

# Learner Workbook

## 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



Learner: .....

Facilitator: .....

Date: .....

## Before we start...

This Learner Workbook is designed to accompany the Learner Guide for the units of competency CGMC0616 and CGCA0716. It provides learner-centred activities and assessment tools to foster learning of key concepts and skills in these units, which form part of Certificate I in Climate Change and Disaster Risk Reduction. The competencies developed are in line with the key competencies promoted by VQA to foster greater empowerment and success in the work place. Additionally, a Facilitator Guide for these units provides further background knowledge and teaching notes for facilitators, trainers and teachers.

This guide was designed to be used by a trained and accredited assessor who is registered to assess these specific unit standards as per the requirements of VQA. Prior to the delivery of the program the facilitator and assessor must familiarize themselves with the content of this Learner Workbook and the accompanying Learner Guide. The assessor, facilitator and learner must plan the assessment process together, in order to offer the learner the maximum support and the opportunity to display his/her competence.

This guide provides step-by-step instructions for the assessment process of:

**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

These units are two of the building blocks in the qualification listed below:

Title	Code	VQA Level	Credits
Certificate 1 in Climate Change and Disaster Risk Reduction	.....	1 & 2	46

## Activity 1.1a – Instruction to learner:

### Matching exercise - definitions

Join the words in List A with the correct definitions in List B.

#### LIST A

<b>MITIGATION OF GHGs</b>	•
<b>ADAPTATION</b>	•
<b>GREENHOUSE GASES</b>	•
<b>NATURAL GREENHOUSE EFFECT</b>	•
<b>ENHANCED GREENHOUSE EFFECT</b>	•
<b>FOSSIL FUELS</b>	•
<b>EMISSIONS</b>	•

#### LIST B

1. carbon dioxide, methane and nitrous oxide
2. warming of the atmosphere caused naturally when greenhouse gases trap outgoing heat radiation from the earth
3. substances or gases released into the atmosphere
4. coal, petroleum and natural gas
5. reducing the causes of climate change by cutting down the emissions of greenhouse gases and increasing carbon sinks
6. additional warming of the atmosphere caused by human activities that put extra CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O and other gases in to the atmosphere
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

## Activity 1.1b – Instruction to learner:

Pair work - analysis of photographs

In pairs, study photographs A, B, C, D, E and F, then complete the table on page 5:

**Fig. 1**



SPC/GIZ CCCPIR, 2015



Morley Read / Shutterstock,  
2007-2010



Karthikeyan, A./ Wikimedia, 2012



SPC/GIZ CCCPIR, 2013



SPC/GIZ CCCPIR, 2013



Carol Young, 2014



Photograph	What does the picture show?	How is this contributing to atmospheric warming?
A		
B		
C		
D		
E		
F		

### Activity 1.1c – Instruction to learner:

#### Building models

The class can divide into two groups. One can build a model to show the natural greenhouse effect. The other can build a model to show the enhanced greenhouse effect. Be creative and use objects from the natural environment. To help you, look the photos below, 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.

**Fig. 2: Natural greenhouse effect**



Pierce, C., 2010

**Fig. 3: Enhanced greenhouse effect**



Pierce, C., 2010

## Activity 1.2 – Instruction to learner:

### Pair work - short answer questions

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

1. According to observations made at the top of Mauna Loa, Hawaii, what has happened to the carbon dioxide concentration in the atmosphere since 1960?

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2. How has this change in the concentration of carbon dioxide in the atmosphere affected the average global temperature?

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3. List **ten** impacts of rising global temperatures on the environment and on human society:

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_
- e) \_\_\_\_\_
- f) \_\_\_\_\_
- g) \_\_\_\_\_
- h) \_\_\_\_\_
- i) \_\_\_\_\_
- j) \_\_\_\_\_

4. What did the 5<sup>th</sup> Assessment Synthesis Report (2014) of the Intergovernmental Panel on Climate Change say about the following?

- a) The warming of our climate: \_\_\_\_\_
- b) The changes in our atmosphere and ocean: \_\_\_\_\_
- c) The amounts of snow and ice on our planet: \_\_\_\_\_
- d) World sea levels: \_\_\_\_\_
- e) Concentrations of greenhouse gases: \_\_\_\_\_

- f) The main cause of the warming observed since 1950: \_\_\_\_\_
- g) The result of continued emissions of GHGs: \_\_\_\_\_
- h) The way to limit climate change: \_\_\_\_\_
5. What do you think is going to happen if the human race does not reduce its emissions of greenhouse gases from their present levels? Suggest **five** consequences:
- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_
- e) \_\_\_\_\_

### Activity 1.3a – Instruction to learner:

#### Definitions

Explain the meaning of each of the following:

#### **United Nations Framework Convention on Climate Change (UNFCCC)**

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#### **Conference of the Parties (COP)**

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## Kyoto Protocol

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## A legally binding target

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## Ratify

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## Carbon sink

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## Emissions trading

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## Carbon credit

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### Activity 1.3b – Instruction to learner:

#### Discussion in small groups

Form small groups of 3-4 trainees. Each group should then discuss the following questions, then report back its findings to the whole class.

1. Why do you think that the governments of some rich industrialised countries did not want to accept the requirements of the Kyoto Protocol?

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2. Why do many developing countries blame the industrialised nations for causing climate change? Do you agree?

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3. Why was it essential for all nations to sign the Paris Agreement to reduce their greenhouse gas emissions? What might happen in the absence of such an agreement?

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4. Should we as individuals and communities in Vanuatu depend on the governments of the world to reach an agreement about lowering GHG emissions, or should we try do something about this ourselves? What can we do?

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### Activity 2.1a – Instruction to learner:

Pair work - analysis of a photograph

Name all the ways in which imported fossil fuels are being used in this picture:

Fig. 4



Pierce, C., 2013

### Activity 2.1b – Instruction to learner:

True or False?

