse in the Maldives, including:

- Reusing plastic bags for shopping or take a basket or cloth bag with you when shopping
- Reusing glass jars and plastic bottles for storage of water and food
- Covering fruit crops with plastic bottles to protect them from bats and rats
- Shredding organic matter to reduce volume and produce mulch for use under shrubs and trees
- Hire, share or borrow items you do not use very often
- Open envelopes carefully so that they can be reused
- Buy second-hand books for school and pleasure
- Keep a box beside your desk at home, at school or at work for paper to be reused (e.g. study notes, drawing paper for young children, telephone messages, shopping lists)

Choose durable and reusable products instead of disposable ones. For example:

- handkerchiefs instead of paper tissues
- pens with replaceable refills
- razors with replaceable blades
- refillable lighters
- using reusable utensils and plates/cups instead of throwaways
- using rechargeable batteries instead of single-use ones
- sponges instead of paper towels
- cloth nappies and bottom wipers instead of disposable ones



Fact Sheet 3.2

Do the Right Thing- Reduce, Reuse, Recycle

Recycling materials into new objects saves the energy and resources that would have been used to make a new product. Examples include making recycling metal, plastic or glass to make new cans or bottles.

- Selling or giving these materials to recycling companies
- Collecting recyclable materials such as metal and plastic and cardboard
- Crushing cans and bottles to reduce its volume for recycling
- Tuna cans – MIFCO
- Composting organic matter to reduce its volume and to fertilise the soil for garden and agricultural use

Enjoy a Waste Aware Ramazan

1. Say No to Plastic Bags. Try to take reusable shopping bags or a basket with you and decide whether or not you really need a new bag for every purchase.
2. Plan meals wisely. Think ahead when buying food and plan for left-overs. This will help minimise the amount of waste you throw away, and avoid wasting money.
3. Compost vegetable peelings and left over food scraps except meat, seafood and dairy products.
4. Try to buy crockery, utensils and kitchen appliances that can be used for several years.
5. Avoid buying products with excess packaging.
6. Choose products which are long lasting, repairable, refillable, reusable or recyclable for when they eventually reach the end of their life.
7. Avoid purchasing items which are non-functional and gimmicky. Avoid buying products which need batteries.
8. If you are throwing a party, avoid using disposal items such as cups, plates and napkins.

Adapted from Waste Wise Shopping – the smart way to Shop



Fact Sheet 3.3

Don't be Shy- Say no to Plastic Bags!



Plastic Bags are on the world wide environmental hit list. They are the curse of our modern consumer society, littering streets, polluting oceans, killing at least 100,000 birds, turtles, dolphins, seals and whales every year. After an animal is killed by plastic bags its body decomposes and the plastic is released back into the environment where it can kill again.

A person's use of a single use plastic bag can be counted in minutes – however long it takes to get from the shops to home, however it is estimated that plastic bags can take anywhere between 15 – 1000 years to break down if they are littered into the environment.

Plastic bags are a by-product of the petroleum industry, made from oil. They produce toxic fumes if burnt.

Many countries are introducing campaigns to alert consumers to “Say No to Plastic Bags” whilst shopping and to remind them to “Bring Your Bag!” Towns, cities, islands and schools are phasing out plastic bags and becoming “Plastic Bag Free”.

In April 2003 Coles Bay in Tasmania, Australia successfully banned plastic grocery bags in all their retail stores. In the first 12 months, Coles Bay stopped the use of 350,000 plastic grocery bags.

Each year the number of plastic bags imported into the Maldives increases, in 2003 it was 55 million and in 2006, it was 162 million, that's a 300% increase! Some bags are reused as garbage bags and end up at Thilafushi, some are burnt causing toxic fumes and many are dropped in the street and block drainage systems or float out to sea becoming a hazard for marine wildlife like turtles.



Plastic bag floating in sea water becomes a hazard to wildlife and boats.

Fact Sheet 3.3

Don't be Shy- Say no to Plastic Bags!

Plastic bags are not free! Most consumers don't realize the hidden cost associated with single use plastic bags as there is a 200% import duty on plastic bags in the Maldives and this cost is passed on to them at the point of purchase.

Did you know that the number of plastic bags imported to Maldives has grown from 53 million to 162 million in the past 3 years? That's a 300 % increase.

What's the Problem with Plastic Bags?

Plastic bags are a convenience; however they also cause many waste and environmental problems.

- Plastic bags are a litter problem which not only looks ugly, but can harm and kill our wildlife.
- Plastic kills up to 1 million seabirds, 1000 sea mammals and countless fish each year worldwide. When the animal dies and decays the plastic is free again to repeat the deadly cycle.
- Plastic bags take a long time to break down, which can be anywhere between 20 and 1,000 years.

How can we Reduce our use of Plastic Bags?

- When you are shopping think before you accept a plastic bag.
- When you go shopping carry a reusable bag (such as a cloth bag).
- If you are buying 1-2 items carry these items, instead of asking for a bag.
- Reuse your plastic bags at home or take them back to the shop and reuse them over again.



