Sea Level rise is a real threat to coastal communities and coastlines in the Solomon Islands.

Year 5
Learner’s Resource Book
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Background

The development of this Year 5 Climate Change Resource Book is part of the Solomon Islands Development Trust (SIDT) project under the Child Centred Climate Change Adaptation (4CA) Project.

The Child-Centred Climate Change Adaptation (4CA) program, funded by Australian Aid and Plan International Australia (PIA), is a project implemented in four countries in South-East Asia and six countries in the Pacific, aimed at achieving the overall goal of building: ‘Safe and resilient communities in which children and young people can contribute to the management and the reduction of the risks associated with changes in climate’.

In the Pacific, 4CA is managed at the regional level by FSPI and at the national level by FSPI network partners based in Tonga - Tonga Community Development Trust (TCDT), PNG - Foundation for the People and Community Development (FPCD), Solomon Islands - Solomon Island Development Trust (SIDT), Fiji Islands – Partners in Community Development Fiji, Tuvalu -Tuvalu Association of NGOs (TANGO) and in Kiribati by the Foundation for the Peoples of the South Pacific (FSPK). The program has the following objectives: 1) To increase the awareness and capacity of children, youth and communities on climate change and related disasters, to enable them to facilitate child-centred climate change adaptation (4CA) processes; 2) To develop and implement locally appropriate climate change smart solutions that incorporate and demonstrate the 4CA model; and 3) To advocate for the incorporation of good practices and learning from the 4CA program approach in local, district and/or national government processes.
Acknowledgement

This book is focused on climate change and its effects on living things globally. It is designed for the Solomon Islands context and aims to address many of the issues that are evident today. The Solomon Islands Development Trust (SIDT) would like to thank the following Government Ministries, donor agencies, international and local NGOs, and individuals whose work has led to the development of this material.

Government Ministries

Ministry of Environment, Climate Change and Disaster Management and Meteorology (MECDM)
Ministry of Education and Human Resources Development (MEHRD)

Donor Agencies

Australian Aid
Plan Australia International (PIA)

International and local NGO`s

Foundation of the People of the South Pacific (FSPI)
Solomon Islands Red Cross (SIRC)
World Vision Solomon Islands
Adventist Development Relief Agency-Solomon Islands (ADRA)

Technical support

Curriculum Development Division, Ministry of Education and Human Resources Management
Climate change is and will affect our livelihood; your great input will contribute to help make our world a safer place to live.
Introduction

This Year 5 learner’s resource book on climate change has been developed as a supplementary material to the Primary Social Studies learner’s books that are currently used in schools. It provides notes, illustrations and follow up activities that show what climate change is. The types of activities in the book are more on the participatory approach or child centred approach to learning. Here, learners are encouraged to investigate or research about why and how climate change occurs, and ways in which people respond to it. While developing this learner’s resource book, there is also consideration of the 8 Key Learning Outcomes in the National Curriculum Statement. These eight key learning outcomes are: 1. Cultural promotion, 2. Lifelong learning, 3. Ethics and good citizenship, 4. Peace and reconciliation, 5. Technology, 6. Entrepreneurship, 7. Environment, conservation and climate change, and 8. Development of the whole person.

Thus the four chapters in this resource book reflect key learning outcome 7, namely: Environment, Conservation and Climate Change. The kind of activities that children are involved in are reflected in the explanatory statement that accompanies this key learning outcome: “Development of positive attitudes and values towards the preservation and conservation of the environment, adaptation and management of the effects of climate change. This includes understanding of the hazards, planning and management and responses to the impacts of disaster”.

There are four chapters in this book that cover the whole issue of climate change. The material has been developed and contextualized to suit Solomon Islands.
Aim
The aim of the Year 5 Climate Change Resource Book is to:

- Raise awareness of climate change among young learners.
- Assist learners to use information about climate change through participatory or child centred learning approach.
- Enable learners to gain knowledge and skills and to develop appropriate attitudes to respond to climate change.
- Provide ways which contribute to a safe and sustainable livelihood.

Rationale
The purpose of this Year 5 Learner’s Resources Book on Climate Change is to educate learners about the changes in weather patterns which are being brought about by climate change. A Teacher’s Guide has been developed to go along with this resource book. These materials will enable teachers to support learners effectively as they use the books. Working through this book will help learners acquire understanding in the following three key areas.