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

1. Refined forms of petroleum used in Vanuatu include petrol (gasoline), diesel fuel, kerosene, paraffin, fuel oil and lubricating oil. \_\_\_\_\_
2. Petrol and diesel fuel cost less in the rural areas of Vanuatu than they do in the towns. \_\_\_\_\_

3. Most of the electricity produced by UNELCO and VUI comes from imported petroleum. \_\_\_\_\_
4. Most of the energy from renewable sources in Vanuatu comes from solar panels and hot springs. \_\_\_\_\_
5. In comparison with most countries, Vanuatu has a large carbon footprint. \_\_\_\_\_
6. If more and more coconuts are used for producing biofuel in Vanuatu, our exports of copra will decrease. \_\_\_\_\_
7. Firewood is a renewable source of energy. \_\_\_\_\_
8. When we burn firewood, this releases carbon dioxide into the atmosphere. \_\_\_\_\_
9. Most inter-island transport in Vanuatu is dependent on fossil fuels. \_\_\_\_\_
10. Energy obtained from the sun's rays, from coal and from wind is always available and is free. \_\_\_\_\_
11. It would be better for people in Vanuatu to use renewable sources of energy rather than fossil fuels because this would reduce GHG emissions. \_\_\_\_\_
12. In the long-term, renewable sources of energy will be cheaper than energy from fossil fuels. \_\_\_\_\_

### Activity 2.1c – Instruction to learner:

#### Group work - investigation and discussion

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. You can use a table like this:

NAME OF COMMUNITY OR AREA:				
Source of energy (e.g. firewood, solar panels, biofuel, imported petroleum, etc.)	What is the energy used for?	Renewable or non-renewable	Number of households using this form of energy	% of all households using this form of energy

## Activity 2.2 – Instruction to learner:

### Pair work - discussion

Discuss the following questions in pairs, then write down your answers:

1. What are **four** steps that the Vanuatu Government has taken to promote the mitigation of greenhouse gas emissions and adaptation to climate change?

a) \_\_\_\_\_  
\_\_\_\_\_

b) \_\_\_\_\_  
\_\_\_\_\_

c) \_\_\_\_\_  
\_\_\_\_\_

d) \_\_\_\_\_  
\_\_\_\_\_

2. Do you think that the Government is doing enough to promote the mitigation of greenhouse gas emissions? Why/why not?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Activity 2.3 – Instruction to learner:

### Group work - discussion and practical activity

Form small groups of 3-4 trainees and discuss how you could contribute toward the reduction of GHG emissions. Think about these two questions:

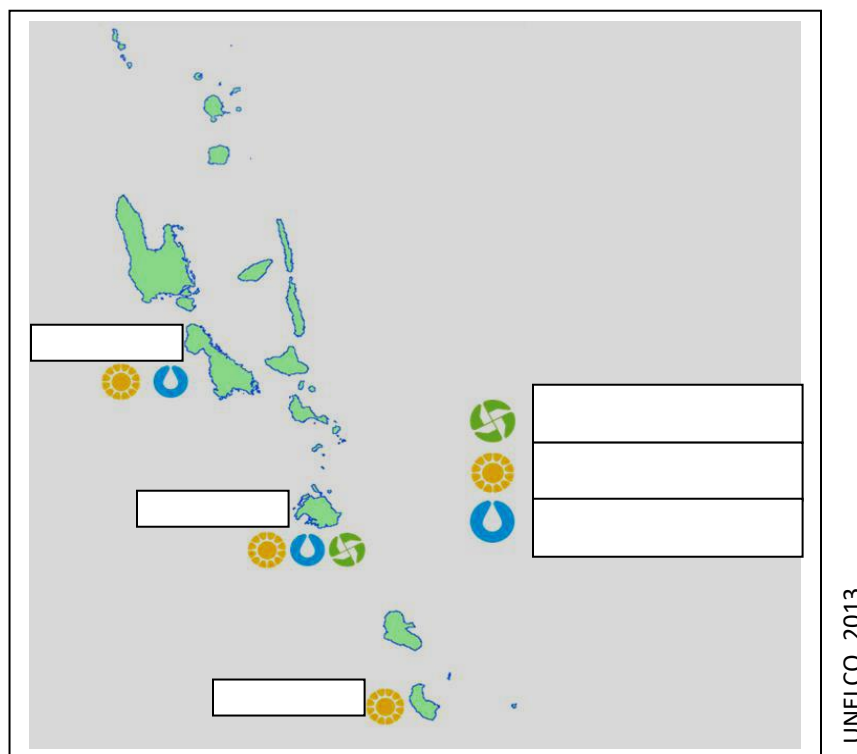
1. Is there any way that you could establish your own system for using renewable energy to produce electricity? What sources could you use? Could you build this yourselves? Could you start on this now?
2. How could you improve and increase the carbon sinks in your area? What steps would you take. Can you start doing this now?

### Activity 3.1a – Instruction to learner:

#### Individual exercise - short answer questions

1. Study this map, and answer questions a) and b):
  - a) On the map, name the three islands on which UNELCO produces electricity from renewable sources, and complete the key to name the three sources.

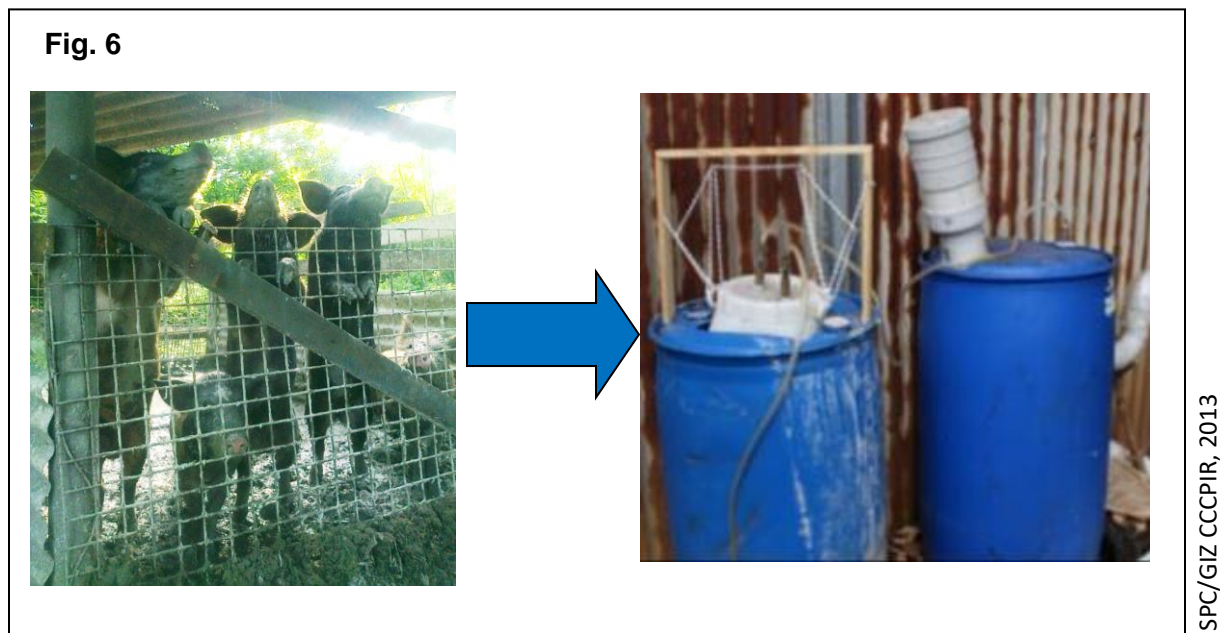
**Fig. 5**



- b) Which source of renewable energy is not shown on this map? \_\_\_\_\_
  - c) State the ways in which energy from renewables is being generated:
    - On Malakula: \_\_\_\_\_
    - On Efate: \_\_\_\_\_
    - On Tanna: \_\_\_\_\_
2. Give an actual example from Vanuatu of each of the following ways of producing energy:
  - a) The use of biogas: \_\_\_\_\_
  - b) The use of hydro-power: \_\_\_\_\_
  - c) The use of solar panels: \_\_\_\_\_
  - d) The use of biofuel: \_\_\_\_\_
  - e) The use of wind power: \_\_\_\_\_
  - f) The use of biomass: \_\_\_\_\_



3. Study this illustration (Fig. 6), then answer questions a) and b):



a) What does the illustration show?

