VQA Level: 1

Facilitator Guide

Certificate I in Climate Change and Disaster Risk Reduction

Units 6 and 7: CGMC0616 and CGCA0716

Demonstrate ways of contributing to the mitigation of climate change

Demonstrate ways of adapting to climate change

Facilitator: .....

Organization: .....

Date: .....

Before you get started…

Dear Facilitator,

This Facilitator Guide (together with the relevant Learner Guide) is aimed at facilitators/trainers who will be assisting learners wishing to complete the following units:

Title:	Demonstrate ways of contributing to the mitigation of climate change		
VQA code:	CGMC0616	**VQA Level:** 1	**Credits:** 5

Title:	Demonstrate ways of adapting to climate change		
VQA code:	CGCA0716	**VQA Level:** 1	**Credits:** 5

This guide contains all necessary instructions to ensure that learners will attain the expected competencies required by the above-mentioned units. This guide is designed to be used during the presentation of learning sessions for these units. Learners are advised to read the unit of competency outlines in their own time.

Please discuss the unit of competency outlines with the learners to ensure that they understand what they must do to achieve the required outcomes of these units.

There are three guides, namely the Learner Guide, the Learner Workbook and the Facilitator Guide.

These guides have been developed to address specific aspects of the learning experience. Each of the guides complements the others.

Make this an enjoyable learning experience!

Context of learning

Nowadays everyone is talking about climate change. A lot of information is available but is not always easy to obtain for people living in rural areas of Vanuatu. Some of us do not pay attention to the topic of climate change and some don't even believe that it is happening.

But we are all aware of natural hazards that destroy our lives and our property - cyclones, earthquakes, volcanic eruptions, long periods of drought, floods, landslides, fires, etc. When the effects of a natural hazard become so great that the community cannot handle them by itself, and needs help from outside, the hazard becomes a "disaster".

This course of eleven units entitled "Climate Change and Disaster Risk Reduction" helps us to understand more about climatic changes and disasters that have affected us in the past and at present, and are likely to affect us in the future. Many people say that we cannot do much about these changes and disasters, but this is not true. We can do a great deal to reduce the impacts of climate change and natural hazards, both as individuals and in our local communities, and to adapt to these changes in the future. In fact our communities already have a lot of traditional knowledge that can help in reducing the risks and adapting to change. You will learn more about this as we proceed through the course.

The sixth and seventh units help us to understand more about steps that can be taken at community level to adapt to the changes in climate that are likely to occur, as well as measures that can mitigate the emissions of greenhouse gases that are contributing to climate change. We shall first look at the world-wide need to mitigate greenhouse gas emissions and explain why communities in Vanuatu should also be involved. After looking at some of the steps that can be taken, we shall look at the difference between mitigation and adaptation, explain why adaptation strategies must be adopted in Vanuatu, and then consider some practical examples of these strategies. Learners will then work with a local community to identify and demonstrate appropriate adaptation and mitigation measures, and then to help the community make action plans to implement some of these measures.

You, as the facilitator, have the challenge to ensure that the learning materials can be applied to the learners' own context, in other words, to their own situations, their own communities and their own islands. As much as possible, you must help them to refer to local examples of everything that is in the course.

The contextualization of the learning material is a very important step in facilitating the learning experience. You must ensure that enough time and effort is put into this.

How to use this guide…

Throughout the guide information is given specifically aimed at you, the facilitator, to **assist** in the actual presentation of the learning material and/or facilitation of the learning process. Although this guide contains all the information required for attaining competency in these two units, references to additional resources, both printed and electronic, are provided for additional reference by the facilitator and further study by the learner.

Please note that the purpose of this information is merely to **guide** you, the facilitator, and is provided as a suggestion of possibilities. It remains the responsibility of every facilitator to re-assess the learner/s in each learning situation throughout the learning process in order to stay in touch with his or her specific learning needs. The needs of each learner must come first!

As you go through this guide, you will come across certain code words and boxes that will help you to facilitate learning more clearly. They are as follows:

Instructions regarding **activities**, whether to be done in a group or individually, will be provided in this type of box.

Facilitator's 'tip' to give you additional information or to help you and the learners with the answer.

My Notes…

(You can use this box for your own notes/comments.)

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What will you be facilitating, and how will you do it?

The learning experience…

On completion of these two units, the learner will be able to:

- justify the need for a world-wide mitigation of greenhouse gas emissions;
- explain why communities in Vanuatu should try to reduce their emissions of greenhouse gases;
- describe, with examples, some of the mitigation measures that can be taken by individuals and communities in Vanuatu;
- differentiate between mitigation of climate change and adaptation to climate change;
- explain why adaptation strategies must be adopted by communities in Vanuatu;
- outline and demonstrate some of the adaptation measures that are appropriate for Vanuatu, with examples;
- show that many of these measures are strategies for both adaptation and mitigation;
- assist a local community to develop appropriate measures for mitigation and adaptation.

Before starting these two units, the learner is expected to have:

- awareness of some of the human actions that lead to increased amounts of greenhouse gases in the atmosphere;
- some understanding of how increased atmospheric GHG content will lead to global warming and climate change, and of how climate change is likely to affect the atmosphere and oceans;
- knowledge of a local community, especially in terms of leadership structure, cultural and religious practices, and livelihoods;
- basic graphicacy skills - graph construction and interpretation, mapping skills;
- knowledge and skills acquired from the preceding units of competency: CGHR0116, CGCK0216, CGCV0316, CGCC0416 and CGCE0516.

In general, upon completion of a unit at Certificate I level, the learner will be able to:

- perform a defined range of routine activities, usually under supervision;
- demonstrate basic practical skills;
- apply thinking skills such as induction and evaluation;
- participate in a team or working group;
- communicate effectively and convey information and ideas

My notes:

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Time frame

Section of Unit	Hours allocated for tutorials (theoretical learning)	Hours allocated for practical activities and personal study	Hours allocated for field work	Total hours
Orientation	1	1	-	**2**
Introduction to Learner Guide	3	-	-	**3**
Section 1	3	8	-	**11**
Section 2	2	3	2	**7**
Section 3	7	12	2	**21**
Section 4	1	3	-	**4**
Section 5	1	2	-	**3**
Section 6	8	13	4	**25**
Section 7	2	3	-	**5**
Section 8	2	7	8	**17**
Preparation for test	-	2	-	**2**
Summative test	-	1	-	**1**
Whole unit	**30**	**55**	**16**	**101**

Facilitator's checklist

Use this checklist to ensure that you are properly prepared and have all the materials needed for the facilitation of successful learning:

Tick this box when you are ready

PREPARATION

Knowledge of the qualification	I have familiarized myself with the qualification that the learners are aiming to obtain	⇩
Knowledge of the unit standard	I have familiarized myself with the required level of this unit standard	
Knowledge of the unit content	I have sufficient knowledge of the unit content to enable me to facilitate with ease	
Application	I have done enough preparation to be able to deliver the programme	
Contextualization	I am ready to include information that is specific to the local community and to Vanuatu	

ABILITY TO RESPOND TO LEARNERS' BACKGROUND AND EXPERIENCE

Understanding of learners	I know something about my learners' gender, age, background and experience and am ready to deliver the programme accordingly	
Enthusiasm and commitment	I am enthusiastic about this subject and am committed to creating an environment that motivates learning	

MATERIALS AND EQUIPMENT

Learner guides	One for each learner	
Learner workbook	One for each learner	
Facilitator guide	One	
Copy of *Learning about climate change the Pacific way*	One Visual Guide (set of "toolkit" pictures) One Teacher's Guide	
Copy of *Community Conservation Area*	One poster	
Writing materials	Notebook, pen, pencil, graph paper & rubber per learner	
Other materials	Clipboard for recording information during fieldwork	
Butcher paper	One roll. Alternatively, large sheets of flip chart paper.	
Whiteboard & pens	One whiteboard & set of coloured whiteboard markers	
Blackboard & chalk	One blackboard and coloured chalk	
Data projector	Optional. To be used for power point presentations	
Laptop	Optional. To be used for power point presentations and internet connection. USB flash drive useful.	
Internet connection	Desirable but not always possible	
Attendance register	One	
Course evaluation	One sheet for each learner (copied from Learner Workbook)	
Portfolio of evidence	One portfolio holder for each learner	
Summative test	One copy for each learner	

Contextualization of content

At this stage, it will be useful for you to go through these Units and think about the specific information and local examples that should be included in the learning.

Section	Specific examples from the local area, Vanuatu or the Pacific region
1	
2	
3	
4	
5	
6	
7	
8	

Section 1 Demonstrate the need for a world-wide mitigation of greenhouse gas emissions

Learner Guide: Page 15

After completing this section, the learner should be able to:

1.1 define greenhouse gas mitigation in the context of climate change;
1.2 justify the global need to reduce emissions of greenhouse gases;
1.3 clarify the role of the UNFCCC and the main agreements made at an international level.

Concepts 1.1, 1.2 and 1.3	Time frame	Activities related to the concepts
1.1 Mitigation of greenhouse gas emissions	**5 hours**	**1.1a, 1.1b, 1.1c**
1.2 The global need to reduce greenhouse gas emissions and the possible consequences if there is no such reduction	**3 hours**	**1.2**
1.3 The UNFCCC and international agreements regarding GHG emissions.	**3 hours**	**1.3a, 1.3b**

Please allow learners to complete activities 1.1a and 1.1b in their workbooks:

Type of activity	Resources
1.1a Matching exercise - definitions	Learner Guide
Instructions to give to the learners	
Activity 1.1a: Join the words in List A with the correct definitions in List B.	

Type of activity	Resources
1.1b Pair work - analysis of photographs	Learner Guide, own ideas
Instructions to give to the learners	
Activity 1.1b: In pairs, study photographs A, B, C, D, E and F, then complete the table on page 5 of your Learner Workbook.	

Activity 1.1a

MITIGATION OF GHGs	1. carbon dioxide, methane and nitrous oxide
ADAPTATION	2. warming of the atmosphere caused naturally when greenhouse gases trap outgoing heat radiation from the earth
GREENHOUSE GASES	3. substances or gases released into the atmosphere
NATURAL GREENHOUSE EFFECT	4. coal, petroleum and natural gas
ENHANCED GREENHOUSE EFFECT	5. reducing the causes of climate change by cutting down the emissions of greenhouse gases and increasing carbon sinks
FOSSIL FUELS	6. additional warming of the atmosphere caused by human activities that put extra CO_2, CH_4 and N_2O in to the atmosphere
EMISSIONS	7. making modifications to our way of living that will enable us to become more resilient to the negative effects of climate change and take advantage of benefits that climate change may bring

At the end of this activity, please ensure that learners understand the difference between "mitigation" and "adaptation".