Knowledge: learners will be able: to explain what climate change is and its causes; to describe the impacts of climate change in Solomon Islands; to understand the global effort, and in particular, Solomon Islands’ efforts with regards to climate change adaptation and mitigation.

Skills: learners can act personally to mitigate and adapt to climate change; contribute to the development of climate change adaptation and mitigation plans for their families, communities and schools, and enhance their ability and capacity to observe, analyze and evaluate the impacts of climate change.

Attitude: learn to develop a sense of responsibility and a positive attitude to actively participate in the protection of the environment; in the building of green lifestyles; in promoting low carbon emissions, and the development of a sense of sustainable consumption of resources and an interest in low carbon production and business.
Chapter 1

Weather, Climate and Climate Change

In this chapter, you will:

- learn about weather, climate and climate change
- differentiate between ‘Weather, Climate and Climate Change’
- differentiate between ‘Climate Change’ and ‘Global Warming’

Weather

Weather is all around us, all the time. It refers to the condition of the air or the atmosphere of an area over a short period of time. For example, rain, sunshine, windy and cloudy are all terms that describe the daily weather. Weather is an important part of our lives and one that cannot be controlled. Instead the weather often controls how and where we live, what we do, what we wear and even what we eat.

Figures 1.1, 1.2 and 1.3 show different weather patterns we experience in Solomon Islands.

Figure 1.1 Fine weather Nguvia school

Figure 1.2 Cloudy Nguvia school

Figure 1.3 Haze Mataniko
This activity should be done in groups of four to five. Use your exercise books to record what you observe.

1. In your groups, go outside of the class and:
   a. Observe the surroundings and say what the weather today is like.
   b. List all the things you describe about the weather in your exercise books.
   c. Go back to the class and write your findings on a bigger chart.
   d. Present your group work to the class.

   It is very important for people to know the weather forecast information daily. This alerts people in case of any natural disaster. Information on weather can be heard over the radio – SIBC and Z-FM, and found in newspapers - Solomon Star and Island Sun and on the internet (mobile phone).
### Activity 1.2

#### 5 days weather chart

**Morning**

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>T</th>
<th>W</th>
<th>T</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sunny</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Afternoon**

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>T</th>
<th>W</th>
<th>T</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloudy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. In your same group, make a weather chart for a week.
2. Listen to the radio each day for the weather forecast and record what you hear in your chart.
3. You can use the sample table provided above.
4. By end of day 5 all groups should present and display their weather chart in class.
Climate
Climate is the average weather conditions at a particular place over a long period of time. It tells us what weather is like in a given place and it also determines the type of weather we have. We learn about different climates around the world. For example, deserts have a hot and dry climate; the Antarctic has a very cold and dry climate while much of Australia has a mild and temperate climate. Solomon Islands is located in the tropical region and experiences warm and wet weather. This is what is meant by a tropical climate. Most countries in the Pacific region have the same climate as Solomon Islands.

Activity 1.3
1. In your groups, discuss and list countries in the Pacific region which have similar climate to Solomon Islands.
   a. __________
   b. __________
   c. __________
   d. __________
   e. __________

2. Describe the climate in countries such New Zealand and Australia.
Climate Change
Climate change is when the average long-term weather patterns of a region change. The shift includes wind patterns, the average temperature or the amount of rain or snow. These changes can affect one region, many regions or the whole planet.

Climate can be affected by natural changes. These changes include:

Changes within the sun.
Changes in the earth travelling around the sun.
Changes happening in the sun itself can affect the power of the sunlight that reaches earth’s surface. This can cause the earth to either warm or cool and has a long term effects to day-by-day weather patterns we experience. For example, increasing hot temperature causing longer drier conditions or longer rainy period may be for three to four months. This may cause wet conditions and river flooding.

Figure 1.6 & 1.7: Drier weather season in Kolobangara, Western Province
Activity 1.4

In pairs, discuss and list:

1. What type of food do people in Solomon Islands mostly eat when there is a longer wet or rainy season?

2. How do people prepare gardens during this kind of wet season?

3. What are some of the ways which you think might help them to prepare for this type of season?
Chapter Review

1. Weather is the condition of the air or the atmosphere of an area over a short period of time.
2. Examples are: rain, sunshine, windy, rainy and cloudy.
3. Information about weather can be heard over the radio or found in newspaper as well as internet or mobile.
4. Climate is the average weather conditions at a particular place over a long period of time.
5. Solomon Islands has a tropical climate.
6. Solomon Islands climate has warm and wet weather.
7. Climate change refer to when the average long-term weather patterns of a region is changed.
Revision

These revision questions can also be used for the assessment purposes.