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b) Do you think that the use of this type of energy has a future in Vanuatu? Why?

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### Activity 3.1b – Instruction to learner:

Group work - discussion and presentation

Form small groups of 3-4 trainees. Each group should make a large copy of the following 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.

Source of energy	Renewable or non-renewable	Advantages	Disadvantages
Petrol, diesel fuel, kerosene, (refined petroleum)			
Firewood (biomass)			
Solar radiation			
Running water (hydro-power)			
Biofuel made from coconut oil			
Wind			
Biogas			
Geothermal (hot springs)			

### Activity 3.2 - Instruction to learner:

Pair work - interpretation of pictures

In pairs, study page 31 of your Learner Guide, then answer these questions:

1. Look at this picture (Fig. 7). In what ways is electricity being wasted in this house?



- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_
- e) \_\_\_\_\_

2. What is the advantage for a family in using the type of light bulb shown in this picture (Fig. 8)?

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**Fig. 8**



Pierce, C., 2014

3. If most people in the world used the kind of light bulbs shown in Fig. 8, would this contribute to the mitigation of greenhouse gas emissions? Give a reason for your answer.

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### Activity 3.3 – Instruction to learner:

Pair work - short answers and practical work

Study pages 32-34 of your Learner Guide, then answer these questions:

1. Explain the meaning of the words in this slogan:

**“REFUSE, REUSE, REDUCE AND RECYCLE”**

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2. How does separation and recycling of waste contribute towards the mitigation of greenhouse gas emissions?

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3. Do you think that it would be possible for separation and recycling of waste to be done in your local community? How would you encourage people to do this?

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4. How do the composting and mulching of vegetable matter contribute towards the mitigation of greenhouse gas emissions and adaptation to the negative impacts of climate change? Explain three ways:

a) 

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b) 

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c) 

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5. What do you think of the decision of the Municipality of Port Vila to ban the use of plastic bags? What is the advantage of doing this?

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### Activity 3.4 – Instruction to learner:

#### Individual work - drawing a poster

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, cycling or canoeing.
- “Refuse, reuse, reduce and recycle”

Remember that the reason you are doing this is in order to help your community to contribute towards the reduction of greenhouse gases, as well as to help people take steps towards adaptation to climate change.

### Activity 3.5a – Instruction to learner:

#### Individual work - short answer questions

Study pages 35-37 of your Learner Guide, then answer these questions:

1. What is meant by each of the following?

**Forest conservation:** \_\_\_\_\_  
\_\_\_\_\_

**Carbon sink:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Reafforestation:** \_\_\_\_\_  
\_\_\_\_\_

**REDD:** \_\_\_\_\_  
\_\_\_\_\_

2. What are **two** advantages of having a community-based project for the sustainable management of forests?
  - a) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  - b) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. How do forest conservation and forest management help to mitigate climate change? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. In addition to the role of trees in mitigating climate change, state **three** other benefits of keeping a tree cover on as much land as possible:
  - a) \_\_\_\_\_
  - b) \_\_\_\_\_
  - c) \_\_\_\_\_

### Activity 3.5b – Instruction to learner:

#### Practical work

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. Here are some examples:

- If I cut down a tree, I plant a new one and look after it.
- We work with the local community to plan a locally-managed conservation area.
- We work with the local community to set aside an area where a fuelwood plantation can be established, to meet future needs for firewood, etc. Species such as *kasis* grow quickly and can survive on poor soils.
- We work with the local community to identify and protect an area from soil erosion.

### Activity 3.6 – Instruction to learner:

#### Class discussion

After discussing the questions on page 38 of the Learner Guide, write down some of your thoughts in this box. Do men and women have different roles to play in the mitigation of climate change, or are their roles the same?



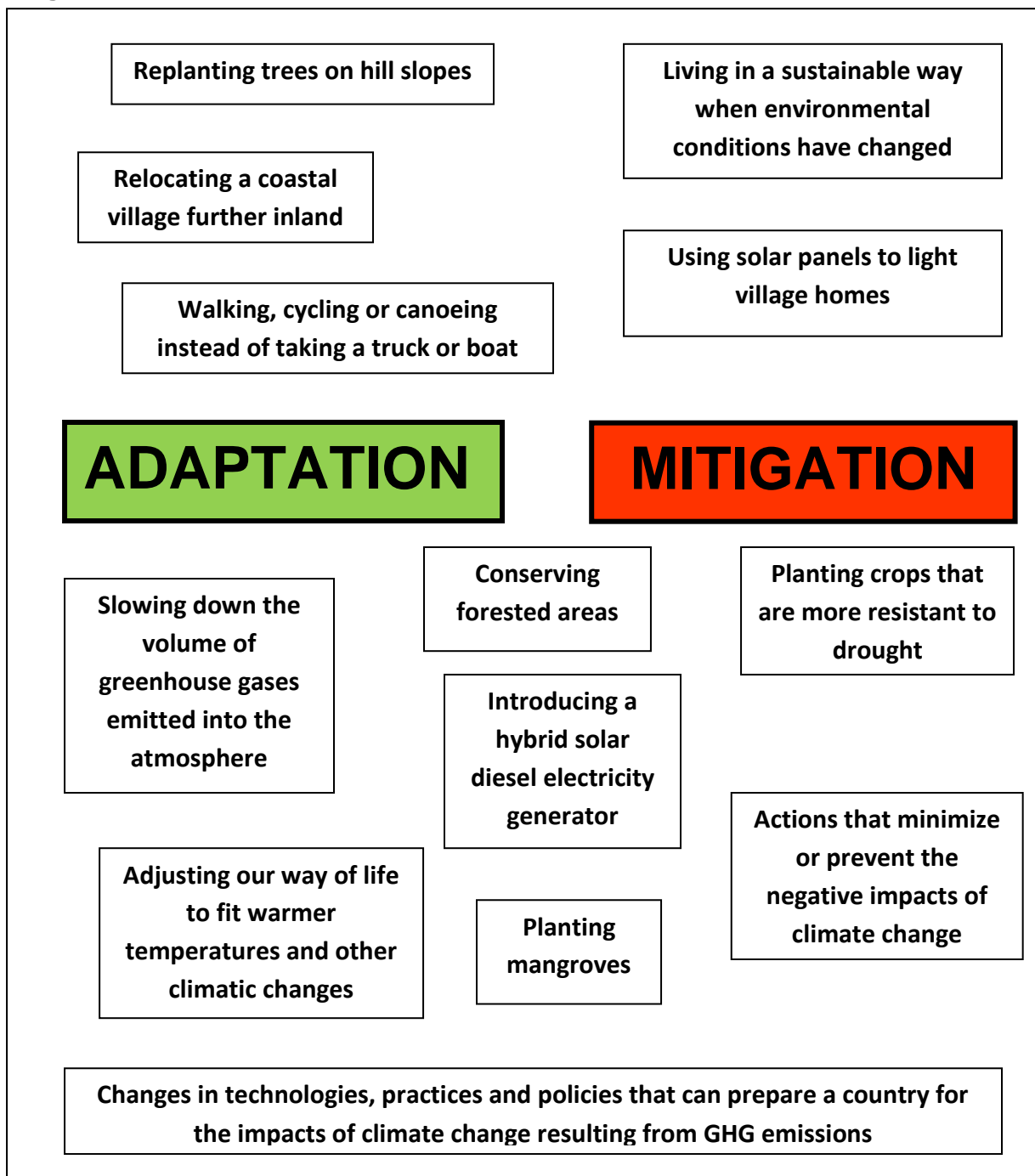
### Activity 4.1a – Instruction to learner:

#### Individual exercise - difference between mitigation and adaptation

In the diagram on the next page (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 the boxes showing mitigation or adaptation (or both).

Finally, shade each white box in the appropriate colour (red for mitigation, green for adaptation, or red and green together for both).

**Fig. 9**

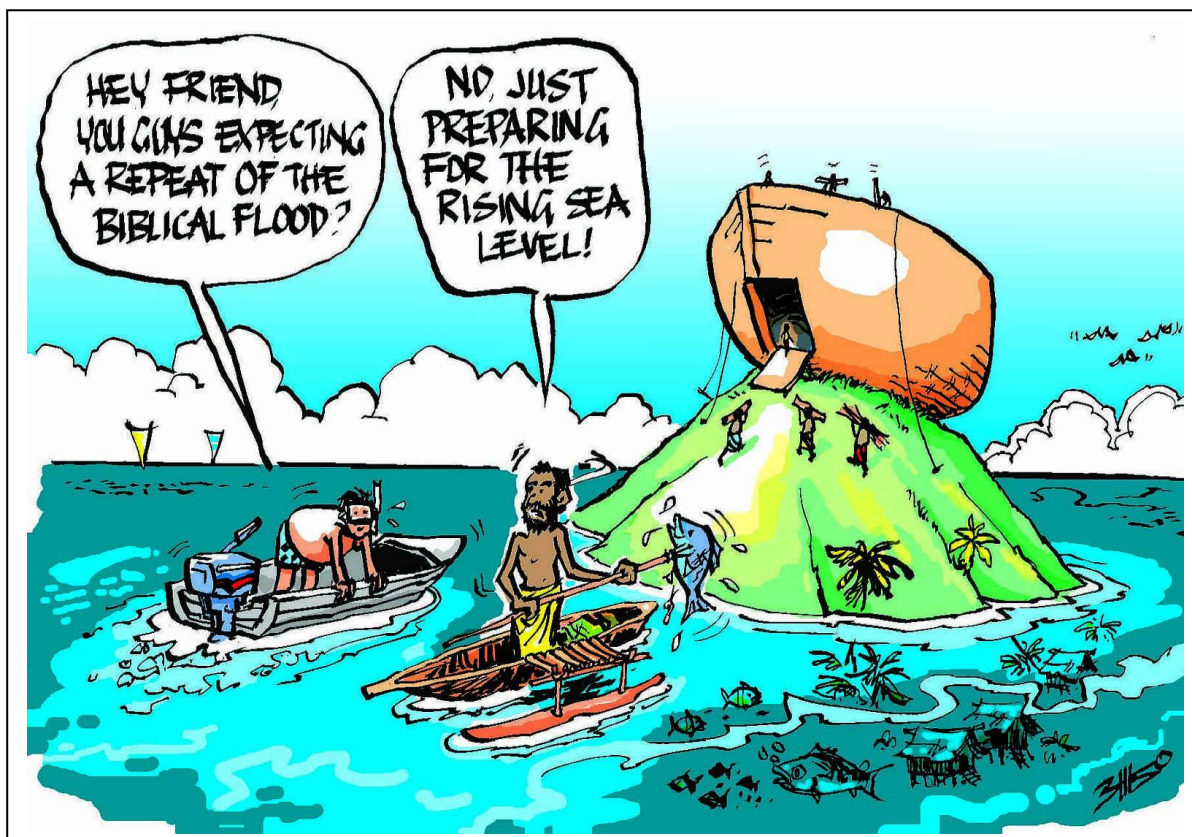


### Activity 4.1b – Instruction to learner:

#### Pair work - cartoon interpretation

In pairs, study this cartoon (Fig. 10), and make sure you understand what the two men are saying to each other. Then answer questions 1, 2 and 3 below. The cartoon was the winning entry from an Asia-Pacific cartoon competition on Climate Change and Human Development organized by UNDP.

Fig. 10



Bisilo Osake/UNDP/Flickr, 2012

1. Does this cartoon show mitigation of climate change or adaptation to climate change? Why do you say this?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. What steps are being taken by the man in the canoe to prepare for rising sea levels?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



3. Compare the carbon footprints of the two men shown in the picture. What do you notice? \_\_\_\_\_

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### Activity 4.2 – Instruction to learner:

#### Discussion in pairs

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 below. Then go and talk to another pair and exchange opinions.

Which has higher priority - GHG mitigation or climate change adaptation?

Why do you say this?

1.

2.

3.

4.