Case Study:

Plastic Bag Free campaigns have already been popular in the Maldives on islands such as Maduvaree, Komandhoo and B. Kihaadhoo. Abdulla Naseem, the Katheeb from B. Kihaadhoo said that, "our teachers started the plastic bag free campaign on the island after the Canadian and Australian Red Cross Waste Management training and we introduced the use of reusable cloth bags and paper bags, our island is not completely plastic free, , but last year we were able to reduce the amount of plastic bags being used by approximately 75%."



Fact Sheet 4.1

Good Waste Management: Happy, Healthy, Wealthy

Waste practices such as dumping rubbish in the forest, on the beach or into the ocean, as well as burying and burning have long been the traditional methods of disposal of unwanted materials in the Maldives. However, these practices are no longer sustainable and not only are they having huge environmental and social impacts, there is an increasing risk to the economy which is so dependant on tourism and fishing.

Health, Environmental and Economic Impacts

Poor waste management practices can impact our **health**: (i) mosquitoes can breed in water collected in tins, cans and plastics and contribute to the spread of mosquito borne diseases such as dengue fever and chikungunya, (ii) rotting organic matters attracts vectors such as rats and crows, (iii) burning of plastics and wet organics can cause local air pollution that can be inhaled by the island inhabitants, and (iv) long term buried waste can contaminate ground water potentially affecting the quality of water in wells.

Poor waste management practices can also affect our **economy**: (i) waste floating in the seas, on the reefs or swept onto beaches is not attractive and impacts on the image of the Maldives environment as a pristine environment, especially for the tourism industry, (ii) waste floating in the seas can also damage boats (e.g. stuck in propellers) and (iii) chemicals from waste dumped at sea may contaminate marine life and fish stocks, a risk to seafood industries.

Poor waste management practices can also affect our land and marine **environments**: (i) waste dumped on the beach can pollute the water and spread it to other islands; (ii) non biodegradable plastics can be ingested by animals such as turtles, birds, dolphins, whales etc, and (iii) burying wastes such as batteries and nappies can also pollute the groundwater.

Good Waste Management

Communities are now tackling these impacts and finding solutions to create a 'Clean Maldives' that will not only protect the environment but also protect our health and livelihoods. If we manage our wastes better, we can help to prevent these types of impacts on our health, environment and livelihoods.

Waste Management is much more than waste disposal. Waste management includes the processes involved in dealing with solid waste, including minimisation, handling, processing, storage, recycling, transport, and final disposal' (Webster's New millennium dictionary). Good waste management requires all stakeholders to actively manage waste, by doing the following:

- Reduce, reuse and recycle.
- Say no to plastic bags.
- Keep waste out of our seas.
- Don't dispose of waste on our beaches.
- Separate your wastes (organic, residual, hazardous, plastic, metals), so that they can be managed better.

Fact Sheet 4.1

Good Waste Management: Happy, Healthy, Wealthy

- Don't dump waste; Take your waste to a waste management centre.
- Stop mosquitoes breeding in our waste, crush cans/bottles that can store water.
- Put Waste in the Bin.
- Don't burn plastics or wet organics.
- Don't throw nappies on the ground. Dry them and then burn nappies at high temperatures.
- Mulch or compost organics for your garden.
- Store Hazardous waste separately.



Did you know that a June 2006 United Nations Environmental Program report estimated that there is an average of 46,000 pieces of plastic debris floating on or near the surface of every square mile of ocean.



Case Study:

The Maldivers have long been at the forefront in the campaign to "Clean Up" the reefs and beaches near Male'. Recently they assisted the Strength of Society (SOS) youth group on Clean Up The World Day, 15th September 2007 to collect 79 bags of rubbish weighing 500 kgs along a 150m stretch of beach front at Hulhumale. But this is just a drop in the ocean compared to how much rubbish is dumped on reefs and floating around in the ocean. The main items found on the beach were bags of rubbish that probably floated on the sea currents and landed there having been dumped at sea and some was left by picnickers. We mostly found plastic bottles, cans, cups, plates, forks and cigarette butts. On one of our Clean Ups Maldivers were able to rescue a turtle that had been caught up in fishing line, but unfortunately they find many more dead animals and it's often too late to save them.

Fact Sheet 4.2

Do the Right Thing - Recycle Right

Recycling is the reprocessing of materials into new products. Recycling is beneficial in two ways: it reduces the consumption of raw materials and energy usage (therefore reducing greenhouse gas emissions) and reduces the amount of waste produced for disposal. Nowadays, many countries recycle a range of wastes, including glass, paper, batteries, plastic and metals. To date, although there has been some recycling of high value scrap metal, a national recycling program has not been feasible in the Maldives. This is largely because the collection infrastructure and private sector incentives are not yet in place to establish a recycling industry which is able to reclaim other recyclable materials from the waste stream.