Answer these questions in your exercise book. Circle the letter of the correct answer.

1. What is weather?
   a. Condition of wet air in the sky and sea
   b. Condition of the air or the atmosphere of an area over a short period of time.
   c. Condition of very dark night
   d. Condition of no playing in wet room,

2. Which of these are examples of weather?
   a. Stones and bones
   b. Sunny, cloudy and rainy
   c. Eating, sleeping and playing
   d. Shaky, bouncy and slimy

3. Climate change is ;
   a. when the average long-term weather patterns of a region change.
   b. when the average long-term weather patterns of a region is stable
   c. when the average long-term weather patterns of a region is bouncing
   d. both A and B are correct

4. What are the causes of climate change?
   a. By only natural activities
   b. By only human activities
   c. By both natural and human activities
   d. By preparing for it

5. When the sun rays are trapped causing the atmosphere to heat up, it is called the ;
   a. Climate change
   b. Greenhouse effect
   c. Greenhouse gas
   d. Greenhouse change
Chapter 2

Causes of Climate Change

In this chapter, you will:
- Identify the causes of climate change;
- Explain the greenhouse effects
- Describe the changes in weather pattern

Climate change or changes in the normal climate pattern are caused by natural and human activities. Natural activities are those such as:

- Volcanic eruptions throw out large amounts of sulphur dioxide ($SO_2$), water vapour, dust, and ash into the atmosphere
- The amount of energy coming off the sun is not constant but keeps changing
- Slow changes in the Earth’s distance from the sun affect the amount of energy received from the sun.

These variations contribute to ice melting from glaciers and the North and South Pole. Water then flows into the oceans causing sea levels to rise. This has affected a lot of low lying islands in Solomon Islands causing coastal erosion. For example, islands such as Ontong Java atolls, Kwai, Ngongosila and Fanalei Islands in Malaita and the Reef Islands in Temotu.
Different parts of the World are experiencing change in different ways.

For example:

Some deserts are increasing, and some once fertile areas are becoming arid zones. Ecosystems can move and change, with some animal and plant species becoming endangered.

**Activity 2.1**

Do this activity in groups of four to five. Use big charts for activity.

1. Sea level rise in Solomon Islands has been measured at 8mm per year. Fill in the table below to see how high the sea level will be after 2015.

<table>
<thead>
<tr>
<th>Year</th>
<th>Sea Level Rise (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>8 mm</td>
</tr>
<tr>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
</tr>
</tbody>
</table>

Note: The sequence between 2000, 2005, 2010 and 2015

2. Make a list of what you will be expecting under each of the topics listed below

   a. Temperature rise ........................................
   b. Sea level ..................................................
   c. Frequent rain ............................................
   d. Coastal erosion .........................................
   e. Warm sea surface temperature .........................

3. Group presentation after completing the task and display charts in class.
Greenhouse Gases

The Earth’s atmosphere is a mixture of certain gases (like carbon dioxide and methane) which protect us from the harmful rays of the sun. These gases allow some of the sun’s rays through to provide the Earth with warmth and light. But when too much of the protective gases form a blanket around the Earth, the rays are trapped causing the atmosphere to heat up. This is called the greenhouse effect.

Consider the difference between Earth and Mars. We know how the atmosphere brings life on Earth but Mars has an extremely thin atmosphere with not enough greenhouse gases to trap heat to sustain life.

People are changing the atmosphere. Man’s activities release too much carbon dioxide and other gases which trap too much heat in the atmosphere and so make the Earth warmer. This is a condition known as ‘global warming’ which increases sea and air temperatures, causes sea levels to rise and changes the weather patterns.

Our communities in Solomon Islands contribute to global warming on a smaller scale than other countries with big industries. But everyone contributes through:

- Transport (cars, trucks, planes and boats)
- Energy (burning of fossil fuel - diesel, coal & fuel)
- Land clearing (logging)
- Agriculture (slash and burn clearing and intensive farming)
These extra greenhouse gases come from human activities over the last century.
Why does sea level rise?