## Individual reflection

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

### Individual exercise - short answer questions

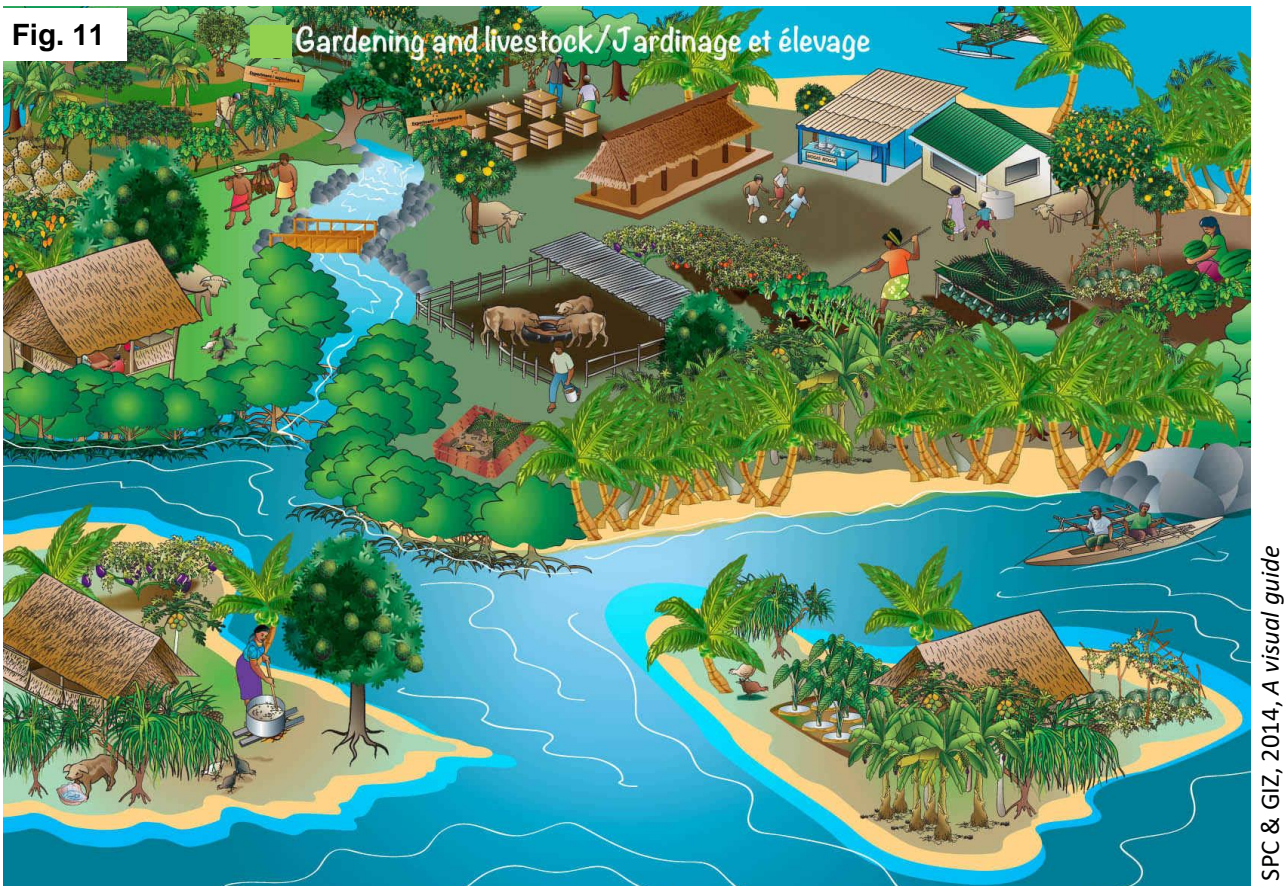
1. Name one department of the Vanuatu Government that is helping people and communities to adapt to climate change: \_\_\_\_\_
2. Name one NGO that is helping people and communities in Vanuatu to adapt to climate change: \_\_\_\_\_
3. Name one overseas government agency that is helping to fund adaptation activities in Vanuatu: \_\_\_\_\_
4. Name one international development partner that is working with government and NGO agencies in Vanuatu to help communities to adapt to climate change: \_\_\_\_\_

5. Why can we say that yam planting using yam vines and the yam minisett technique are good ways of adapting to climate change? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. What is the advantage of producing cross-breeds of taro? \_\_\_\_\_  
\_\_\_\_\_
7. What does “pig husbandry” mean? \_\_\_\_\_  
\_\_\_\_\_
8. What are the **two** things that the CCCPIR project is developing at its pig husbandry site on Pele island?
  - a) \_\_\_\_\_
  - b) \_\_\_\_\_
9. State **three** reasons why it is important to improve honey bee husbandry:
  - a) \_\_\_\_\_
  - b) \_\_\_\_\_
  - c) \_\_\_\_\_
10. What is one way of reducing coastal erosion? \_\_\_\_\_  
\_\_\_\_\_
11. Why should we plant vetiver grass on slopes? Give **two** reasons:
  - a) \_\_\_\_\_
  - b) \_\_\_\_\_
12. Do you think that the breeding of tilapia fish in your own backyard is a good way of improving food security? Why /why not? \_\_\_\_\_  
\_\_\_\_\_
13. Why should trees such as *Glyricidia* and *Erythrina* be planted between food crops such as taro, cabbage and ginger? \_\_\_\_\_  
\_\_\_\_\_
14. Name **two** leguminous cover crops that can be used by farmers in Vanuatu:  
\_\_\_\_\_ and \_\_\_\_\_
15. Which of the adaptation measures described on pages 45 to 52 of the Learner Guide could be used in your area? \_\_\_\_\_  
\_\_\_\_\_

## Activity 6.1b – Instruction to learner:

Pair work - discussion of a picture

In pairs, study this picture of an imaginary Pacific island (Fig. 11), then answer the question below:



What steps have been taken on this island to adapt farming practices to climate change?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_

### Activity 6.2a – Instruction to learner:

#### Short answers

What is meant by **agroforestry**? \_\_\_\_\_

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Why is agroforestry something that we should encourage? \_\_\_\_\_

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### Activity 6.2b – Instruction to learner:

#### Pair work - discussion of a picture

Study the picture of an imaginary Pacific island (Fig. 12) on the next page. It shows how forestry and agroforestry trap carbon dioxide, increase biodiversity, conserve resources, prevent erosion and make crop production and animal husbandry more sustainable.

1. Name some of the trees, fruits, crops and livestock that you see in the picture:

Trees	Fruits	Crops	Livestock

2. What forestry and agroforestry practices can you see in the picture?

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3. How does planting trees help to reduce GHG emissions? \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
4. Give **three** reasons why planting trees is a good strategy for adaptation to climate change:
- a) \_\_\_\_\_
- \_\_\_\_\_
- b) \_\_\_\_\_
- \_\_\_\_\_
- c) \_\_\_\_\_
- \_\_\_\_\_

Fig. 12



### Activity 6.3 – Instruction to learner:

#### Research and demonstration of adaptation measures

The class should divide into pairs. Each pair should select one of the following adaptation measures. If your class is small, your facilitator may ask each of you to do one topic.