However with the growing amount of materials imported every year into the Maldives, the Environment Research Centre has recently engaged a consultant to investigate the feasibility of establishing a national recycling program in the Maldives. The Environment Research Centre is currently looking at the type of markets and incentives required to enable greater private sector participation in reclaiming recyclable materials.

Each waste material is recycled by a different process, so the first step to establishing recycling programs is to start separating wastes into different categories, according to what the waste is made from. For example, separating plastic waste. Male' Municipality Waste Management Services currently segregate different types of household and commercial waste, either at the two Transfer Stations in Male' or at Thilafushi. Materials such as plastic (LDPE, HDPE), glass, metal tins, Aluminium, Wood, Fiber and Coconut Husk are currently segregated. Discarded metal products and sludge oil is handed over to 2 parties interested in their exportation (for recycling purposes), the rest of the waste is stockpiled in Thilafushi for future recycling and/or discarding projects.



An island waste management centre- showing separate bays

Fact Sheet 4.2

Do the Right Thing - Recycle Right

Waste Management Centres on the islands have been designed to store different waste materials in separate bays or designated areas. Waste materials such as metals, plastics, construction and demolition waste, hazardous materials, residuals and organics are stored separately in bays. By separating waste materials in this way, at the centers, it will make it easier to collect and transport these recyclable materials so that there is a greater likelihood that the materials can be recycled.



Crushed cans.

One other step that can help to recycle right is to crush cans and plastic bottles. To make the best use of the available space, reduce the risk of mosquitoes breeding and for easier transportation it is encouraged that metal cans and plastic bottles are crushed and bagged.



Case Study:

At K. Dhiffushi, a member of the Island Development Committee made can crusher to assist in the process of reducing can size for storage. Nashid Fikry from K. Dhiffushi explains “I have invented a can crushing unit, which is manually operated. We use the machine to reduce the volume of cans. It could be used to reduce a range of cans or tins, from the bigger biscuit tin containers to small beverage cans. When the cans are crushed the volume is reduced considerably, therefore, it is easier to transport the materials from the island to landfill sites. Another advantage is that it is easier to sell these products to those who buy cans or metal products”.



Fact Sheet 4.3

Do the Right Thing - Burn Waste Correctly

Burning waste is a form of disposal on the waste management hierarchy. It is much more beneficial to avoid, reduce, reuse and recycle! However on many islands burning is commonly used to reduce volumes of waste. But burning waste can also cause damage to nearby vegetation, can be a safety issue to people walking nearby and releases air pollutants which can cause local health problems for island inhabitants. Burning plastics and wet organics can especially release a lot of smoke and pollutants.

The ERC recently produced an information leaflet outlining Correct Burning Practices. Environment Research Centre advises that plastics should never be burnt as they release poisonous dioxins which can cause health problems. Other wastes can be burnt, as long as it is done under controlled conditions (i.e. someone is watching), the weather conditions are suitable (i.e there is no threat of the fire

getting out of control) and the waste is burnt at high temperatures. To burn waste at high temperatures, the best way is to construct a tray or drum that is elevated off the ground. Elevating the tray off the ground allows good air circulation into the fire and creates higher temperatures. In this way waste is burnt more quickly and completely.



Vegetation damage on K. Himmafushi



Case Study:

Nappies are one of the biggest waste issues on islands. Everyone always asks what to do with nappies. After all no one likes to see a used nappy thrown away on the beach. To deal with this common problem, the preferred option is for nappies to be dried and burnt in a tray or drum, rather than thrown in the sea or buried on the beach. In order to fully burn the nappies, the tray or drum should be elevated off the ground, so that good air circulation can get into the fire and create higher temperatures- this helps to burn the waste more quickly and efficiently.

Many Islands are dealing with the problems of how to dispose of nappies, Dhiffushi was the first island to take on the challenge of correct disposal of nappies by designing and building an elevated burning tray and at Dh. Vaanee nappies are dried out and then burnt in elevated drums. Ms. Amira Suleiman, head of the Women's Development Committee on B. Kendhoo where they also have built an elevated burning tray, said that "we dry leaves and combine them with paper and nappies before burning"

Fact Sheet 4.3

Do the Right Thing - Burn Waste Correctly



A burning tray at K. Dhiffushi



Bad burning practices at K. Himamfushi

Fact Sheet 4.4

Do the Right thing - in the Garden

Mulch or Compost Organics for your Garden

It is estimated that 60 - 70% of the waste we throw away on the Islands is organic, that is, it comes from either plant or animal materials. Instead of burning it and creating air pollution, the most natural way to dispose of it is to turn it back into rich nutrients for the soil. Organic waste is usually produced in two forms, either food waste from kitchens (approx 30%) or garden waste, such as leaves and branches (approx 35%).

Composting and mulching of organics are new concepts to the Maldivian way of life, traditionally organics were either dumped, buried or burnt, but with the problems of increasing waste, impacts on health from disease and poor air quality and the difficulty of disposal (ie it is easier to place leaves and branches in the forest than carry them to the burning pit to dry and burn) it has become increasingly obvious that organic waste should be treated differently.