Activity 1.1b

Photo-graph	What does the picture show?	How is this contributing to atmospheric warming?
A	String grass cutter	Uses petrol/diesel fuel. Emits CO_2
B	Deforestation	Removes trees that can absorb CO_2, so there is more CO_2 in the atmosphere. Burning of trees puts CO_2 in the atmosphere.
C	Rubbish dump	Decaying rubbish emits methane (CH_4)
D	Motor launch (speedboat)	Uses petrol/diesel fuel. Emits CO_2
E	Small passenger plane	Uses aviation fuel (kerosene). Emits CO_2
F	Chainsaw	Uses petrol/diesel fuel. Emits CO_2

Now please invite learners to carry out activity 1.1c:

Type of activity	Resources
1.1c Building models	Learner Guide and own ideas

Instructions to give to the learners

Activity 1.1c:
The class can divide into two groups. One group can build a model to show the natural greenhouse effect. The other group can build a model to show the enhanced greenhouse effect. Be creative and use objects from the natural environment. To help you, look at the photos on page 5 of the Learner Workbook, which show how trainees at the Vanuatu Institute of Teacher Education constructed similar models in 2010. When the models are complete, divide into pairs, and each trainee takes it in turns to explain the difference between the two models.

Activity 1.1c

This activity can be completed gradually over the next few weeks. The learners do not have to finish it before going on to the next activity.

You can encourage them to use materials that are available at their training institution and in their local environment. In the models shown in the photos, strong wire mesh was used to indicate the boundary of the atmosphere, and was fixed to a flat wooden sheet underneath. This made sure that the model was strong and could easily be carried from place to place. Objects on the earth were made of cardboard, wood or leaves, and painted.

Once the models are completed, encourage the learners to form pairs and practice using the two models to explain to each other the difference between the natural and the enhanced greenhouse effect.

This is a very valuable, creative and enjoyable "hands-on" activity for the learners, because they are learning by "doing".

My notes:

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Next, please ask the learners to complete activity 1.2 in their workbooks:

Type of activity	Resources
1.2 Pair work - short answer questions	Learner Guide

Instructions to give to the learners

Activity 1.2:
Read again through pages 16-19. Look particularly at the impacts mentioned in the last paragraph of page 17 of the Learner Guide. Study the graphs and the statements of the IPCC. Then answer questions 1-5.

Activity 1.2

1. It has increased from about 315 ppm in 1960 to 395 ppm in 2014.
2. It has caused the average global temperature to increase (to just over 14.5°C in 2014).
3. Ask learners to look at the last paragraph on p. 7 of the Learner Guide. Any 10 of these impacts:
   a) Sea level rise
   b) Increasing number of extreme weather events
   c) Acidification of sea water
   d) Loss of snow and ice
   e) Loss of biodiversity
   f) Impacts on health (e.g. more malaria, more heat stress)
   g) Impacts on education (e.g. more absences from school, destruction of buildings)
   h) Less food security
   i) Changing social relationships (e.g. stress through forced migration)
   j) Pressure on fresh water sources
   k) Greater rural-urban migration
   l) Conflicts over water and land
4. a) It is unequivocal (no doubt about it)
   b) They are unprecedented (never happened before)
   c) Have diminished (got less)
   d) Have risen
   e) Unprecedented in at least the last 800,000 years (i.e. higher than ever before in the last 800,000 years)
   f) Human influence / human (anthropomorphic) emissions of greenhouse gases
   g) Further warming and changes in all components of the climate system
   h) Substantial and sustained reductions of GHG emissions, together with adaptations
5. Possible consequences:
   a) Continued rise in sea level and loss of coastal towns and villages
   b) Loss of biodiversity and loss of food security
   c) Less availability of fresh water
   d) More conflict between nations and groups over water, land and resources
   e) More severe cyclones in the Pacific
   f) More extreme weather events such as very hot days, drought, heavy rainfall
   g) More flooding and erosion
   h) Livelihoods of the poorest people will be severely affected

   Many other answers are possible. Learners can refer back to CCDRR03 and CCDRR04.

Now allow learners to complete activity 1.3a:

Type of activity	Resources
1.3a Definitions	Learner Guide (including the glossary)
Instructions to give to the learners	
Activity 1.3a: Explain the meaning of the terms given on page 7-8 of the Learner Workbook	

Activity 1.3a

UNFCCC	An agreement between nations to work towards keeping atmospheric greenhouse gas concentrations at a level that will gradually slow down global warming and reduce its dangerous impacts. The Convention also acknowledges the vulnerability of all countries to the effects of climate change and calls for special efforts to ease the consequences, especially in developing countries which lack the resources to do so on their own (adaptation).
COP	The Conference of the Parties. An annual (yearly) meeting of nations who have signed the UNFCCC.
Kyoto Protocol	An international agreement to reduce GHG emissions that was adopted in principle in 1997 by 195 nations (who are called the "parties" to the agreement). In 2005, under the Kyoto Protocol, 37 industrialised countries and the European Union adopted legally binding targets to reduce their emissions between 2008 and 2012. In 2012, under the Doha Amendment, 38 countries adopted targets for the period 2013-2020. But the Kyoto Protocol could not be enforced because at least 144 countries (three quarters of the current 192 parties) had to make a commitment to reducing their emissions, and this did not happen. However, an internationally binding requirement for nations to cut their CO_2 emissions has now been signed at the COP 21 meeting in Paris in December 2015. This requires every country to adopt a target for reducing GHG emissions. This is the first time in over 20 years of negotiations that there has been a binding and universal agreement on climate from all nations of the world. *(Note to the facilitator: This is background information for you. You are not obliged to pass on every detail to the learners!)*

Activity 1.3a (continued)

A legally binding target	A goal or aim that must be achieved according to international law
Ratify	To agree officially to something. In other words, the government has passed a law to say that it agrees.
Carbon sink	A natural or artificial reservoir that takes up and stores carbon. Trees, plants, oceans, rocks and soils are natural sinks, while landfills are artificial sinks.
Emissions trading	System by which countries and organizations receive permits to produce a certain amount of CO_2 and other greenhouse gases. These permits may be traded with other countries or organizations.
Carbon credit	A permit that allows a country or organization to produce a certain amount of carbon emissions. If the full amount is not used, the remaining allowance can be traded with another country or organisation.

My notes:

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Next, please allow learners to complete activity 1.3b:

Type of activity	Resources
1.3b Discussion in small groups	Learner Guide, own ideas

Instructions to give to the learners

Activity 1.3b:
Form small groups of 3-4 trainees. Each group should then discuss the four questions given. Later, it will report back its findings to the whole class.

Activity 1.3b

Encourage the groups to discuss these questions freely. Circulate round and check that their discussion is relevant to the question.

Some of the ideas that might arise are as follows:

1. Perhaps because their governments do not want to upset the big oil companies that are based in their countries. If they ask the oil companies and coal-fired power stations to cut emissions, this could affect the country's economy because it will put people out of work. And this could lose votes for the government! In the USA, the large manufacturing and power companies are very powerful and have a strong influence on government and politics.

2. Many developing countries blame industrialised nations because it is these nations (e.g. in Western Europe, North America, Japan, Australia) that have been putting GHG emissions into the atmosphere for a much longer period than all the other countries (150 to 200 years). They also have the technology to be able to reduce their emissions more easily than developing countries.

   Reasons for agreeing: As above.

   Reasons for disagreeing:
   - Nowadays, developing countries like India, China, Brazil, Mexico, etc. have many industries and their emissions of GHGs are similar to those of the industrialised nations. China is now the greatest GHG emitting country in the world.
   - It is in the tropical developing countries where the greatest deforestation is occurring, and the quantity of emissions from deforestation/burning is greater than the quantity produced by the burning of fossil fuels in all forms of transport (see p. 36 of the Learner Guide)

3. To avoid an increase in global temperatures of more than 2°C from their pre-industrial levels. An increase of more than 2°C is expected to bring great danger to the world - degradation of coral reefs, extinction of species, loss of food security, problems of fresh water supply, extreme weather events that cause greater damage, death and injury than ever before, etc.

4. No, we must not depend on governments reaching an agreement. We must do things ourselves. Possible actions - tree planting, using renewable forms of energy, producing less waste, relocating villages, etc. *Many answers are possible - all kinds of adaptation and mitigation measures that will be covered later in this Unit. The purpose here is for learners to realize that individual action <u>can</u> make a difference.*

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Section 2 Demonstrate the need for communities in Vanuatu to reduce their emissions of greenhouse gases

Learner Guide: Page 22

After completing this section, the learner should be able to:

2.1 identify the advantages for communities in Vanuatu of switching from fossil fuels to renewable sources of energy;
2.2 identify the steps being taken by the Vanuatu Government to promote the mitigation of GHG emissions;
2.3 explain why mitigation measures in Vanuatu should also focus on forest conservation.

Concepts 2.1 and 2.2	Time frame	Activities related to the concepts
2.1 Advantages for communities in Vanuatu of switching from fossil fuels to renewable sources of energy.	**3 hours**	**2.1a, 2.1b, 2.1c**
2.2 Steps being taken by the Vanuatu Government to promote the mitigation of GHG emissions and adaptation to climate change.	**2 hours**	**2.2**
2.3 In Vanuatu, mitigation of climate change must also be done through forest conservation.	**2 hours**	**2.3**

Firstly, please allow learners to complete activity 2.1a:

Type of activity	Resources
2.1a Pair work - analysis of a photograph	Own ideas

Instructions to give to the learners

Activity 2.1a:
Look at the picture on page 10 of the Learner Workbook. Name all the ways in which imported fossil fuels are being used in this picture.

Activity 2.1a

1. Used as fuel (petrol, diesel) in buses and trucks.
2. Used as fuel in UNELCO generator to power electricity supply (for street lights).
3. Used as fuel in UNELCO generator to power electricity supply (for Island Chicken Café, City Lodge, and all the shops).
4. Used as fuel in UNELCO generator to power electricity supply for Digicel.

Now please allow learners to complete activity 2.1b:

Type of activity	Resources
2.1b True or False	Learner Guide

Instructions to give to the learners

Activity 2.1b:
Read pages 23-24 of your Learner Guide, then say whether each of these statements is TRUE or FALSE:

Activity 2.1b

This activity can be done individually or in pairs.