1. Yam planting (vine technique)
2. Yam planting (minisett technique)
3. Taro breeding technique
4. Banana multiplication technique
5. Pig breeding
6. Honey bee husbandry
7. Tree planting to reduce coastal erosion
8. Planting trees and vetiver grass to reduce soil erosion
9. Backyard tilapia farming
10. Alley cropping
11. Using cover crops and crop rotation
12. Agroforestry
13. Forestry
14. A traditional method of food preservation
15. Solar fruit drying

After choosing your topic, you should do some research on how exactly the technique is carried out. You can make use of materials produced by the Department of Agriculture and Rural Development, the Department of Livestock and the Department of Forestry. You can also use the pamphlets and manuals produced by the SPC-GIZ CCCPIR programme, which your facilitator should be holding.

Now you must prepare a short presentation in which you will demonstrate the technique to others. You should summarize your technique by drawing diagrams or pictures on a large sheet of paper. If possible, you will demonstrate how the technique is carried out, using real materials. You will probably have to do your demonstration in the field, outside the classroom.

Your facilitator will now ask you to make your presentation and demonstration in front of the class or to another group of people.

## Activity 6.4 – Instruction to learner:

Pair work - discussion of a picture and photographs

1. In pairs, study this 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 the questions below:



- a) State some of the ways in which the reefs, sea grass beds and mangroves are being damaged: \_\_\_\_\_  
\_\_\_\_\_
- b) State some of the measures that conserve fish and protect reefs, sea grass beds and mangroves: \_\_\_\_\_  
\_\_\_\_\_



2. These two photographs show the removal of crown-of-thorns starfish from the reefs near Pele island (Fig. 14), and the processing of the starfish into compost (Fig. 15).



SPC/GIZ CCCPIR, 2013

Crown of thorns starfish are harmful predators that feed on coral polyps and destroy coral reefs. Research has shown that the starfish increase in number when heavy rain and storms cause a greater run-off of sediment from the land to the sea. The run-off puts more nutrients into the water and this encourages the growth of the phytoplankton on which the larvae of the starfish feed (Brodie et al, 2005). Climate change is likely to increase this run-off.

Read the information above, then suggest **two** reasons why the processing of crown-of-thorns starfish into compost is a good way of adapting to climate change:

- a) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- b) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Activity 6.5 – Instruction to learner:

### Pair work - analysis of a picture

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 these questions:

1. Complete this table to name 8 measures that have been taken to adapt to climate change in this community conservation area:

1	5
2	6
3	7
4	8

2. How does this community conservation area help the local people to have sustainable livelihoods? Give some examples:

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## Activity 6.6 – Instruction to learner:

### Complete the missing words

Read pages 56-62 in your Learner Guide, then complete the missing words:

1. If we protect our reefs, our sea grass beds and our mangroves, this is an \_\_\_\_\_ measure that will help coastal communities to have better \_\_\_\_\_ and to be more resilient to \_\_\_\_\_.
2. Another name for coral gardening is \_\_\_\_\_.

3. If fishermen have a fish aggregating device (FAD), they no longer need to travel long distances to catch deep-water fish such as \_\_\_\_\_ and \_\_\_\_\_. Food security is \_\_\_\_\_ and people can also gain an \_\_\_\_\_. At the same time, the \_\_\_\_\_ on coral reefs is \_\_\_\_\_.
4. The bottom part of the FAD near Nguna-Pele is at a depth of \_\_\_\_\_ metres.
5. In the future, we can expect longer periods of drought that come during an \_\_\_\_\_ period.
6. In order to harvest rain water, a household needs to invest in a \_\_\_\_\_ and in a \_\_\_\_\_ roof.
7. To prepare for water shortages, people should fix \_\_\_\_\_ gutters and fix \_\_\_\_\_ in water pipes.
8. To reduce water loss through evaporation, \_\_\_\_\_ and \_\_\_\_\_ should be covered.
9. We should encourage the \_\_\_\_\_ of children on the \_\_\_\_\_ of fresh water and the protection of water \_\_\_\_\_.
10. To save water and get better sanitation, we should introduce \_\_\_\_\_.

### Activity 6.7 – Instruction to learner:

Research work in pairs or groups of three

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:

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### Activity 6.8 – Instruction to learner:

#### Individual reflection

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

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Activity 7.1a – Instruction to learner:

#### Picture interpretation

Using the picture on page 65 of your Learner Guide, make a list of 5 measures that are **both** adaptation and mitigation:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

## Activity 7.1b – Instruction to learner:

Pair work - adaptation or mitigation?

In pairs, look at this 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	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.		