Mulching of large leaves, branches and coconut husks is another useful way to dispose of plant materials. It uses a process of shredding plant materials and then placing them onto the soil so that it retains moisture and adds nutrients as it breaks down.



Composting is a process of combining plant materials, food and manure and letting nature do its work through the action of bacteria and other organisms to decompose the materials into a rich fertilizer that can be used to improve soil and crop quality. Adding compost is an excellent way of putting nutrients back into the soil and if used regularly will reduce the need for chemical fertilizers.

- Compost improves the structure of the soil. It allows more air into the soil, improves drainage and reduces erosion.
- Compost helps to stop the soil from drying out in times of drought by holding more water.
- By improving soil structure, compost makes it easier for plants to take up the nutrients already in the soil.
- Compost may also improve soil quality by adding nutrients. This can help to produce better yields.
- Compost can reduce pest and disease problems in the soil and on the crop. The crop will be stronger and healthier and therefore resist pest and disease attack.

Fact Sheet 4.4

Do the Right thing - in the Garden

- Compost is a better way of feeding plants than using chemical fertilisers. These fertilisers provide nutrients for plants but do not improve soil structure or quality. They usually only improve yields in the season in which they are applied. Compost is not washed away through the soil like chemical fertilisers, so the beneficial effects are long lasting. Plants that are grown with chemical fertilisers are more attractive to pests because they have greener, sappy growth.

Making Compost

Households and farms produce many materials which can be used to make compost. Making compost makes use of materials that may otherwise be wasted. You may already be making compost. This booklet could help you to improve your methods. Organic matter is often piled up in the compound but left unmanaged. This will produce compost but the materials will take a long time to decompose and nutrients will be lost. If it is possible to invest some time and effort to manage the heap, the results will be very rewarding.

In a managed heap nutrient loss will be reduced, so more of the nutrients will be available to feed plants when the compost is used. This type of compost heap will often heat up enough to kill weed seeds and plant diseases.

What to Put in a Compost Heap

Nearly all organic matter can be used to make compost but different items will take varying amounts of time to decompose and form different end products. For example, fruit on its own will go slimy and coconut leaves will go dry and dusty.

It is essential to include a mixture of old and tough with young and sappy materials for a good result. This is because different types of organic matter contain different proportions of carbon and nitrogen. In general, young, living material that decomposes fast contains low levels of carbon but high levels of nitrogen. Tough, dead material, for example palm fronds and stalks, decomposes slowly and contains large amounts of carbon but low amounts of nitrogen. Too little nitrogen-rich material and the decomposition will be slow; too much and the heap will become acid and smelly. If different compost ingredients are not available, households in the local community might have useful by-products such as coconut husks and groundnut shells. It may also be possible to obtain suitable material from the roadside. The table on the opposite page gives an indication of the type of items which can be put on a compost heap.

Availability of Materials

Some of the materials mentioned in the table, such as soil or crop residues, may be collected on the day of building the heap. Some ingredients, such as kitchen wastes, are collected on a regular basis. If the heap is to be built in one single process these materials should be gathered and stored. They should be kept dry and cool and covered so that too much air does not reach it. Banana leaves or grass thatch provide a good cover. This treatment should prevent water loss before the heap is constructed. It is also possible to build the heap in stages and add the material as it becomes available. However, the process of decomposition will be slower and it will therefore take longer to make compost.

Fact Sheet 4.4

Do the Right Thing - in the Garden

Examples of Materials that can be Used to Make Compost

Material	Preparation	Notes	Precautions
HOME			
• Fruit and vegetable peelings		• Decomposes quickly	
• Wood fire ash		• High in potassium and lime	• Use in very small quantities
• Paper and cardboard	• Tear up or shred	• Decomposes slowly. Mix with wet/moist ingredients	
• House and compound sweepings		• Variable quantity and quality	

GARDEN

• Crop residues (the remainder of a crop after it has been harvested).	• Chop up tough material. If dry moisten well before use.	• If the material is tough, it will decompose slowly.	• Do not use if recently sprayed with herbicide
• Dead leaves	• If dry, use as above		
• Crops grow on specifically for the compost heap	• Chop up if large	• Legumes commonly recommended	
• Crops grow on specifically for the compost heap	• Chop up if large		• Avoid roots of perennial weeds and mature seeds of annuals

OTHER SOURCES

• Manure		• Not essential but an excellent source of nutrients	
• Urine (animal and human)	• Difficult to collect. Maybe collected in the bedding of animals.	• Sprinkle on heap. Will greatly accelerate decomposition	• Use in small quantities
• Soil	• Use soil from the top 10cm of cropped land	• Not essential but a sprinkle may reduce nitrogen loss from hot heaps. May be used to cover a heap	
• Seaweed	• If used in large quantities should be wilted first. Always apply with dry material	• Has an abundance of trace elements	

Fact Sheet 4.4

Do the Right Thing - in the Garden

Materials that should not be put in the compost heap:

- Material such as plants which have been recently sprayed with pesticides or herbicides
- Meat scraps, as these may attract rats and other pests
- Large amounts of material that is diseased
- Material with hard prickles or thorns
- Persistent perennial weeds. These should be killed by laying out in the sun to dry, or even burning, to avoid them spreading. The dried material or ash could then be added to the heap.
- Non-organic materials such as metal or plastic

Where a Heap Should be Placed

There are three factors to consider when deciding where to put a compost heap:

Transport

A compost heap should be placed in an area where it is easy to carry the materials collected. Distance and access to the fields or garden where the compost will be applied are also important considerations.