1. T
2. F
3. T
4. F
5. F
6. T
7. T
8. T
9. T
10. F
11. T
12. T

My notes:

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Now please allow learners to complete activity 2.1c:

Type of activity	Resources
2.1c Group work - investigation and discussion	Learner guide and fieldwork

Instructions to give to the learners

Activity 2.1c:
Form small groups of 3-4 trainees. Each group should choose a nearby local community, or a part of one community, and investigate the sources of energy that are being used. Make a list of all these sources, stating what they are used for and whether they are renewable or non-renewable. Try to estimate the approximate percentage of households that are using each source. Make use of a table like the one shown on page 11 of the Learner Workbook.

Activity 2.1c

Depending on the location of the RTC, each group can choose a different community, or else work in different sections of the same community. Learners should visit all the households in their area to find out what sources of energy are being used, and note them down. They should also visit any schools, stores, churches, dispensaries or other public buildings in their area. They can record their findings on a table like this.

Name of head of household	Source(s) of energy used (√)					
	Fire-wood	Solar	Electricity from petrol/diesel	Engine using kerosene/ petrol/diesel	Biofuel	Other

They can then use this information to compile the table shown on page 11 in the Workbook.

My notes:

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Now please allow learners to complete activity 2.2:

Type of activity	Resources
2.2 Pair work - discussion	Learner guide, own ideas
Instructions to give to the learners	
Activity 2.2: Discuss questions 1 and 2 in pairs, then write down your answers.	

Activity 2.2

1. Four steps:
   a) It signed the UNFCCC in 1999 and is active in global forums and agreements to promote GHG mitigation and adaptation to climate change
   b) National Energy Road Map launched on 10th April 2014
   c) Creation of a multi-sectoral body known as the National Advisory Board on Climate Change and Disaster Risk Reduction (NAB)
   d) Creation of the new Ministry of Climate Change in April 2013.

2. Pairs can argue yes or no. Encourage them to explain why. Examples:
   - Yes, because the NAB is encouraging action through a wide range of government departments
   - Yes, because of the National Energy Road Map, which aims to increase the share of renewables in power generation to 40% by 2015 and 65% by 2020.
   - No, because Vanuatu is not advocating strongly enough in regional or international forums for the reduction of GHG emissions.
   - No, because the Ministry of Climate Change does not appear to be doing very much yet.

Now please allow learners to complete activity 2.3:

Type of activity	Resources
2.3 Group work - discussion and practical activity	Learner guide, own ideas

Instructions to give to the learners

Activity 2.3:
Form small groups of 3-4 trainees and discuss how you could contribute towards the reduction of GHG emissions. Think about these two questions:
1. Is there any way that you could establish your own system for using renewable energy to produce electricity? What sources could you use? Could you build this yourselves? Could you start on this now?
2. How could you improve and increase the carbon sinks in your area? What steps would you take. Can you start doing this now?

Activity 2.3

Put the learners in small groups, but be flexible with this activity. If the groups discuss the two questions and decide that they want to take some practical actions immediately, then encourage them and allow time for their activities. They may want to go out and do some tree planting in the RTC compound or the local community. They may want to set up a solar panel or a hybrid diesel/solar generator for the RTC or in the local community. You will have to find ways of helping them to do this, perhaps by using local experts.

Another option is to postpone doing these practical activities until towards the end of this Unit, when the learners will be working with the local community to implement some mitigation or adaptation measures.

My notes:

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Section 3 Illustrate mitigation measures that can be taken by individuals and communities in Vanuatu

Learner Guide: Page 27

After completing this section, the learner should be able to:

- **3.1 identify examples of the use of renewable sources of energy in Vanuatu;**
- **3.2 state some strategies for the more efficient use of electricity;**
- **3.3 justify the importance of separating and recycling waste, and the benefits of garden composting and mulching;**
- **3.4 justify the need to walk, cycle and canoe instead of using motorized forms of transport;**
- **3.5 explain why it is important to plant and replant more trees and how this impacts on atmospheric GHG concentrations;**
- **3.6 discuss the different roles played by women and men in the mitigation of climate change.**

Concepts 3.1, 3.2, 3.3, 3.4, 3.5 and 3.6	Time frame	Activities related to the concepts
3.1 Examples of the use of renewable energy in Vanuatu.	**6 hours**	**3.1a, 3.1b**
3.2 Ways in which energy can be used more efficiently.	**2 hours**	**3.2**
3.3 The importance of separating and recycling waste, and the benefits of garden composting and mulching.	**3 hours**	**3.3**
3.4 Reduction of our carbon footprint through walking, cycling and using canoes instead of using trucks, buses and speedboats.	**3 hours**	**3.4**
3.5 The importance of planting and replanting more trees, and how this impacts on atmospheric GHG content. Role of REDD+ in Vanuatu	**5 hours**	**3.5a, 3.5b**
3.6 Roles of men and women in the mitigation of climate change.	**2 hours**	**3.6**

Please allow learners to complete activity 3.1a and 3.1b:

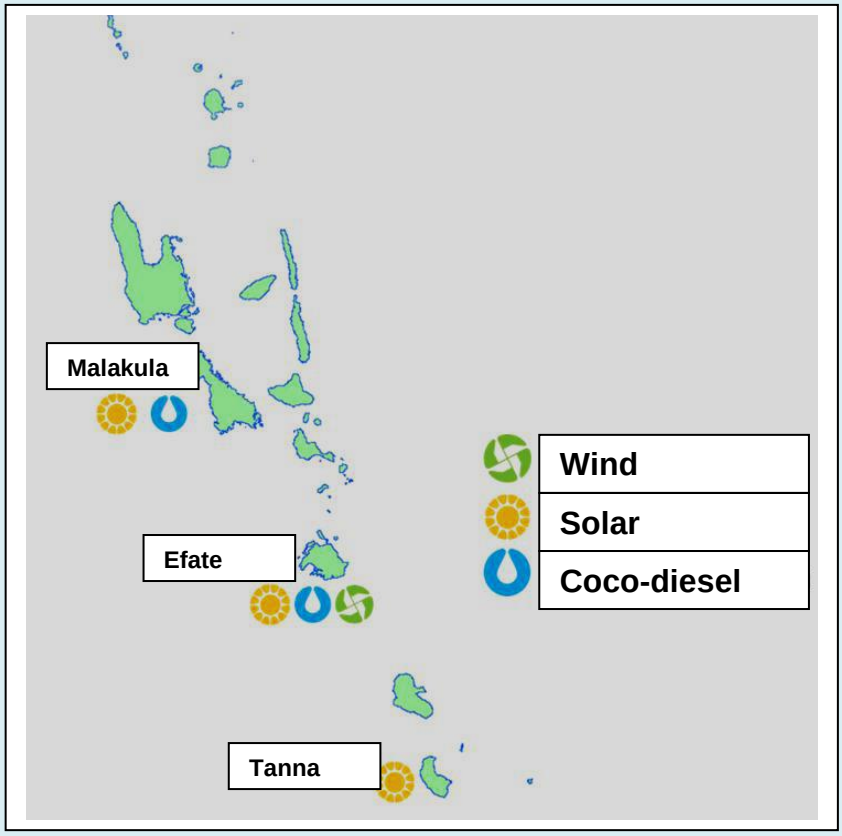
Type of activity	Resources
3.1a Individual exercise - short answer questions	Learner Guide, own ideas.
Instructions to give to the learners	
Activity 3.1a: Read pages 27-29 in your Learner Guide, then answer the questions.	

Type of activity	Resources
3.1b Group work - discussion and presentation	Learner Guide, own ideas
Instructions to give to the learners	
Activity 3.1b: Form small groups of 3-4 trainees. Each group should make a large copy of the table, then complete it to show the advantages and disadvantages of each type of energy source. You can indicate several advantages and disadvantages for each energy source. The completed charts can be placed on the wall of the classroom for everyone to see.	

Activity 3.1a

1. Questions on the map.

a)



b) Hydro (running water)

c) Malakula - Solar, Coco-diesel; Efate - Solar, Wind, Coco-diesel; Tanna - Solar

2. a) Bouffa, from pig dung (SPC-GIZ CCCPIR); Epau, from cow dung (Japan)
   b) Fanafo (VUI); Talise (micro-hydro)
   c) Fareavau, Nguna. Other villages.
   d) UNELCO power plants at Lakatoro and Tagabe.
   e) Devil's Point, Efate (UNELCO); schools on Futuna and Aneityum (PIGGAREP)
   f) Any village in Vanuatu (using firewood or charcoal)

3. a) It shows how pig waste / dung can be used to make biogas

   b) Yes, because people in rural areas have many pigs. Also, the production of biogas is renewable, because the source of the fuel is pig excreta, which is produced naturally every day without any harm to the pig

Activity 3.1b

Source of energy	Renewable or non-renewable	Advantages	Disadvantages
Petrol, diesel fuel, kerosene, (refined petroleum)	Non-renewable	• Available if you have money	• High cost • GHG emissions
Firewood (biomass)	Renewable	• Easily available at no cost	• Can cause deforestation
Solar radiation	Renewable	• Available at no cost when sun shines	• Cost of installation • No sun - no power
Running water (hydro-power)	Renewable	• Cheap to run	• Cost of installation • Does not work in long droughts
Biofuel made from coconut oil	Renewable	• Coconuts available on all islands	• Many coconuts needed. • Less copra for export • Less land for food crops
Wind	Renewable	• Available at no cost when wind blows	• Cost of installation • No wind - no power
Biogas	Renewable	• Many pigs • Cheap	• Initial cost of equipment
Geothermal (hot springs)	Renewable	• Available at no cost all the time	• Costly to install equipment. • May only be able to serve a small area.

My notes:

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Please allow learners to complete activity 3.2:

Type of activity	Resources
3.2 Pair work - interpretation of pictures	Learner Guide, own ideas
Instructions to give to the learners	
Activity 3.2: In pairs, study page 31 of your Learner Guide, then answer questions 1, 2 and 3.	

Activity 3.2

1. Ways in which electricity is being wasted:
   - Television/DVD left on in bedroom when nobody is there.
   - Lights left on in bedroom and kitchen when nobody is there.
   - Too much hot water being used in the bathroom, so that it overflows from bath on to the floor
   - Fan left on in kitchen
   - Fridge door left open in kitchen
   - Electric stove left on with food cooking in frying pan.
2. One energy saving light bulb is using as much power as 9 ordinary light bulbs.
3. Yes it would. Because less fossil fuels would be needed to generate electricity. If less fossil fuels were used, there would be a reduction in GHG emissions.