Sea level rise is caused by two factors:

- Sea temperatures rise thus expanding the water and taking up more space.
- Melting land-based ice including glaciers, South Pole and the North Polar icecap add to the amount of water in the ocean.

We can observe some clear changes in weather patterns such as more rain during the wet time of the year and less rainfall during the dry season.

More rain leads to flooding that can destroy food gardens, property or even lead to loss of life. Less rain badly affects crops and gardens that rely on regular rainfall.

Activity 2.2

This activity can be done individually.

Materials needed:
- Exercise books
- Pencil
- Recording machine (if you have one).
- Questionnaires

Instruction:
1. Go into a nearby community and find an older man or woman.
2. Interview them, asking about some of the changes to weather patterns they have observed over their lifetime.
3. Write a short report on your findings after the interview.
4. Compare your findings to what is happening now
5. Present report to the teacher after two weeks.
Activity 2.3

This is a role play activity.

1. Divide yourselves into groups.
   a. Role play answers to this theme:
      "CLIMATE CHANGE IS A GLOBAL PROBLEM"

2. Each group should think of:
   a. The ways in which Solomon Islanders contribute to global warming.
   b. Ways in which Solomon Islanders and the rest of the world can help reduce the causes of global warming.

For example:
- Global Action - planting more trees.
- Using solar power and not town (diesel generated) power.
- Not cutting down forests.
- Not using slash and burn clearing methods.
- Not using cars.

Chapter Review

1. Climate change is caused by natural and human activities.
2. The Earth’s atmosphere is a mixture of certain gases like carbon dioxide and methane.
3. Greenhouse effect is when too much of the protective gases form a blanket around the earth rays and trapped causing the atmosphere to heat up.
4. Human activities that causes too much heat in the atmosphere and makes the earth warmer is called “Global warming”.
Revision

Answer these following questions.

1. 
   a. Briefly explain in one to two sentences about how human activities contribute to cause climate change.

   ________________________________________________________________

   b. Briefly explain in one to two sentence about how natural activities caused climate change.

   ________________________________________________________________

2. Solomon Islands communities also contributed to global warming on a smaller scale than other countries with big industries. Briefly explain how the following contributed to global warming.

   i. Transport (cars, trucks, planes and boats)

   ________________________________________________________________

   ii. Energy (burning of fossil fuel - diesel, coal & fuel)

   ________________________________________________________________

   iii. Land clearing (logging)

   ________________________________________________________________

   iv. Agriculture (slash and burn clearing and intensive farming)

   ________________________________________________________________
Chapter 3

Impacts of Climate Change

In this chapter, you will:

- Identify climate change impacts on human life and nature
- List some localities in Solomon Islands that are badly affected
- Describe extreme weather events
- Identify the effects of extreme weather patterns on people, their environment and properties.

Climate Change Impacts in the World and in Solomon Islands

Climate change will impact the world and Solomon Islands in different ways. Changes in the weather patterns and seasons will be more variable. People will experience more hot days. Coastal communities will experience the effects of sea level rise, while inland communities or on the river banks are at high risks of flood as a result of heavy downfall. Stronger tropical cyclones and an increase in the number of storms recorded; unexpected warming at the poles. These are some of the effects of climate change.
Activity 3.1

Do this activity in groups:

Closely look at the two pictures below and:

1. Identify and list the main differences you see.
2. List some of the impacts or changes in weather patterns that really affect people?
3. Group presentation;  
   ⇒ Explain your findings?
4. Display charts in class

Changes in weather patterns for example, increased rainfall in some areas, stronger tropical cyclones, unexpected warming at the poles; and an increase in the number of storms recorded. These are some of the effects of climate change.

Solomon Islands is among a number of countries in which rainfall is increasing each year. This can be an effect of climate change.

Sea Level rise

Climate change–related to sea level rise will continue to put low-lying islands like Malaita Outer Islands (MOI) in danger, as appeared in Solomon Star of 24th January 2015 “We are sinking! Climate change taking its toll on MOI.” It reminds us that this issue is no joke but is real and at our doorstep. And it emphasizes that the effects would be made more serious where natural barriers have been removed.
Sea level rise is caused by increased temperature. Figure 3.4 below, shows how warmer conditions result in the melting of land-based ice and so increasing the total amount of water in the ocean.