Water

A compost heap should be placed in a shady, sheltered area to avoid too much evaporation, for example under a tree. If you want to provide more shelter you could construct a fence around the heap, although this is not essential if labour is limited.

Water usually needs to be added to the heap so ideally, a source of water should be nearby. If you do not have a well close by you should keep a container, such as a jerrycan filled with water, near to the heap.

If water is scarce, it may seem preferable to use available water directly for irrigation rather than for producing compost. However compost added to the soil can improve its water holding capacity and, in the long term, will reduce the amount of the water required to irrigate the crops. If water is scarce, you may want to consider building the heap in a pit.

Vermin

It is important to consider pests and vermin such as rats, termites, flies and mosquitoes. It is possible that they may be attracted to the compost heap so it should not be placed too close to the home.

Size

A good size for a heap is about 2 metres wide by 1.5 metres high. If it is much larger air circulation will be poor. The heap should not be smaller than 1 metre by 1 metre. The length can vary, as required. If there is not enough material available to make a compost heap of this size, a number of people could collect ingredients together to make a common one.

Fact Sheet 4.4

Do the Right Thing - in the Garden

How to Build the Compost Heap

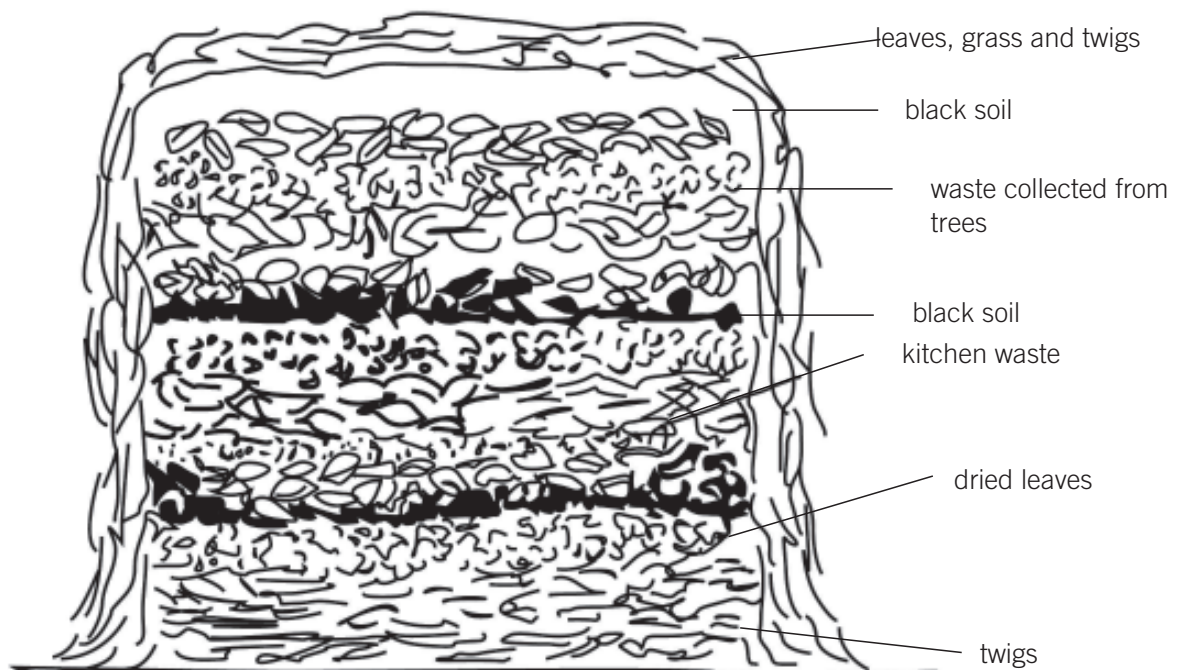
A compost heap should be built on bare soil and not on a hard surface such as concrete. This is the recommended way to build a compost heap:

1. Firstly make a base 30 centimetres (cm) high and 2 metres (m) wide with coarse plant material such as twigs. This will ensure good air circulation and drainage.
2. Add a 10cm layer of material that is difficult to decompose such as palm fronds or coconut husks.
3. Add a 10cm layer of material that is easily decomposed such as fruit and vegetable scraps.
4. Add 2cm of animal manure, old compost or slurry, if available.
5. Add a sprinkling of earth from the top 10cm of cropped land.