My notes:

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Now please ask the learners to complete activity 3.3 in their workbooks:

Type of activity	Resources
3.3 Pair work - short answers	Learner Guide, own ideas
Instructions to give to the learners	
Activity 3.3: Study pages 32-34 of your Learner Guide, then answer questions 1-4.	

Activity 3.3

1. REFUSE: Refuse to make waste or to accept other people's waste. When shopping, take your own bag and refuse plastic bags. Always find another way to use or recycle things you don't want.

   REUSE: When you have finished with something, find another way to use it. For example, use a tin or a glass jar as a holder for flowers. Use the backs of envelopes for writing notes.

   REDUCE: Make an effort to produce less waste. Make food scraps into compost. Recycle paper, glass, cardboard, etc.

   RECYCLE: Find out if there are facilities on your island to recycle waste - paper, cardboard, metals, etc. If there are not, find out how goods made of these materials can be transported to companies in Port Vila or Luganville that can do the recycling.

2. If waste is separated into different categories, e.g. paper and cardboard, glass, iron and steel, aluminium, it is much easier to collect up the different types of waste and take them to a recycling centre. There they can be processed into new paper, glass, steel bars and aluminium, etc. This reduces the need to manufacture these goods. Manufacturing causes the emission of greenhouse gases from factories and power stations. So if there is less manufacturing, there is less production of greenhouse gases, and emissions will be reduced.

3. Answer depends on the community! Perhaps if the RTC trainees do an awareness campaign on the advantages of separating and recycling waste, this might encourage people to do this. At least they could separate waste into organic materials (to be used as compost), tins, plastic bottles and glass. They could use the plastic bottles and glass for other things. Tins could be stored in a safe place and a recycling agent in Port Vila or Luganville notified. Toxic waste could be buried in deep pits.

4. a) They reduce the need to manufacture chemical (artificial) fertilizers. The manufacture of chemical fertilizer consumes a lot of energy obtained from fossil fuels, which adds to GHG emissions. Also, when fertilizers are applied to the soil, large amounts of N_2O (a GHG) are generated.
   b) Composting and mulching uses vegetable matter that costs nothing. Their use does not increase GHG emissions.
   c) Mulching and composting fertilize the soil and give better crop yields. So food security is improved. This is an important adaptation measure to help communities cope with extreme events (droughts, floods, high temperatures).

4. Learner states his/her opinion. The main advantage is that it reduces the amount of waste. Plastic bags make up a high proportion of our waste, are non-biodegradable, and give off toxic fumes if they are burnt.

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Please ask learners to complete activity 3.4 on a large piece of paper:

Type of activity	Resources
3.4 Individual work - drawing a poster	Learner Guide, own ideas

Instructions to give to the learners

Activity 3.4:
You are invited to draw a large poster to hang up in your local community on one of the following themes:

- Persuading people to use composting and mulching
- Persuading people to recycle as much of their waste as they can, and to bury the rest.
- Persuading people to do more walking or canoeing.
- "Refuse, reuse, reduce and recycle"

Remember that the reason you are doing this is in order to help your community to contribute to the reduction of greenhouse gas emissions and to help them take steps towards adapting to climate change.

Activity 3.4
Encourage each learner to draw a large poster using his/her creativity. Make sure that you have coloured marker pens or paints available. The posters can be pinned up in your training institution and/or a local community.

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Next, please allow learners to complete activities 3.5a and 3.5b in their workbooks:

Type of activity	Resources
3.5a Individual work - short answer questions	Learner Guide (including the glossary)

Instructions to give to the learners

Activity 3.5a:
Study pages 35-37 of your Learner Guide, then answer questions 1-4.

Activity 3.5a

1. Definitions

Forest conservation	Planting and maintaining forested areas for the benefit of future generations.
Carbon sink	A natural or artificial reservoir that takes up and stores carbon. Trees, plants, oceans, rocks and soils are natural sinks, while landfills are artificial sinks.
Reafforestation	Establishing a forest in an area where there was no forest or where forest has been cut down.
REDD	Reducing emissions from deforestation and forest degradation.

2. Two advantages:
   a) If forests are managed sustainably, they provide a carbon sink that absorbs greenhouse gas emissions.
   b) Sustainable management means that the forests are not cut down, but their products (nuts, fruits, ferns, etc.) can be used for food, for earning a small income, and for cultural purposes. Also, they maintain biodiversity (habitats for insects and animals), protect slopes from erosion, and ensure that fresh water sources are conserved. All these things are important ways of being resilient to climate change.

3. They ensure that forests are kept and even expanded. Forests are carbon sinks that absorb carbon dioxide from the atmosphere through the process of photosynthesis.

4. Three other benefits:
   - Protect the ground from soil erosion
   - Allow rain water to infiltrate the soil, and from there filter through into streams, so keeping the stream water pure. This is called "watershed protection".
   - Conservation of biodiversity
   - A wide variety of products can be obtained from the forests.
   - Traditional uses of forests can be maintained - sacred sites, traditional medicines, etc.

   Other answers are possible.

Now please ask the learners to do activity 3.5b

Type of activity	Resources
3.5b Practical work	Learner Guide Ideas from group discussion
Instructions to give to the learners	
Activity 3.5b: As a large group, think about some practical activities that you yourselves could undertake to increase the carbon sinks around you, and then start implementing at least one of them.	

Activity 3.5b

Be flexible with this activity. Much will depend on the location of your training institution and whether it is close to communities that are already taking measures to protect and enhance their carbon sinks.

Discuss the activity briefly with the whole class, and see what reaction you get. The learners may want to form groups and start one of the suggested practical activities straight away. They may also think of other activities that could be carried out.

As with activity no. 2.3, another option is to postpone doing these practical activities until towards the end of this Unit, when the learners will be working with the local community to implement some mitigation or adaptation measures.

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Finally in this section, please ask the learners to complete activity 3.6 in their workbooks:

Type of activity	Resources
3.6 Class discussion	Learner Guide Ideas from group discussion
Instructions to give to the learners	
Activity 3.6: After discussing the questions on page 38 of the Learner Guide, write down some of your thoughts in the box provided in your Learner Workbook. Do men and women have different roles to play in the mitigation of climate change, or are their roles the same?	

Activity 3.6

It is important for learners to first discuss the six questions that are given in the Learner Guide. One important issue to raise is that of access to information. Do women have the same access as men to information about mitigation of greenhouse gases and why this is necessary? Also, can women make decisions in the household, or is it only the men who do this? And are women more motivated to take action about climate change because of their role in feeding and caring for the family?

After the class discussion, encourage each learner to reflect quietly by himself or herself, then to write down his/her thoughts.

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Section 4 Differentiate between mitigation and adaptation

Learner Guide: Page 39

After completing this section, the learner should be able to:

4.1 make a distinction between the mitigation of greenhouse gases and climate change adaptation;

4.2 give an opinion on which should be of higher priority for local action by ni-Vanuatu - GHG mitigation or climate change adaptation.

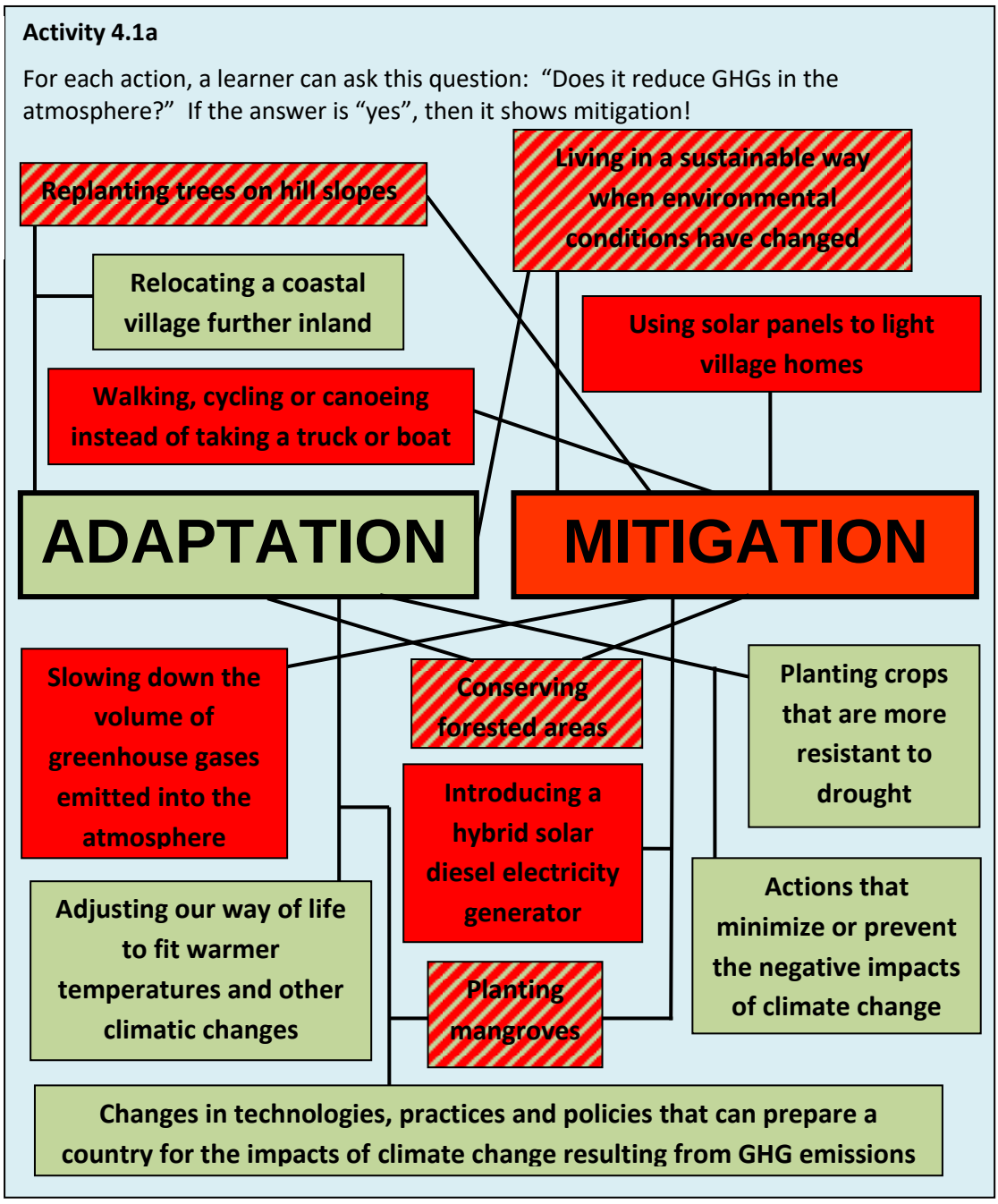
Concepts 4.1 and 4.2	Time frame	Activities related to the concepts
4.1 Differences between the mitigation of climate change and adaptation to climate change.	**2 hours**	**4.1a, 4.1b**
4.2 Opinion on which has higher priority for local action by ni-Vanuatu - GHG mitigation or climate change adaptation	**2 hours**	**4.2**

Please ask learners to complete activities 4.1a and 4.1b in their workbooks:

Type of activity	Resources
4.1a Individual exercise - difference between mitigation and adaptation	Learner Guide
Instructions to give to the learners	
Activity 4.1a: In the diagram (Fig. 9), first look at the actions in the white boxes and decide whether each of them shows mitigation or adaptation, or both. Put the letter M or A in each box to show this. Then draw lines to connect the actions in the white boxes with either mitigation or adaptation (or both). Then shade each white box in the appropriate colour (red, green, or both).	