Weather bureau records show that average temperatures have increased in many parts of Solomon Islands. Look at Figure 3.5 below, the graph shows the annual maximum and minimum temperatures for Auki from 1962 to 2007. It is estimated that annual temperatures across the South Pacific may rise by a further 3 degrees by 2100. This will have impacts on

- land based ecosystem productivity (eg. Crop yield, biodiversity)
- Human health (eg. Increased heat stress)
- Sea surface temperature (implications for coral reefs)

It is predicted that the sea level will rise by 0.5 to 1.0 metres in the next 100 years. Solomon Islands is experiencing increases of 8 mm per year while the global average annual sea level rise is about 3.4 mm.
Activity 3.2

Work in pairs to do this activity.

1. List five of the problems we are facing as a result of Climate Change. Use Figure 3.3 to help you answer this question.
   For example; the earth is getting hotter
   i. ____________________________________
   ii. ____________________________________
   iii. ____________________________________
   iv. ____________________________________
   v.  ____________________________________

2. Describe and explain what you think the earth will be like in 50 years’ time if climate change continues.

**Coastline erosion as a result of sea level rise**

Solomon Islands have some of the most beautiful coastal sites in the world. But these beautiful sites will be destroyed if the sea keeps on rising.
In Solomon Islands the sea is rising by 8 mm per year. This is changing most of the islands in the country through increased coastal erosion.
The most vulnerable islands are those like Ontong Java and Lord Howe which are only about one metre above sea level.

Figure 3.6: A coastal cemetery was eroded as the result of rising sea.

Figure 3.7: Beaches at Ugi Island (Makira Province) are continually eroding as a result of sea level rise caused by climate change.
Bigger king tides

King tides and tidal surges are natural events but they are now becoming dangerous to coastal villages as a result of rising sea level.

Saltwater intrusion

As the sea level rises, salt water enters the underground fresh water making it unsuitable for use. On low lying atolls, many communities depend on well for most of their household uses. Salt water enters the well and their garden, affecting food crops like taro, a stable food for many coastal and low lying island communities.

Impacts on marine Resources:

Increasing sea surface temperatures, rising sea level and damage from tropical cyclones will all affect the health of coral reefs and other marine ecosystems. The sea provides Solomon Islanders with food and tourists come to look at the reefs so we need to protect marine ecosystems.
Crop Disease and Pests:

Hotter weather, changes in rainfall, and increased pests and diseases, will all affect food security. We will need to look at the way we grow food and the types of food we grow to help us cope with these changes.

Figure 3.11: Pest and Disease on water melon, Takwa Malaita provinces
Extreme weather events

Heavy Rain and Flooding

The wet period in Solomon Islands is from November to April which is also the season for tropical cyclones. The wettest months are usually at the beginning of the year. For example, the heaviest daily rainfall recorded, 380mm at Auki, was in April 1970. It is likely that the amount of rainfall will change. Heavier and more frequent rainfall will affect food production, potentially leading to poor yields and food shortages.

Heavy downpours can also cause flash flooding. For example, the Mataniko flood on the 3rd of April 2014 killed 23 people, destroyed many homes and properties and left hundreds homeless. Heavy rain puts human lives, property and animals at risk. It also changes the face of the land mass.

Figure 3.12: A house at Vara Creek almost under water during 3rd April 2014 flood

Figure 3.13: Old Mataniko Bridge was destroyed during the 3rd April 2014 floods.
Activity 3.3

Do this activity in pairs

1. Discuss and list those islands in the country which are badly affected by coastline erosion and floods?

2. What can people on these islands do in response to these threats? Jot down your answers and present to the class.

Tropical cyclones

Many of us have experienced what is called a tropical cyclone and may recall bad memories of one.

In other parts of the world cyclones are known as hurricanes or typhoons. All cyclonic weather patterns occur over the warm water near the equator – the imaginary line that runs around the middle of the Earth. Cyclones consist of extremely strong winds blowing in a circle around a calm centre called the eye. Cyclones bring heavy rain and extreme winds which tear down houses and trees and also cause storm surges when the ocean rises much higher than usual.

Solomon Islands lies within what is known as the tropical cyclone belt with several cyclones occurring each season.

The most serious natural disaster to strike Solomon Islands occurred in 1986 when in the space of four days Tropical Cyclone Namu killed 103 people, made nearly 100,000 people homeless and caused damage estimated in the millions of dollars.

Figure 3.14: A satellite image of Hurricane Katrina that destroyed the US city New Orleans in 2005.
Activity 3.4

Do this activity in pairs.