6. Ash and urine can then be lightly sprinkled onto these layers, to accelerate the process of decomposition.
7. Then water the whole pile well.
8. Repeat all these layers except the first layer of coarse material, until the heap reaches 1 to 1.5m high.

The heap should be covered to protect it against evaporation and heavy rain as this will wash away all the nutrients. Sacking, grass thatch or banana leaves are suitable for this.

Each layer should be laid down by starting at the edge of the pile so that the heap does not collapse. Another way to ensure this is to use a wire mesh (not useful in dry areas because it will allow drying out) or wooden planks around the heap. Air vents, made out of bamboo canes with holes cut in them and placed both vertically and horizontally throughout the heap, will improve the air circulation.



Layers of the a compost heap

Fact Sheet 4.4

Do the Right Thing - in the Garden

Organisms Involved in the Composting Process

Most of the organisms involved in the composting process are so small that you cannot see them. In order to survive they need water, air and organic material which is their food. The organisms feed on the organic matter and produce carbon dioxide, water and heat. There are three important phases during the decomposition of a compost heap; the hot phase, the cooling down phase and the maturation phase. During the 'hot phase' the highest temperatures are reached at the centre of the heap. This has a hygienic effect, killing diseases, if present, in the organic materials and sometimes weed seeds also. Next, the heap goes through a 'cooling down phase' and the fungi become important. They break down the tough fibrous material such as crop stems. During the final, 'maturation phase' larger organisms such as termites and worms also have an important role in breaking down and mixing material. In a hot climate the organisms are more active and the organic materials are broken down more quickly than in a cold climate. The types of organic matter used and the acidity of the soil will also affect the rate of decomposition.

Conditions Required in the Heap

The compost heap requires three conditions: air, water and heat.

Air

The micro-organisms in the heap require oxygen to survive. The carbon dioxide produced by the activity of the organisms also needs to be blown out by a flow of air. If there is not enough air, other unwanted organisms will thrive which produce a bad smell and slow the decomposition of the heap.

Water

The activity of the organisms in the compost heap will slow down if the heap is too dry. But if the heap becomes too wet then there will not be enough air and the composting organisms will die. This will cause the heap to ferment rather than compost. Judging the right amount of water requires a little experience.

Heat

The heap will create its own heat as the decomposition process occurs. If the heap becomes too hot the microorganisms may leave the heap, causing decomposition to slow down. When the heap cools down the organisms will return.

Using Compost

The main use of compost is to increase and maintain crop yields by improving the ability of the soil to hold water and nutrients and keeping the soil healthy. It can also be used to prevent soil erosion by incorporating it into the soil.

Compost is commonly used close to home in the kitchen garden. When preparing a soil bed for sowing seed, compost can be mixed with the top 10cm of soil. It should not be dug in any deeper as crop roots will not be able to take up the nutrients released by the compost. An effective way of using limited supplies of compost is to place small amounts of compost directly into the planting holes. In dry areas these holes can be extended into pits or furrows which can be used for trapping water.

Compost can be used for mulching between crops or around trees. Compost that has not fully decomposed can be used for this; it will continue to mature on the ground and animals in the soil will draw it into the soil where it will decompose further.

Fact Sheet 4.4

Do the Right Thing - in the Garden

When using compost as mulch it should be covered with a thin layer of leaves. This will avoid loss of nutrients due to direct exposure to sunlight and heat. Compost can also be mixed with soil and used for raising tree seedlings and can be used as fish feed.



Case Study:

The benefits of compost are helping to improve the economic returns on agricultural islands, such as at Maafahi who provide agricultural products to the Seagull grocery stores. “We have found that since switching to using compost in 2004 we have saved 50 – 60% of our costs, instead of importing large amounts of cow dung and chemical fertilizers from Sri Lanka we now create our own compost by shredding and layering our plant waste such as papaya and banana leaves, grass and agricultural waste and some cow dung into compost heaps. We cover the heaps with coconut palms and tarpaulins to keep the rain out, then we turn the heaps every 15 days or so and the results have been amazing. We have found that the plants we grow now are much healthier and stronger and have greater resistance to pests and diseases” Indran Thampapillai, agriculture manager.

Fathimath Shafeeqa, Live & Learn Country Manager, has visited many communities across the Maldives and has seen how they are implementing the Clean Communities approach, “One community in Kelaa has taken on the challenge and is experimenting with different composting methods. They are trialing composting in used cooking oil containers” she said.

Soneva Fushi Resort has been researching appropriate composting and mulching techniques as part of its Permaculture Garden. During visits to the resort a team from Live and Learn Environmental Education observed that yard waste, fruit peel and vegetable peel are being used to make compost. The composting units are placed in the organic garden using large wooden boxes with pipes inserted from the sides for aeration. Mulching is done with large plant materials such as tree trunks and branches. Mulch is used in the gardens to keep the plants in a healthy condition.



Fact Sheet 5.1

Nala Nala Raajje? - It's up to us

Although waste is a World wide problem, the issue is even more critical in the Maldives and other small island states. The environment in the Maldives is being placed under increasing pressure from a growing population, changing lifestyles and improvements in living standards. Wastes are being generated in ever growing volumes. Maldivians are following the world wide trend of consuming more disposable products, including plastic bags, plastic bottles, disposable nappies and packaging materials.