*(Continued on the next page)*

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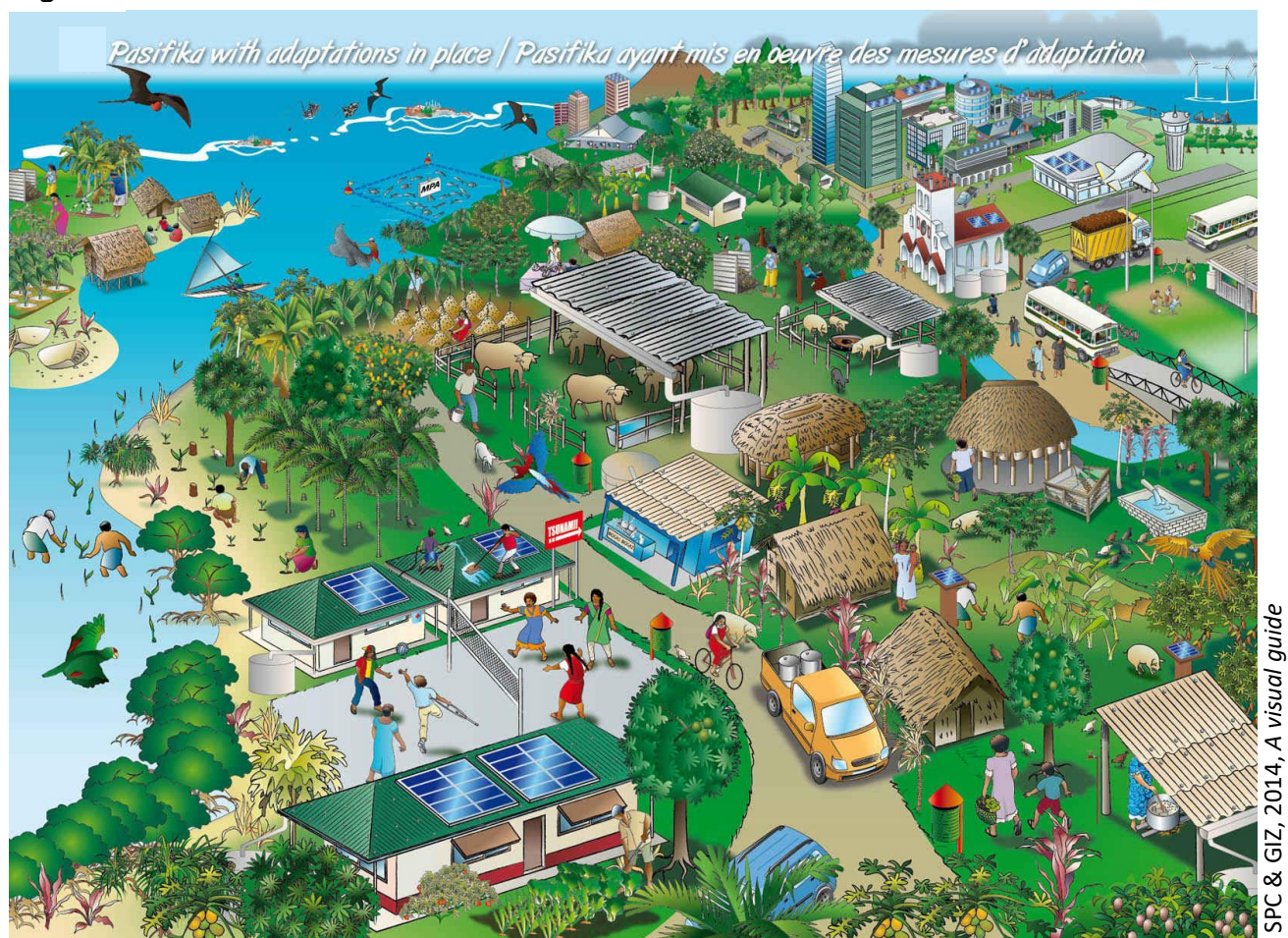
Activity	Adaptation	Mitigation
Avoid cutting down forests. Plant and replant trees.		
Promote more forest nurseries.		
Walk instead of using trucks and buses.		
Plant more mangroves along the sea shore.		
Avoid dumping waste and sewage into rivers and the ocean.		
Use wind power and solar energy rather 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, sea grass beds 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.		

### Activity 7.1c – Instruction to learner:

Pair work - analysis of a picture

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.

**Fig. 16**



1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

## Activity 8.1 – Instruction to learner:

### Report on class discussion

After your class discussion, write down your own thoughts on the following questions and on any other issues that you talked about:

In your local area, who are more likely to want to plant trees and vetiver grass to reduce erosion - men or women or both? Why?	
Who are more likely to introduce adaptation measures in relation to pigs, cattle and other livestock - men or women? Why?	
Do women and men have different roles in agroforestry and crop cultivation? How are they different?	
Are men more involved than women in the protection of coral reefs and mangrove ecosystems?	
Who are likely to be more interested in FADs - men or women? What about solar fruit drying? Why?	
Who collects the firewood and the fresh water - men or women or both?	
Do women in your community have access to information about adaptation activities? Can women make decisions about these activities, or must they always have the agreement of men?	
Who should decide whether an area of a reef should be made taboo for a few years in order to stop over-fishing and dumping of rubbish?	
In general, do you think that women and men should have an equal say in promoting activities that encourage mitigation of climate change and adaptation to climate change? What about children and young people - should they have a say too?	
Other issues	

## Activity 8.2 – Instruction to learner:

### Your own reflections

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 following:

1. What are the needs of the vulnerable groups in your local community in order to cope with hazards and climate change?

Women and girls	
Babies and infants	
Children	
Youth in general	
Elderly people	
People living with disabilities	
People living in poverty	
Other vulnerable people (please specify)	

2. Do you think that these groups of people should be included in decision-making about measures to take regarding climate change adaptation and mitigation?

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3. Do some of these vulnerable groups have skills, capacities and experience that others may not have? Give some examples. \_\_\_\_\_

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4. How can these vulnerable groups be given a voice in planning for adaptation and mitigation activities? \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Activity 8.3 – Instruction to learner:

#### Preparation for a display

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 these steps:

1. With the help of your facilitator and interested people from the community, make a list of all the mitigation and adaptation measures that you would like to present and demonstrate in the community. You already have the materials on adaptation prepared by pairs and individuals in the class for activity 6.3, and these same materials can be used again. In addition, you can look through the practical mitigation activities covered in section 3, and select some that could be presented and/or demonstrated. Remember to choose measures that are appropriate for the local community you have chosen.
2. Make a summary of the topics to be presented or demonstrated:

Topic	Names of those responsible	Topic	Names of those responsible

3. Prepare your materials and your demonstration. Make sure that someone from the community is working with you to prepare for the demonstration. Be ready to seek the advice of officers from the Departments of Agriculture and Rural Development, Forestry and Fisheries who may be available in your area. You can also ask for help from representatives of non-government organisations who are working on your island.
4. Practice your presentation and/or demonstration. Aim to present your topic in about 5-10 minutes.
5. With the help of your local community and your facilitator, arrange a suitable time when the presentations or demonstrations can be made.

#### Activity 8.4a – Instruction to learner:

##### Presentation or demonstration of adaptation and mitigation techniques

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 already been arranged.

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

#### Activity 8.4b – Instruction to learner:

##### Consultation and action planning

After making these presentations and demonstrations, your class should consult with the community. 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. Your facilitator will help you to do this. It is important that you consult with both men and women, and that the interests of children, elderly people and those living with disabilities are represented.

First, ask people in the community to think of their priorities and goals. Try to determine an overall objective for the community, then decide on the actions 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 this 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 should make a large copy of the table below to use when deciding what mitigation and adaptation measures are to be carried out. It is suggested that you choose just one action to take, but if you prefer, you can choose two or three.

NAME OF COMMUNITY / FAMILY / GROUP OF FAMILIES:							
NAMES OF MEMBERS OF THE WORKING GROUP							
What do we want to achieve:							
Action	Mitigation or adaptation?	When?	Where?	Who?	What skills and resources are needed?	How can we get support for our action?	How can we measure if our action was successful?

Remember that you yourself are involved in the implementation of the actions that are decided. You as a learner are helping the community to carry out the particular measure or measures that have been chosen. Your role is to serve the community and to provide what assistance the people require. You are there as helpers and advisors, not to tell the community what to do! Your selfless service to the community will be greatly appreciated.

In the box below, please keep a diary of your service to the community:

Date	Activity

## ASSESSMENT OF LEARNING

You will be given a short test to find out your learning from this Unit. Here are some of the questions that you might be asked. Before the test, carefully go through these questions and think about how you might answer them.