Activity 4.1a

For each action, a learner can ask this question: "Does it reduce GHGs in the atmosphere?" If the answer is "yes", then it shows mitigation!



Type of activity	Resources
4.1b Cartoon interpretation	Learner Guide, own ideas

Instructions to give to the learners

Activity 4.1b:
In pairs, study the cartoon and make sure you understand what the two men are saying to each other. Then answer questions 1, 2 and 3.

Activity 4.1b

You might have to help learners understand that the "biblical flood" refers to the story of Noah's Ark! Ask them "Why did Noah build the ark?"

1. It shows adaptation to climate change. The man in the canoe is preparing for rising sea levels by building an ark on top of an island.
2. He is building a safe place to live on the highest point he can find. He is also living sustainably by using a canoe and eating fish.
3. The man in the speedboat has a bigger carbon footprint because he is using petrol or diesel to power his boat, and the burning of fossil fuels adds to GHG emissions. The man in the canoe is only using natural materials to eat and to build his house, and has a very small carbon footprint.

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Now please ask learners to complete activity 4.2:

Type of activity	Resources
4.2 Discussion in pairs	Learner Guide, own ideas

Instructions to give to the learners

Activity 4.2:
In pairs, discuss this topic: "Which should be of higher priority for local action by ni-Vanuatu - GHG mitigation or climate change adaptation?" When you have decided on your point of view, give reasons for your opinion. Write your answers in the box provided. Then go and talk to another pair and exchange opinions.

Activity 4.2

First of all, ask each pair to study page 40 of their Learner Guide again. Then, encourage each pair to reach a point of view and to justify it with several reasons. They do not need to give four reasons - less than four will be fine. After they have recorded their ideas in the box in the Learner Workbook, arrange for one pair to go and talk to another pair to find out whether they agree or disagree. This may make pairs change their minds! At the end of this activity, you could have a whole class discussion to share points of view.

In fact, adaptation should be the priority, and learners will find this out in the next few sections. People in Vanuatu must take necessary steps to contribute towards slowing down GHG emissions, particularly through forestry and better waste management. However, the effect of our actions on world-wide emissions is small. And because evidence is showing that the atmosphere and oceans are already warming (and are predicted to go on warming), climate change is certain to happen. Communities in Vanuatu are very vulnerable to the impacts of climate change - increases in temperature, rising sea levels, loss of biodiversity, more floods and droughts, more intense cyclones, coastal erosion, soil erosion, loss of food security, loss of livelihoods, etc. So adaptation to cope with these impacts must have priority.

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Section 5 Demonstrate the need for adaptation strategies

Learner Guide: Page 41

After completing this section, the learner should be able to:

5.1 provide evidence to show that climate change is inevitable;
5.2 justify why communities in Vanuatu must adopt adaptation measures to prepare for the impacts of climate change.

Concepts 5.1	Time frame	Activities related to the concepts
5.1 and 5.2 Mitigation measures have not been universally adopted in all countries, and climatic statistics show a continuation of global warming. Thus climate change is inevitable, and communities in Vanuatu must prepare for its impacts.	**3 hours**	**5.1**

You can now ask the learners to complete activity 5.1:

Type of activity	Resources
5.1 Individual reflection	Learner Guide, own ideas
Instructions to give to the learners	
Activity 5.1: Read again pages 41-44 of your Learner Guide. Then write a paragraph in your own words to explain why it is very important for communities in Vanuatu to adopt measures for adapting to climate change.	

Activity 5.1

Ask the learners to read the relevant pages of their Learner Guide, and check whether they have any questions on the graph or on the cartoon. Then ask them to sit quietly and individually write down their thoughts. Circulate and help those who are having difficulties with expressing their ideas. Encourage them not just to copy what is in the Learner Guide, but to use their own words.

When everyone has finished, you may wish to ask one or two of the learners to share their ideas.

You yourself can record your own ideas in the box below.

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Section 6 Illustrate appropriate adaptation measures

Learner Guide: Page 45

After completing this section, the learner should be able to:

- **6.1 identify and demonstrate adaptation techniques being implemented by various government, civil society and development organizations;**
- **6.2 justify the importance of agroforestry;**
- **6.3 identify and demonstrate traditional and modern methods of food preservation that can provide food security;**
- **6.4 identify ways of protecting coral reefs, sea grass beds and mangrove ecosystems;**
- **6.5 demonstrate the advantages of establishing a community conservation area;**
- **6.6 identify measures for ensuring household water security;**
- **6.7 give reasons why some settlements in Vanuatu may need to be relocated;**
- **6.8 discuss other aspects of adaptation.**

Concepts 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7,6.8	Time frame	Activities related to the concepts
6.1 Adaptation measures appropriate for Vanuatu - breeding varieties of crops and animals that are better adapted to drought, flooding, pests and diseases, etc.; honey bee husbandry improvement; reducing erosion by planting trees and vetiver grass; backyard tilapia farming; soil improvement in rural areas; climate change resource centre at Lume RTC.	**6 hours**	**6.1a, 6.1b**
6.2 The importance of agroforestry.	**3 hours**	**6.2a, 6.2b**
6.3 Food preservation techniques.	**7 hours**	**6.3**
6.4 Adaptation measures for protecting coral reef, sea grass and mangrove ecosystems.	**4 hours**	**6.4**
6.5 Community conservation areas.	**1 hour**	**6.5**
6.6 Measures for ensuring household water security.	**1½ hours**	**6.6**
6.7 Relocation of settlements.	**1½ hours**	**6.7**
6.8 Other aspects of adaptation	**1 hour**	**6.8**

Firstly, allow learners to complete activity 6.1a:

Type of activity	Resources
6.1a Individual exercise - short answer questions	Learner Guide, own ideas
Instructions to give to the learners	
Activity 6.1a: Read pages 45-52 of your Learner Guide, then answer questions 1-16	

Activity 6.1a

1. Any of the following:
   - DARD
   - Livestock
   - Forestry
   - Fisheries
   - VMGD
   - NAB
   - Environmental Conservation and Protection
   - Energy
   - VARTC

2. Any of the following (and others that may be working in the CC field):
   - Live and Learn Environmental Education
   - OXFAM
   - Save the Children Australia
   - Care International
   - Red Cross
   - Wan Smol Bag
   - International Union for the Conservation of Nature (IUCN)
   - World Wide Fund for Nature (WWF)

3. Any of the following (and others that may be working in the CC field):
   - New Zealand
   - Australia (including Australian Bureau of Meteorology, CSIRO, etc.)
   - Germany (through GIZ and other agencies)
   - Japan
   - USA

4. Any of the following (and others that may be working in the CC field):
   - United Nations Development Programme (UNDP)
   - UNICEF
   - UNESCAP
   - UNESCO
   - FAO
   - World Bank
   - Asian Development Bank
   - World Meteorological Organisation

(Continued on the next page)

Activity 6.1a (continued)

- European Union
- EU Global Climate Change Alliance
- Secretariat of the Pacific Community (SPC)
- Secretariat of the Pacific Regional Environment Programme (SPREP)
- University of the South Pacific (PACE programme)
- International Renewable Energy Agency (IRENA)
- Forum Fisheries Agency

5. Because they enable a much greater yield of yams to be obtained over the same period as with normal planting techniques. This will help to overcome food security problems caused by climate change.

6. The cross-breeds will be better adapted to droughts and floods, are more resistant to pests and diseases, offer protection from fungus, and have better eating quality.

7. The care and breeding of pigs.

8. a) Better compounds for keeping pigs, with protection from high temperatures, heavy rains and strong winds; separate pens for farrowing, breeding, growing and exercising; a sales yard, water tank, storage and cooking unit, chicken unit, and mixed root crop garden.

   b) Cross-breeding of native with exotic varieties of pig; the resulting hybrid combines the advantages of the exotic pig (larger, more meat) with the ability of the native pig to cope with a hotter climate. Cross-breeds are more resistant to heat, grow faster and have more piglets, and (according to some people) taste better to eat.

9. Three reasons:
   - Honey is a food source for ni-Vanuatu.
   - Honey can be sold to earn a small income.
   - Honey bees are important pollinators of fruits and vegetables.

10. To plant trees and/or vetiver grass along the shore line, above high water mark.

11. Why plant vetiver grass?
   - Its thick fibrous root system holds the soil together and reduces soil erosion.
   - The roots fertilize the soil.
   - Later, the soil can be used for gardening.
   - Vetiver grass can be used for mulching, compost and roof thatch.

12. The fish can supply families with nutritious food, which helps improve food security in times of drought, floods and other extreme weather events that will come with climate change. On the other hand, if they escape into fresh water streams, they can become a predatory species on other fish.

13. They provide nitrogen, which fertilizes the food crops. *(Continued on the next page)*

Activity 6.1a (continued)

14. Glycine, Mucuna and Lablab beans.

15. Answer will depend on the area. However, most of these measures are possible.

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Now please ask learners to complete activity 6.1b:

Type of activity	Resources
6.1b Pair work - discussion of a picture	Learner Guide, own ideas
Instructions to give to the learners	
Activity 6.1b: In pairs study the picture of an imaginary Pacific island (Fig 11), then answer the question.	