1. Go into the community near your school and find an older person.
2. Interview the person and ask them about any cyclones or floods they may have experienced in their lifetime?
   Use this table to answer question 2 above.

3. How might people affected by cyclones or floods in those days manage to survive?
4. Who do you think provided them with assistance?

<table>
<thead>
<tr>
<th>Year cyclone occur</th>
<th>Cyclone Name</th>
<th>Damage it caused</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year flash flood occur</td>
<td>Flash flood (name)</td>
<td>Damage it caused</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Activity 3.5

This is a group activity.

1. If your school is located near the sea, go to the seashore and closely observe the coastline to see if it is being eroded. (Use the river banks if your school is not near the sea).

2. Describe what you see and list those features you think are due to coastal erosion.

3. Discuss and list five actions which you think might help prevent coastal erosion.

   i. ___________________________________________________________________
   
   ii. ___________________________________________________________________
   
   iii. ___________________________________________________________________
   
   iv. ___________________________________________________________________
   
   v. ___________________________________________________________________
Chapter Review

1. The following are some impacts of climate change
    More hot days.
    Sea level rise,
    River banks are at high risks of flood as a result of heavy downfall
    Stronger tropical cyclones and unexpected storms warming

2. Impacts on marine Resources
3. More Crop Disease and Pests
4. Extreme weather events are referred to as when there is weather that is not normal to the weather pattern
Revision

Answer these questions

1. Give 4 examples of impact of climate change in Solomon islands
   a. ___________________________________________________________________
   b. ___________________________________________________________________
   c. ___________________________________________________________________
   d. ___________________________________________________________________

2. Explain what does extremely weather events mean?
   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________
   ___________________________________________________________________
Chapter 4:
Preparation and Response to climate change and disaster

- Discuss ways to respond positively to the impact of climate change
- Identify ways to help people before, during and after extreme natural events
- List items to prepare for use before and during natural disasters

Climate Change Adaptation

Adaptation to climate change is about finding ways for people to adjust to the environmental changes that are happening around them. The aim of adaptation is to develop a population that is better able to survive and flourish in their environment, despite the challenges of climate change. Adaptation initiatives may be undertaken at a national, provincial or community level.

People hear about climate change adaptation and think it is always a complex technical process – when in fact communities have been adapting to changes in their environment for centuries.

Some examples of adaption activities or actions we can carry out at our communities;

**Agriculture:**

Food can be grown above the ground to avoid contamination by saltwater. This photo shows slippery cabbage and taro being grown in a canoe garden bed.

**Freshwater Supplies:**

In times of drought or if fresh water supplies have been affected by salt water, rainwater tanks can be used to collect freshwater. This is a good adaptation measure for communities on coral atolls who are affected by saltwater intrusion.
Plant trees and Mangroves:

The sea level is rising because of climate change and big waves are taking away land on the coast. Mangroves and trees provide a network of roots that hold the earth together, preventing coastal erosion. The raised roots act as a trap for bits of sand and coral, building up the coastline.

Food Preservation:

Hotter weather, changes in rainfall, and increased pests will all affect food security. Extreme weather events like cyclones may damage crops and they could take weeks to recover. Using traditional food preservation techniques, like the one illustrated in this photo, can provide food for people in hard times.
Construct sea wall:
Construct and maintain sea wall using traditional sea walls. Sea wall prevents the coastal erosion and acts as buffer against rising sea.

Awareness:
Generate awareness activities on climate change and extreme weather events. We need to build our capacity to respond and adapt to the impacts of climate change.

Natural disasters
Natural disasters kill thousands of people each year. They also cause billions of dollars in damage to property. But by being properly prepared for a natural disaster, you can better protect your family home and property. Some examples of natural disasters include cyclones, earthquakes, tsunamis, tornadoes, fires, and floods. Most natural disasters occur unexpectedly catching people off guard. This is why it is essential to be prepared with the right skills, tools and knowledge of what to do when one strikes. Being ready may save your family or your property in times of danger.

Activity 4.1

Divide the class in groups to do this activity.

1. Discuss and brainstorm how people in Solomon Islands might prepare for natural disasters (cyclones, floods, tsunami etc.)
2. Appoint someone to write your points down using charts.
3. Make a list of items that you might need before, during and after natural disasters (noting how different types of disasters might require different items).
4. Present your findings to the class after completing the activity.
Responses or preparation for a flood
Below are list of ideas that will help you to prepare for natural disaster whenever it occurs.