1. What is meant by “greenhouse gas mitigation”, and why should we adopt measures to do this mitigation?
2. What is the IPCC? What did the IPCC say about climate change in its latest report?
3. Why is it important for all countries to be involved in signing an international agreement to reduce GHG emissions?
4. What are two advantages for communities in Vanuatu of switching from fossil fuels to renewable sources of energy?
5. Describe five measures that can be used in Vanuatu to mitigate GHG emissions.
6. How do recycling, composting and mulching contribute towards GHG mitigation?
7. Explain why adaptation strategies must be adopted by communities in Vanuatu.
8. Describe five measures that can be undertaken by communities in Vanuatu in order to adapt to climate change and become more resilient to its impacts.
9. Why is tree planting both a mitigation and an adaptation measure?
10. Why can we call food preservation a way of adapting to climate change?
11. Give three examples of communities in Vanuatu that are preparing for climate change.
12. Explain three ways in which families can improve their household water security.
13. Why will some villages on the coast and in river valleys need to be relocated in future?
14. What are some of the barriers faced by women in adopting adaptation measures?
15. Name five government or other agencies that promote adaptation/mitigation measures in Vanuatu.

# Illustrations

Fig. number	Source
Cover	Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) CCCPIR, 2013, <i>Alley cropping at the SPC/GIZ CCCPIR pilot site at Teouma Bush, Efate, Vanuatu.</i>
1.	<p>A. Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) CCCPIR, 2015, <i>Using a string cutter.</i></p> <p>B. Dr Morley Read / Shutterstock, 2007-2015, <i>Slash and burn cultivation in the Peruvian Amazon</i>, accessed on 7 February 2015 at <a href="http://www.shutterstock.com/pic-89446369/stock-photo-slash-and-burn-cultivation-in-the-peruvian-amazon-clearing-in-the-rainforest-planted-with-maize.html?src=5OjzURv-bm5UZQSxDIWjw-1-0&amp;ws=1">http://www.shutterstock.com/pic-89446369/stock-photo-slash-and-burn-cultivation-in-the-peruvian-amazon-clearing-in-the-rainforest-planted-with-maize.html?src=5OjzURv-bm5UZQSxDIWjw-1-0&amp;ws=1</a></p> <p>C. Karthikeyan, A. K. / Wikimedia, 2012, accessed on 15 January 2015 at <a href="http://commons.wikimedia.org/wiki/File:Sithalapakkam_Garbage_Dump_1.jpg">http://commons.wikimedia.org/wiki/File:Sithalapakkam_Garbage_Dump_1.jpg</a></p> <p>D. Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) CCCPIR, 2013, <i>Taking a speedboat.</i></p> <p>E. Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) CCCPIR, 2013, <i>Air Vanuatu plane taking off.</i></p> <p>F. Carol Young, 2014, <i>Chainsaw being used in Eua, Tonga.</i></p>
2.	Pierce, C., 2010, <i>Model of the natural greenhouse effect made for "Science Week" by students of the Vanuatu Institute of Teacher Education.</i>
3.	Pierce, C., 2010, <i>Model of the enhanced greenhouse effect made for "Science Week" by students of the Vanuatu Institute of Teacher Education.</i>
4.	Pierce, C., 2013, <i>View along Kumul Highway, Port Vila.</i>
5.	Union Électrique du Vanuatu Limited, 2013, <i>Objectifs énergies renouvelables</i> , accessed on 8 February 2015 at <a href="http://www.unelco.com.vu/engagements/objectifs-energies-renouvelables">http://www.unelco.com.vu/engagements/objectifs-energies-renouvelables</a>
6.	Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) CCCPIR, 2013, <i>Biogas from pig farming at the CCCPIR pilot site on Pele island, Efate, Vanuatu.</i>
7.	South Pacific Applied Geoscience Commission (SOPAC), 2008, <i>Home Energy Guide for the Pacific</i> , accessed on 3 February 2015 at <a href="http://www.sopac.org">http://www.sopac.org</a>
8.	Pierce, C., 2014, <i>Energy efficient light bulb.</i>
9.	Pierce, C., 2014, <i>Diagram of adaptation and mitigation activities.</i>
10.	Bisilo Osake / United Nations Development Programme (UNDP)/Flickr, 2012, <i>Winning cartoon from the Asia-Pacific Cartoon Contest on Climate Change and Human Development</i> , accessed on 9 February 2015 at <a href="https://www.flickr.com/photos/37913760@N03/6944349602#">https://www.flickr.com/photos/37913760@N03/6944349602#</a>



11.	Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), 2014, <i>Learning about Climate Change the Pacific Way: A Visual Guide – Vanuatu</i> . Accessed on 12 December 2014 at <a href="http://www.spc.int/images/climate-change/cc-project/Vanuatu-complete.pdf">http://www.spc.int/images/climate-change/cc-project/Vanuatu-complete.pdf</a>
12.	Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), 2014, <i>Learning about Climate Change the Pacific Way: A Visual Guide – Vanuatu</i> . Accessed on 12 December 2014 at <a href="http://www.spc.int/images/climate-change/cc-project/Vanuatu-complete.pdf">http://www.spc.int/images/climate-change/cc-project/Vanuatu-complete.pdf</a>
13.	Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), 2014, <i>Learning about Climate Change the Pacific Way: A Visual Guide – Vanuatu</i> . Accessed on 12 December 2014 at <a href="http://www.spc.int/images/climate-change/cc-project/Vanuatu-complete.pdf">http://www.spc.int/images/climate-change/cc-project/Vanuatu-complete.pdf</a>
14.	Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) CCCPIR, 2013, <i>Removing crown-of-thorns starfish from the reefs near Pele island, Efate, Vanuatu</i> .
15.	Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) CCCPIR, 2013, <i>Processing starfish into compost</i> .
16.	Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), 2014, <i>Learning about Climate Change the Pacific Way: A Visual Guide – Vanuatu</i> . Accessed on 12 December 2014 at <a href="http://www.spc.int/images/climate-change/cc-project/Vanuatu-complete.pdf">http://www.spc.int/images/climate-change/cc-project/Vanuatu-complete.pdf</a>



## Assessment Feedback Form

Comments/Remarks	
Feedback to learner on assessment and / or overall recommendations and action plan for competence:	
Feedback from learner to assessor:	
<b>Assessment judgment</b>  You have been found:  <input type="radio"/> Competent  <input type="radio"/> Not yet competent in this unit standard	Action to follow:  <input type="radio"/> Assessor report to VIT  <input type="radio"/> Learner results and attendance certification issued
<b>Learner's signature:</b>	<b>Date:</b>
<b>Assessor's signature:</b>	<b>Date:</b>
<b>Moderator's signature:</b>	<b>Date:</b>

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