Activity 6.1b

Steps that have been taken on the island to adapt farming practices to climate change:

1. Keeping cattle in a protected compound.
2. Ensuring that the ground is covered in crops or trees
3. Agroforestry.
4. Planting a wide variety of crops, so that if one crop is destroyed by pests or diseases, there are others to eat.
5. Planting a wind break along the sea shore to protect crops from strong winds.
6. Planting mangroves and coconuts along the shore to protect the coast from erosion.
7. Honey-bee husbandry.
8. Composting and mulching.
9. Growing crops and trees in a protected nursery before they are transplanted into the garden.
10. Ensuring a sustainable water supply for animals and crops.
11. Avoiding cultivation of land next to the river, to lessen dangers of soil erosion.
12. Livestock are protected/shaded by roofs trees, and have drinking water.

NOTE: Other answers are possible. Learners may see other things in the picture.

Remember that your training institution should have a large copy of this picture available, as it is part of the SPC-GIZ resource "Learning about climate change the Pacific

My notes:

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Next, please ask learners to complete activities 6.2a and 6.2b:

Type of activity	Resources
6.2a Short answers	Learner Guide, own ideas
Instructions to give to the learners	
Activity 6.2a: Answer the two questions. This can be done individually or in pairs.	

Activity 6.2a

Agroforestry is a way of combining forestry with agriculture. It is a method of growing trees with crops in such a manner that the trees help the crops to grow by protecting them and providing them with nitrogen and other nutrients.

Agroforestry should be encouraged because:

- It restores soil fertility and so increases food security.
- It enables the farmer to harvest tree products such as fruits, nuts and oils.
- Trees can be harvested for fuel wood. When new seedlings are planted in place of the trees that can be cut down, the new trees will continue to absorb carbon dioxide.
- There is less soil erosion.
- Trees absorb carbon dioxide from the atmosphere and are carbon sinks.
- No need to buy chemical or harmful fertilizers. Natural mulch is always available.
- Trees protect crops from strong winds, exposure to sunlight, flooding and drought.
- The variety of crops that are grown help to improve human and animal nutrition.
- There is space for growing medicinal plants.

Type of activity	Resources
6.2b Pair work - discussion of a picture	Learner Guide, own ideas
Instructions to give to the learners	
Activity 6.2a: Study the picture of an imaginary Pacific island (Fig 12). It shows how forestry and agroforestry trap carbon dioxide, increase biodiversity, conserve resources, prevent erosion and make crop production and animal husbandry more sustainable. Then answer questions 1-4.	

Activity 6.2b

1. Names of trees, fruits, crops and livestock in the picture:

Trees	Fruits	Crops	Livestock
Mangrove Pine Pandanus Casuarina	Coconut Breadfruit Orange / Lemon Banana	Yam Taro	Cattle Pigs

2. Forestry and agroforestry practices shown in the picture:
   - Planting mangroves along the shore.
   - Cutting down trees and using them for building houses.
   - Planting windbreaks along the shore.
   - Alley cropping – crops and trees.
   - Planting a variety of trees.
   - Ensuring that trees are conserved on steep slopes.
   - Nursery for tree seedlings.
   - A woman is planting taro in the forest on top of the hill.
   - Habitats for birds and other wildlife are protected.

NOTE: Other answers are possible. Learners may see other things in the picture.

3. The more trees there are, the more carbon dioxide that can be absorbed from the atmosphere. Trees are natural carbon sinks.

4. Reasons for planting trees as a strategy for adaptation to climate change:
   - Growing a variety of trees and crops together is a more healthy form of land-use.
   - In the long term, if there are good management practices and planting is done over a large area, tree-planting helps to ensure that people's livelihoods are more sustainable - more food to eat, more income from the sale of crops and tree products.
   - From an ecological point of view, it is more sustainable. Trees protect the crops from extreme weather events and also provide them with nitrogen and natural nutrients. Mulching is easily used, and there is no need for chemical fertilizers.
   - Agroforestry can be sustained at very little cost, because it is using free and natural methods of cultivation and fertilization.
   - Agroforestry reduces soil erosion on sloping land, and slows down run-off after heavy rain.

Remember that your training institution should have a large copy of this picture available, as it is part of the SPC-GIZ resource "Learning about climate change the Pacific way". If you don't have a large copy, please contact the SPC-GIZ office at the VMGD building in Port Vila.

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Next, please ask learners to complete activity 6.3:

Type of activity	Resources
6.3 Research and demonstration of adaptation measures	Learner Guide, own ideas

Instructions to give to the learners

Activity 6.3:
The class should divide into pairs. Each pair should select one of the adaptation measures listed on page 30 of the Learner Workbook. If the class is small, you as facilitator could ask each individual learner to do one topic.

After choosing the topic, each pair or individual should do research into how the technique is carried out. Use should be made of materials published by DARD and the Departments of Livestock and Forestry, as well as pamphlets and manuals produced by SPC-GIZ CCCPIR. Findings should be summarized by drawing diagrams or pictures on to a large sheet of paper. If possible, the pair or individual should demonstrate how the technique is carried out, using real materials. This will probably mean doing some work in the field.

When all preparations have been done, each pair or individual will make their presentation and demonstration in front of the whole class or to another group of people.

Activity 6.3

Before starting this activity, make sure that you go through section 6.3 (Techniques of food preservation) with the learners.

Activity 6.3 is a summary of the techniques covered in 6.1, 6.2 and 6.3. The object is to help learners to master **one** technique that they can explain and demonstrate to others.

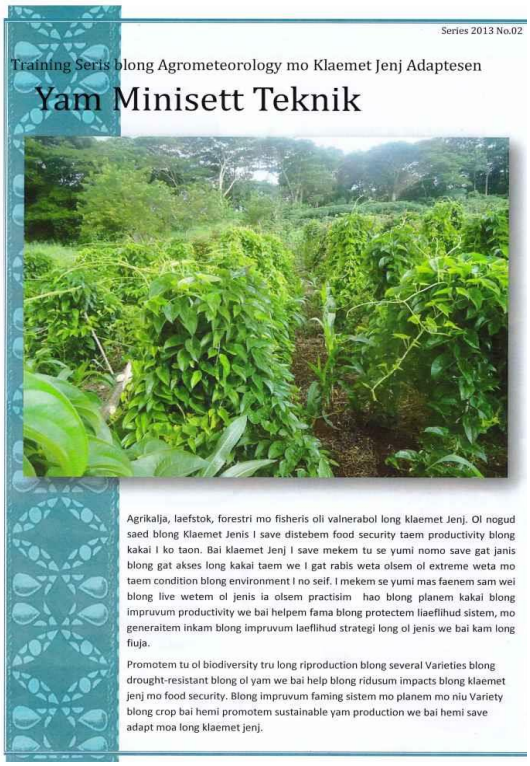
You as facilitator should make sure that the learners have all the materials they need. You may also wish to seek help from local agricultural field assistants or other officers from the Departments of Agriculture, Livestock and Forestry.

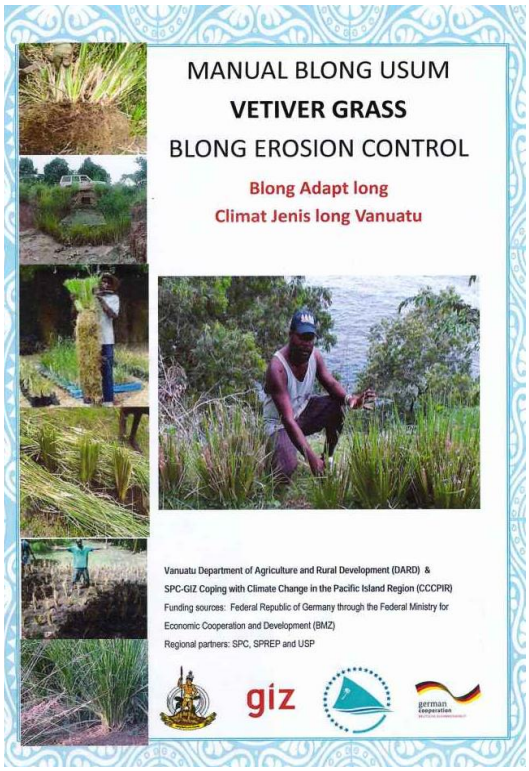
Be ready to encourage pairs or individuals to go out in to the field to learn about the technique they have chosen, and to demonstrate it to others.

(Continued on the next page)

Activity 6.3 (continued):

Good information is available in the series of pamphlets and manuals published by SPC-GIZ CCCPIR. Examples of these are shown below (cover only). If you do not already have them, please contact the SPC-GIZ office in the VMGD building in Port Vila.





Pairs and individuals can present their findings and their demonstrations to the whole class or to any other group of people whom you consider to be suitable.

My notes:

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Now please ask learners to complete activity 6.4 in their workbooks:

Type of activity	Resources
6.4 Pair work - discussion of a picture and photographs	Learner Guide, own ideas

Instructions to give to the learners

Activity 6.4:

1. In pairs study the picture (Fig. 13), which shows methods of fishing that are sustainable (to the right of the dotted line) and unsustainable or destructive (to the left of the dotted line). Then answer questions a) and b).
2. Read the information on the crown-of-thorns starfish, then suggest two reasons why the processing of crown-of-thorns starfish into compost is a good way of adapting to climate change.

Activity 6.4

1. a) Ways in which reefs, sea grass beds and mangroves are being damaged:
   - Use of dynamite for fishing.
   - Use of long nets with small mesh holes.
   - Use of poison to catch fish.
   - Cutting down mangroves and polluting them with household rubbish.
   - Breaking off pieces of coral to take home.
   - Using motor boats that pollute the reefs and mangroves with engine oil / fuel.

NOTE: Other answers are possible. Learners may see other things in the picture.

1. b) Measures that conserve fish and protect reefs, sea grass beds and mangroves:
   - Use of simple outrigger canoes for fishing.
   - Conserving and replanting mangroves.
   - Use of a fish aggregating device (FAD).
   - Using small nets with large mesh holes, or else a simple fishing line.
   - Aquaculture in fish ponds on the land.
   - Marine Protected Area (MPA).
   - Avoiding the dumping of rubbish along the shore.
   - Use of baskets woven from pandanus leaves to carry fish.

NOTE: Other answers are possible. Learners may see other things in the picture.

Remember that your training institution should have a large copy of this picture available, as it is part of the SPC-GIZ resource "Learning about climate change the Pacific way". If you don't have a large copy, please contact the SPC-GIZ office at the VMGD building in Port Vila.