Without adequate treatment and disposal provision for the wastes and action, the risk of polluting the environment is becoming even greater. The wastes threaten the environmental values of the Islands and livelihoods; particularly fishing and tourism. Furthermore, wastes are having a negative impact on peoples' health and well being. The government of the Maldives has highlighted waste as a significant environmental issue and is currently developing waste management policies.

Effective waste management requires communities to take ownership of waste issues, starting from the individual level. Individuals, households, businesses, island authorities must realize their responsibility to act and encourage others to take action before it is too late. All stakeholders must actively seek solutions for our own benefit and that of future generations.

At the end of the day we share responsibility for our environment. Each one of us makes decisions and takes actions which affect the world around us. It is up to all of us to tackle the growing waste problem, a problem which has to be solved at the local level. The need for local solutions, linked to larger management plans and in line with community waste strategy, will increase in the future. Figures of millions of tonnes of waste and talk of regulatory instruments can make us feel that we cannot make a difference. This is not true. Actions we can all take every day to improve the situation include:

As an individual

- Take responsibility for your waste.
- Minimise the amount of waste you generate.
- Put waste in the bin- do not drop it on the street or on the beach.
- Say no to plastic bags.

As a household

- Take responsibility for your waste.
- Segregate waste into organic, plastic, metal, residual and hazardous wastes.
- Take your waste to an island waste management centre.
- Minimise the amount of waste you generate.
- Reuse packaging (e.g. tins, plastic bottles) where possible.
- Look into the possibilities of composting organic matter.
- Take special care when disposing of hazardous household waste.

Fact Sheet 5.1

Nala Nala Raajje? - It's up to us

- Ask your island office what they are doing to improve the local waste situation. For example, do they have a waste management plan?
- Pay for your waste to be collected and disposed of correctly.

As a business

- Take responsibility for your waste. Do not expect the community to be responsible for managing your waste.
- Develop products and production techniques which minimise waste generation. You know your product better than anyone else. Design your product to have minimum environmental impact during its lifetime.
- Limit the amount of packaging in which your products are delivered and try to use this packaging for reuse/recycling.
- Encourage your suppliers to reduce the amount of packaging in which they deliver their products.
- Pay for your waste to be collected and disposed of correctly.

As a local authority

- Lead by example by minimising waste generation in your office.
- Adopt a waste management plan and allocate the necessary resources to ensure its implementation.
- Encourage community participation in clean-ups.
- Encourage business and citizens to minimize waste generation.
- Facilitate waste recycling and recovery through providing separate bays for collection of different wastes.
- Make provision for separate collection of hazardous household waste.
- Create partnerships with industry and business to find ways of reducing waste generation and transporting waste off the island for final disposal.

Fact Sheet 6.1

To be Waste Free there's a Fee

Unique geography poses a key development challenge for the Maldives. The dispersion of the population across the Archipelago raises the cost of delivering services, as economies of scale are difficult to achieve in service provision. This also presents a challenge to providing waste management services. The recently released National Solid Waste Management Policy includes the 'polluter pays' principle. The drive towards a principle of 'Polluter Pays' is a strategy to fund waste management services in the Maldives.

The principle of Polluter Pays requires the person or organisation generating waste to bear the full cost of its segregation, collection, transport and final disposal. The rationale behind this principle is that by paying for its disposal, the polluter has the incentive to minimize the cost and amount of waste generated. It is also important to identify who is the polluter, which includes individuals, industries, resorts, importers and suppliers. In the Maldives the application of the principle involves establishing a fee collection system that represents the true costs of waste management.

The Environment Research Centre notes that waste management is not just the responsibility of the government, it is everyone's responsibility. Effective waste management requires everyone- government, business, households, schools and individuals- to play their part in managing waste responsibly- this includes paying for waste management services for the collection, treatment and disposal of waste. To be waste free there's a fee.

The Environment Research Centre (ERC) has recently initiated a trial of a 12 month project on the collection and transport of waste from Kaafu and Vaavu Atolls. In its first 3 month period the government will pay the full costs related to the transport and disposal of waste in the region. For the remaining 9 months the government will pay 40% of the cost and householders will be



Fact Sheet 6.1

To be Waste Free there's a Fee

asked to pay 60%. The 60:40 split is based on the cost-sharing model that estimates the true cost of collection, transfer and disposal of waste generated by government and the community. The project applies the polluter pays principle. It is expected to provide valuable information on the costs of regional waste management and on the reaction of householders to the proposition that they should pay for waste services.

The need to consider the cost of Waste Management services has been included in the Island Waste Management Planning guidelines developed by the Environment Research Centre. The guidelines outline where the costs for providing waste management services come from:

- Costs of collection systems on the islands (i.e taking the waste to the island waste management center);
- Costs to operate the Island Waste Management Centres (including staff costs/running costs e.g. diesel to operate shredders/can crushers etc);
- Costs of transporting wastes off the islands to the nearest regional waste management facility;
- Costs of disposing of wastes (including staff costs/equipment costs).