2. Two reasons why the processing of crown-of-thorns starfish into compost is a good way of adapting to climate change:
   a) With climate change, there are likely to be more and more crown-of-thorns starfish that grow on coral reefs and destroy them. So by removing them from the reefs and turning them into compost, we will be able to better protect our reefs.
   b) The compost can be used to fertilize gardens and produce better yields of crops, so improving food security when there are hotter temperatures and more extreme weather events.

My notes:

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Now please ask the learners to complete activity 6.5 in their workbooks:

Type of activity	Resources
6.5 Pair work - analysis of a picture	Learner Guide and own ideas
Instructions to give to the learners	
Activity 6.5: Study the picture of a community conservation area in your Learner Guide (Fig. 49). Your facilitator may be able to provide a larger version of this picture. Now answer the questions.	

Activity 6.5

1. Table of measures to adapt to climate change:

Food preservation techniques are used	FAD
Composting toilet	Marine reserve
Honey-bee husbandry	Agroforestry
Cattle farming	Planting of mangroves along the coast
Non-destructive methods of fishing	Forest cover ensures clean water supply

Other measures can be given.

2. Some of the ways in which the community conservation area helps people to have sustainable livelihoods:
   - Local management committee composed of people who live in the conservation area. This committee ensures proper care of the conservation area.
   - Ecotourism.
   - Cattle farming.
   - Non-destructive methods of fishing.
   - Agroforestry - crops and tree products for own consumption and for sale.
   - Ecosystems are protected and forest cover ensures that streams have pure water.
   - Good waste management - no pollution
   - Crops give good yields because of composting and mulching.

   Other answers are possible.

My notes:

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Now please ask the learners to complete activity 6.6 in their workbooks:

Type of activity	Resources
6.6 Complete the missing words	Learner Guide
Instructions to give to the learners	
Activity 6.6: Read pages 56-62 in your Learner Guide, then complete the missing words in sentences 1-10.	

Activity 6.6

1. If we protect our reefs, our sea grass beds and our mangroves, this is an adaptation measure that will help coastal communities to have better food security and to be more resilient to coastal erosion.
2. Another name for coral gardening is mariculture.
3. If fishermen have a fish aggregating device (FAD), they no longer need to travel long distances to catch deep-water fish such as tuna and mahi mahi. Food security is improved and people can also gain an income. At the same time, the pressure on coral reefs is reduced.
4. The bottom part of the FAD near Nguna-Pele is at a depth of 174 metres.
5. In the future, we can expect longer periods of drought that come during an El Niño period.
6. In order to harvest rain water, a household needs to invest in a rain water tank and in a corrugated iron roof.
7. To prepare for water shortages, people should fix broken gutters and fix leaks in water pipes.
8. To reduce water loss through evaporation, wells and water tanks should be covered.
9. We should encourage the education of children on the conservation of fresh water and the protection of water sources.
10. To save water and get better sanitation, we should introduce composting toilets.

Now please ask learners to complete activity 6.7 in their workbooks:

Type of activity	Resources
6.7 Research work in pairs or groups of three	Own ideas

Instructions to give to the learners

Activity 6.7:
Make a list of all the towns, villages or settlements on your island that you think will have to be relocated in the future because of risks of flooding and/or erosion that occurs because of climate change or other factors. You can also show them on a large sketch map.

Activity 6.7

Encourage learners to use their own knowledge and to speak to others on the island. They should make a list of all coastal towns, villages and settlements that may have to be relocated further inland because of rising sea levels, high tides, floods and erosion. Tell them that this may happen after some decades have passed. It is better if they can show the affected settlements on a large sketch map of their island.

My notes:

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Finally in this section, you can ask learners to complete activity 6.8 in their workbooks:

Type of activity	Resources
6.8 Individual reflection	Own ideas

Instructions to give to the learners

Activity 6.8:
Give three examples of adaptation strategies that can help people in some ways but also cause difficulties.

Activity 6.8

Some examples:

- Clearing forest and bush to remove mosquito-breeding sites may remove wind-breaks that protect the village from strong winds during cyclones.
- People relocate their homes to avoid flooding or erosion. However, their ancestral ties to the land are lost.

Other answers suggested by learners.

My notes:

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Section 7 Show that many measures include both adaptation and mitigation benefits

Learner Guide: Page 64

After completing this session, the learner should be able to:

7.1 identify strategies that provide both adaptation and mitigation benefits

Concepts 7.1	Time frame	Activities related to the concepts
7.1 Examples of strategies that provide both adaptation and mitigation benefits.	**5 hours**	**7.1a, 7.1b, 7.1c**

Please ask the learners to complete activity 7.1a in their workbooks:

Type of activity	Resources
7.1a Picture interpretation	Learner Guide
Instructions to give to the learners	
Activity 7.1a: Using the picture on page 65 of your Learner Guide, make a list of 5 measures that are both adaptation and mitigation:	

Activity 7.1a

Before starting this activity, it is important to discuss the whole picture with the class. Ask the learners to identify the mitigation measures shown on the left side of Fig 53, then to identify the adaptation measures shown on the right, then to identify measures that are both mitigation and adaptation. Then ask the learners to complete activity 7.1a individually.

Mitigation measures:

- Wind turbine
- Using solar energy to power television / DVD
- Walking instead of using a truck
- Using a solar-powered cooker
- Using shopping baskets made of coconut/pandanus leaves rather than plastic bags
- Not burning household rubbish

Adaptation measures:

- Rainwater harvesting using tanks and corrugated iron roofs
- Not building houses right on the coastline
- Pig husbandry
- Agroforestry and planting a variety of crops
- Turning off leaking taps
- Aquaculture
- Covering wells and water tanks securely
- Following cyclone warnings and taking appropriate steps to reduce impacts

Measures that are both mitigation and adaptation:

- Solar fruit drying
- Planting trees and vetiver grass along contour lines on sloping land
- Planting mangrove seedlings along the shoreline
- Composting and mulching
- Using biogas made from pig waste
- Growing and eating a variety of healthy island food - root crops and vegetables

Remember that your training institution should have a large copy of this picture available, as it is part of the SPC-GIZ resource "Learning about climate change the Pacific way". If you don't have a large copy, please contact the SPC-GIZ office at the VMGD building in Port Vila.

Now please ask the learners to complete activity 7.1b in their workbooks:

Type of activity	Resources
7.1b Pair work - adaptation or mitigation?	Learner Guide, own ideas
Instructions to give to the learners	
Activity 7.1b: In pairs, look at the list of activities that can be done at family and community level. Decide whether each activity is contributing to the mitigation of greenhouse gases, or to adaptation to climate change, or to both. Then tick the appropriate box or boxes.	

Activity 7.1b

Activity	Adaptation	Mitigation
Plant a range of different types of vegetable and food crops in your garden. If one crop is destroyed, there are others to eat.	√	
Plant new types of yam, taro, kumala and other crops that can withstand very hot days, drought, salt water, and heavy rain.	√	
Plant trees and vetiver grass on slopes to reduce soil erosion	√	√
Avoid using chemical fertilizers. Use mulch	√	√
Use solar panels for cooking, food drying and electricity in the village.		√
Make compost from crown-of-thorns starfish	√	
Dry fruits and vegetables like manioc, bananas, kumala, nuts and mangoes using solar power. The produce can be sold.	√	√
Protect livestock from heavy rainfall, strong sun and drought by providing them with shade and fresh drinking water.	√	
Plant varieties of yam and banana that can propagate quickly because they generate more shoots from the mother plant.	√	
Adjust current methods and times of planting and growing water melon, cucumber, tomato and other species to a more variable, hotter climate.	√	
Cross-breed native pigs with exotic varieties to produce varieties that can withstand warmer, drier conditions and at the same time produce more meat.	√	
Improve the husbandry of honey bees so that they can flourish in warmer, more extreme conditions	√	
Use compost from leaves, and vegetable and fruit remains.	√	√
Separate and recycle household waste		√
Practice alley cropping	√	
Practice agroforestry	√	√
Avoid cutting down forests. Plant and replant trees	√	√
Promote more forest nurseries	√	√
Walk instead of using trucks and buses		√
Plant more mangroves along the sea shore	√	√
Avoid dumping waste and sewage into rivers and the ocean	√	
Use wind power and solar energy rather than imported fuels		√
Use canoes for fishing instead of speedboats		√
Carry out backyard tilapia breeding	√	
Establish marine protected areas and taboo parts of the reef	√	
Use FADs to catch deep water fish in coastal areas	√	
Reduce soil run-off from entering rivers and oceans	√	
Use energy-saving light bulbs and turn off electrical appliances when not in use		√
Protect coral reefs and mangrove ecosystems	√	
Make and use biogas from pig waste	√	√
Avoid burning rubbish such as old tyres, plastic bags, etc.		√
Use a hybrid solar / diesel electricity generator		√

My notes:

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Now please ask the learners to complete activity 7.1c in their workbooks:

Type of activity	Resources
7.1c Pair work - analysis of a picture	Learner Workbook and own ideas
Instructions to give to the learners	
Activity 7.1c: In pairs, study the picture of an imaginary Pacific island on the next page (Fig. 16), and make a list of ten ways in which the people have adapted their ways of living to cope with climate change and reduce risks from hazards:	

Activity 7.1c

Ways of adapting to climate change and reducing risks from hazards:

- Use of renewable forms of energy - offshore wind mills
- Use of renewable forms of energy - solar panels
- Use of renewable forms of energy - biogas from pig waste
- Household water security - maintaining roofs and gutters
- Household water security - strong, covered water tanks and rainwater harvesting
- Planting mangroves along the shoreline
- Marine protected area
- Use of canoes for fishing, not power-driven speedboats
- Buildings have secure roofs to reduce damage during cyclones
- Traditional houses with rounded roofs to offer protection during cyclones
- Few trucks - use of bicycles
- Composting and mulching
- Rearing fish in fish tanks
- Honey bee husbandry
- Agroforestry
- Pig husbandry
- Use of traditional agricultural methods (e.g. for yams)

Other answers are possible.

Remember that your training institution should have a large copy of this picture available, as it is part of the SPC-GIZ resource "Learning about climate change the Pacific way".

My notes:

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Section 8 Assist the development of adaptation and mitigation measures in a local community

Learner Guide: Page 66

After completing this session, the learner should be able to:

8.1 discuss the roles played by women and men in climate change adaptation and mitigation, and the barriers faced by each gender;

8.2 discuss ways of ensuring that vulnerable people are included in the planning of community activities, so that their needs are met and their capacities used;

8.3 work with a local community to prepare a display of adaptation and mitigation measures that might be used;

8.4 consult with a local community about the adaptation and mitigation measures it might wish to adopt, and participate in their implementation.

Concepts 8.1, 8.2, 8.3, 8.4	Time frame	Activities related to the concepts
8.1 Roles played by women and men in adaptation and mitigation, and the barriers they face.	**3 hours**	**8.1**
8.2 Ensuring that women, children, the elderly and people with disabilities are included in planning for community activities, so that their needs are met and their capacities used.	**2 hours**	**8.2**
8.3 Adaptation and mitigation methods.	**6 hours**	**8.3**
8.4 Demonstration of adaptation and mitigation measures in a local community. Consultation with the community about suitable measures to be adopted. Helping the community to implement one or more of these measures.	**6 hours**	**8.4a, 8.4b**

Please ask the learners to complete activity 8.1 in their workbooks:

Type of activity	Resources
8.1 Report on class discussion	Learner Guide Ideas from class discussion Own ideas
Instructions to give to the learners	
Activity 8.1: After the class discussion, write down your own thoughts on the questions given on page 39 of the Learner Workbook, and on any other issues that were talked about.	

Activity 8.1

Make sure that the class discusses the issues raised on page 66-67 of the Learner Guide. You can do this as a whole class activity, or else you can divide up the class into groups of 3-4 learners and ask each group to discuss the questions. There may be other issues that arise and need to be discussed. Note that for many of the questions, there are no right or wrong answers. The purpose of asking them is to share opinions and gain some new ideas.

After the discussion, ask learners to sit quietly and record their thoughts in the boxes on page 39 of the Learner Workbook.

Remember that when dealing with adaptation activities, it is important that children and junior youth (aged 12-15) and youth are involved. It is the young people who will have to live with climate change, not the old people, so it is only fair that they have a voice in planning for the future.

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Now you can ask the learners to complete activity 8.2 in their workbooks:

Type of activity	Resources
8.2 Your own reflections	Learner Guide Ideas from class discussion. Own ideas
Instructions to give to the learners	
Activity 8.2: After you have discussed the need to include vulnerable groups in the planning for adaptation and mitigation activities, write down your own thoughts on the issues raised in questions 1, 2, 3 and 4 on page 40-41 of the Learner Workbook.	

Activity 8.2

Firstly, you should talk about the idea of vulnerability and the people in the community who are the most vulnerable to the impacts of hazards and climate change, and why.

You can ask the class to identify different categories of vulnerable groups. When talking about people living with disabilities, you can identify groups such as the blind, the deaf, those unable to walk, and those suffering from mental and emotional disabilities, etc.

Then the class can proceed to discuss the four questions on pages 40-41 of the Learner Workbook.

1. Discuss the needs of each of these groups. You could write headings for the different groups on the blackboard, and the learners could indicate their different (or similar) needs.

   Now ask the class to think of how these needs can be met when temperatures are hotter and there are more extreme weather events.

2. Then the class should discuss whether each of these groups should be included in decision-making in a community about measures to take regarding climate change adaptation and mitigation. If the answer is yes (as it should be), encourage the class to explore why!

3. Next, it will be interesting for the class to consider the skills, capacities and experience that each of these vulnerable groups may have. The learners may have never thought about this before!

4. Finally, the class can discuss how these vulnerable groups - particularly women and girls - be given a voice in the planning of adaptation and mitigation activities.

Encourage the learners to come up with new ideas and to think creatively. Record ideas on the blackboard.

After the discussion, ask learners to sit quietly and record their own answers to the questions on pages 40-41 of their Learner Workbooks.

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Next, you can ask the learners to complete activity 8.3:

Type of activity	Resources
8.3 Preparation for a display	Learner Guide Materials prepared for activity 6.3 Ideas from learners and community members

Instructions to give to the learners

Activity 8.3:
With the help of people from the local community, your class is going to prepare a display of adaptation and mitigation measures, ready to present and demonstrate in this community. You can follow the steps indicated on pages 41-42 of your Learner Workbook.

Activity 8.3

Follow the steps indicated. In summary, they are as follows:

1. You and the learners should find a few people in the local community who would be interested to help demonstrate a number of mitigation and adaptation measures. These people from the community should be invited to attend a meeting with the learners at which you will all make a list of the measures that are to be presented and demonstrated.

2. The group, consisting of learners and a few community members, makes the list of all mitigation and adaptation measures that they would like to present and demonstrate. Choose measures that are appropriate for the local community. Summarize this list on the board, indicating who is responsible for each topic. Use the table given in the Learner Workbook on page 41. The learners can copy this down so that everyone knows who is doing what.

3. Ask learners and community members to spend time preparing for their presentations. At this point you could consult officers from the Departments of Agriculture, Livestock, Forestry and Fisheries who may be available. You should ensure that other helpful materials are also available - for example, the pamphlets and manuals on adaptation produced by SPC/GIZ CCCPIR.

4. Encourage each small group to practice their demonstrations. Each should present his/her topic in 5-10 minutes.

5. Arrange a day and a time when the groups can make their presentations and demonstrations to the local community.

The learners will need at least 6 hours for preparing for their presentations. The next activity, 8.4, will require a further 6 hours, during which the learners will make their presentations, then work with the community to start implementing one or more of the measures.

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Finally, you can ask the learners to carry out activities 8.4a and 8.4b:

Type of activity	Resources
8.4a Presentation or demonstration of adaptation and mitigation techniques	Materials prepared during activity 8.3

Instructions to give to the learners

Activity 8.4a:
In small groups, you have already selected a number of adaptation and mitigation techniques for presentation to a local community, and prepared your displays and demonstrations. Each small group will probably include one or more people from this local community. A suitable time and place for making these presentations has been arranged.

Now each group will present and/or demonstrate one of the adaptation and mitigation techniques.

Activity 8.4a

You as facilitator are responsible for ensuring that the presentation and demonstration of adaptation and mitigation techniques takes place smoothly at a time and in a place suitable for the community, for the learners and for you. Allow about 3 hours in all for the presentations.

Type of activity	Resources
8.4b Consultation and action planning	Materials prepared during activity 8.3

Instructions to give to the learners

Activity 8.4b:
After making these presentations and demonstrations, the class should consult with the community. This can be done straight after the presentations, if there is time. The purpose is to plan the actions that the community would now like to undertake, either to start on a new measure, or to strengthen one that is already on-going. It is important that both men and women are consulted, and that the interests of elderly people, children and those living with disabilities are represented.

First, ask people in the community to think of their priorities and goals, and try to determine an overall objective for the community. Then decide on the actions to be taken to implement one or mitigation or adaptation activities.

Activity 8.4b

In many ways, this is the most important activity in the two Units. It is where the trainees demonstrate their learning and apply their knowledge and skills to helping a local community.

It is important that you as facilitator build up good relations with the local community you have selected, not only for the work that your learners will be doing with the community this year, but also in future years. In the next few years, you may want to continue working with this same community. Alternatively, you may decide to work with other local communities on your island, but even so, you will eventually want to return to the same community with which you are working this year. For this reason, you must show good will, respect and sensitivity towards this community.

The groups consisting of learners and members of the community have now made their presentations and demonstrations. Directly after this, on the same day if possible, the community can be consulted about the measures it may wish to introduce. You must be ready to facilitate this consultation.

Firstly it will be helpful to ask people in the community to think about their priorities and goals. Try to determine an overall objective for the community, and then decide together on the actions that are to be taken to implement one or more mitigation or adaptation activities.

Note that when dealing with mitigation activities, the focus should be on mitigation through the protection of the natural environment - protecting carbon sinks, tree planting schemes, waste disposal, etc. Do not only think about how to reduce the use of fossil fuels.

The community may ask all of you together to help it implement just one project that will help everyone. Alternatively, they may suggest that your class splits up into little groups, with each group helping a different family on a project that it would like to start. Both these approaches are acceptable.

To help with the planning and implementation, an “action planning table” should be completed. This can be done by the whole class with the whole community. Or it can be done by small groups of learners who each work separately with one family or a group of families. Each working group must make a copy of the table given on page 43 of the Learner Workbook, and use it when deciding what measures are to be carried out.

It is suggested that each group undertakes just one action. However, if the group prefers to try and implement 2 or 3 actions, this is also fine.

You as facilitator should allow at least three hours for the presentations and demonstrations (8.4a), and another three hours for the learners to help with the implementation of measures (8.4b). Some learners will probably want to continue to help the community in their own time. But for assessment purposes, all you need to do is to check that each learner is actually providing some assistance to a family or on a community project. You do not need to monitor the implementation of every project in detail.

My notes:

Illustrations

Illustration and page number	Source
Cover	Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbait GmbH (GIZ) CCCPIR, 2013, *Alley cropping at the SPC/GIZ CCCPIR pilot site at Teouma Bush, Efate, Vanuatu.*
Map of renewable energy used by UNELCO (p. 24)	Union Électrique du Vanuatu Limited, 2013, *Objectifs énergies renouvelables,* accessed on 8 February 2015 at http://www.unelco.com.vu/engagements/objectifs-energies-renouvelables
Completed diagram (p. 32)	Pierce, C., 2014, *Completed diagram of different aspects of mitigation and adaptation*
Front page of manuals on vetiver grass and yam minisett (p. 43)	Secretariat of the Pacific Community and Deutsche Gesellschaft für Internationale Zusammenarbait GmbH (SPC-GIZ) Coping with Climate Change in the Pacific Island Region (CCCPIR), 2013, *Planting of vetiver grass on Aneityum* and Tari Molisale / National Advisory Board on Climate Change and Disaster Risk Reduction (NAB)/ Vanuatu Meteorology and Geohazards Department (VMGD)/ Secretariat of the Pacific Community and Deutsche Gesellschaft für Internationale Zusammenarbait GmbH (SPC-GIZ) Coping with Climate Change in the Pacific Island Region (CCCPIR)/ European Union Global Climate Change Alliance, 2013, *Training Series in Agrometeorology and Climate Change Adaptation, no. 02*

What will I do differently next time?

Take some time to **reflect** on your own activities as facilitator of these two Units.

Then write down five of the most important lessons you have learned:

What will I do differently next time?
1.
2.
3.
4.
5.

As a facilitator, you have gained hands-on experience in the application of the two Unit standards. You may have experienced difficulties that the developers did not anticipate.

So it will be very helpful if you could give your comments below. They will contribute towards the future revision of these Units, and should be brought to the attention of the Training Manager of your institution.

Difficulties I had with these Units	Recommended changes to address the difficulties
1.	
2.	
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