Whilst the introduction of a 'Polluter Pays' scheme will help to cover the costs of waste management services in the Maldives, the primary purpose of introducing such a scheme is to promote waste reduction, reuse and recycling practices on our islands. By levying a fee for the amount of waste produced, there is an incentive to reduce the amount of waste required to be disposed of. Therefore, community members will have an incentive to reduce and reuse waste and separate out recyclable wastes, such as plastics and metals. The amount of waste requiring disposal will be less and this will reduce the overall costs of waste management services to the whole community. In this way islands will be working together - sharing the costs and benefits of better waste management.



Case Study:

In Noonu Atoll Holhudhoo, a "Polluter Pays" system has been established since 2005. Island Chief Mohamed Rashid explains "From July 2005 we have implemented a system in this island where fees are being collected from households, businesses, government owned and private owned properties and unused housing plots. The fees range from 5 to 30 rufiyaa per month, and the amounts were decided as a result of a survey carried out with a total of 423 households in the island. The amounts were identified from the survey, and were further verified by the island office upon further consultations with the community members. The money we collect from the community is used to carry out the waste management activities in the island".



Glossary

Biodegradable

Easily broken down.

Combustible

Waste that can burn.

Decay

To rot or become rotten; decompose.

Disposable

Something that can be thrown away. It is not designed to last for a long time.

Ecosystem

A community of plants, animals and micro-organisms that are linked and that interact with each other and with the physical environment.

Environment

Everything that surrounds a living thing and affects its growth and health.

Hazardous

Something that poses a threat or hazard to people and the environment.

Inorganic

Something that is not made from plants or animals (e.g. metals).

Livelihoods

A way to make money. A job.

Non-biodegradable

Cannot be easily broken down.

Organic

A substance that contains carbon and comes from plants and animals.

Sustainability

Meeting the needs of the present without diminishing the ability of people, other species or future generations to survive.

References

Environment Research Centre (2007) "Public Perception on the Environment: A Maldivian Perspective"

Live & Learn Environmental Education, Maldives (2006) "Clean Communities: Facilitating Community Involvement in Solid Waste Management"

Live and Learn Environmental Education (2006) "A Rapid Assessment of Perceptions into Environmental Management in the Maldives, Volume 1" Ministry of Environment, Energy and Water Maldives, funded by Asian Development Bank.

Ministry of Home Affairs and Environment, Maldives (2004), "Identification of Existing Barriers to the Provision of Effective Solid Waste Management Services within the Maldives and Recommendation for their Removal"

National Waste Awareness Initiative, ESART Project (2000) "Rethinking Rubbish – Towards a new Campaign" www.wasteonline.org.uk/resources/WasteWatch/NWAIFinalReport

SPREP Pacific Regional Environment Program, United Nations Development Program, Global Environment Facility (2006) "Rubbish is a Resource! A Waste Resource Kit for the Pacific Islands

International Waters Project of the Pacific Islands" JICA, Ministry for Construction & Public Works & Pacific Consultants International Environmental Technology Consultants, Maldives (1999), "The Study on Solid Waste Management for Male' City in Republic of Maldives – Final Report Supporting Report"

Armstrong P, & Laffin, J 1993, Waste Matters, Environmental Education Activities About Waste, Gould League of Victoria.

Beverage Industry Environment Council 1996, Recycling Audit and Garbage Bin Analysis, June–September.

Recycling and Resource Recovery Council 1994, Less Waste Wins—How to Reduce, Reuse and Recycle.

<http://www.p2pays.org/ref/17/16573.pdf>

Strategies in Waste Management in low income countries Prof Shaheen Mehtar, Academic Unit for IPC Tygerberg Hospital & SUN, <http://www.slideshare.net/icsp/strategies-in-waste-management-in-low-income-countries/>

http://en.wikipedia.org/wiki/Polluter_pays_principle

Useful Links

Nala Nala Raajje website - www.erc.gov.mv/wasteaware

National Waste Awareness Initiative, ESART Project (2000) “Rethinking Rubbish – Towards a new Campaign” www.wasteonline.org.uk/resources/WasteWatch/NWAIFinalReport

SPREP Pacific Regional Environment Program, United Nations Development Program, Global Environment Facility (2006) “Rubbish is a Resource! A Waste Resource Kit for the Pacific Islands International Waters Project of the Pacific Islands” <http://www.sprep.org/sprep/about.htm>

Waste Wise- <http://www.sustainability.vic.gov.au/www/html/1507-waste-wise.asp>

Do the Right Thing - <http://www.litter.vic.gov.au/www/html/298-do-the-right-thing-.asp>

<http://www.afgc.org.au/index.cfm?id=516>

Live & Learn Environmental Education – www.livelearn.org

Wastenet- <http://www.wastenet.net.au/>