- Have a temporary shelter from rain
- Have clothing or coverings to protect you from the cold
- Have a store of food
- Move to higher ground
- Stay on high ground until the water level has gone down
- Do NOT panic
- Do not be tempted to swim across running rivers
- Store lots of clean drinking water in containers and bottles
- Pack a safety kit box (matches, lighter, candles, torch, and battery.)
- Have ready a First Aid kit or medical kit (plasters, pain relief tablets, bandages, etc.)
- Prepare a temporary shelter (tent or plastics)
- Listen to radio (SIBC), check all media for update information
- Stay together
Responses or Preparation for a cyclone

1. Before a cyclone
   - Store lots of clean drinking water in containers and bottles
   - Store enough food for several days
   - Pack a safety kit box (matches, lighter, candles, torch, and battery.)
   - First Aid kit or medical kit box (plasters, pain relief tablets, bandages, etc.)
   - Prepare a temporary shelter (tent or plastics)
   - Listen to radio (SIBC), check all available media for update information
   - Clothes to keep you warm (clothing, blankets, etc.)
   - Stay together
   - Do not panic

2. During a cyclone
   - Move to safe and higher ground
   - Seek protection from flying objects like copper or falling trees and broken branches.
   - If your house is solid, lie on the floor under a table or under a sturdy object.
   - Avoid staying in flooded areas and keep away from the shoreline and high seas

3. After a cyclone
   - Check family members for injuries
   - Boil water for drinking
   - Clear any sharp objects from around you, such as dangerous tree branches, loose copper, tins etc.
   - Listen to the radio (SIBC) and check all media for updates.

Activity 4.2

This is a role play activity.

1. In small groups role play how people might react during a cyclone, a flood, or a tsunami etc;
For example; you can role play a family trying to save their children, a very old man in the family or a son during a flood or cyclone.
Chapter Review

1. Adaptation to climate change is referred to ways in which people adjust and adopt to the environmental changes that are happening around them.

2. Example of adaptation activities:
   - Planting of food crops in containers or raised beds from contaminated soil
   - Use of water tank instead of contaminated water supply
   - Replanting of trees and mangroves
   - Preservation of food
   - Building seawall as protection for seacoast village
   - Awareness to people

3. Response or preparation for flood

Below are list of ideas that will help you to prepare for natural disaster whenever it occurs.

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- Listen to radio (SIBC), check all media for update information
- Stay together.
4. Responses or Preparation for a cyclone

1. **Before a cyclone**

   - Store lots of clean drinking water in containers and bottles
   - Store enough food for several days
   - Pack a safety kit box (matches, lighter, candles, torch, and battery.)
   - First Aid kit or medical kit box (plasters, pain relief tablets, bandages, etc.)
   - Prepare a temporary shelter (tent or plastics)
   - Listen to radio (SIBC), check all available media for update information
   - Clothes to keep you warm (clothing, blankets, etc.)
   - Stay together
   - Do not panic

2. **During a cyclone**

   - Move to safe and higher ground
   - Seek protection from flying objects like copper or falling trees and broken branches.
   - If your house is solid, lie on the floor under a table or under a sturdy object.
   - Avoid staying in flooded areas and keep away from the shoreline and high seas
Circle the letter of the correct answer

1. Adaptation to climate change means
   a. How people do things according to climate change
   b. How people impact on global warming
   c. How people adjust and adopt to the environmental changes that are happening around them.
   d. How people seek security during climate change

2. Write True against the statement if you think it is true and, false if you think the statement is False.

   i. One example of adaptation activity is replanting of trees and mangroves
   ii. One example of response to flood is, always try your best to cross the river when it is still running.
   iii. Preparation for cyclone is, store lots of clean drinking water in containers and bottles.
   iv. Preparation for during cyclone is hide under shade trees.
Glossary

**Adaptation** - Actions taken to help communities and eco-systems cope with climate change.

**Arid zone** - either of the zones of latitude 15-30˚ N and S characterized by very low rainfall and desert or semi-desert

**Atmosphere** - Refers to the air around us. It is a blanket of different gases including oxygen, carbon dioxide, nitrogen and others that surrounds the Earth. Without the atmosphere the Earth would get too hot and become unsuitable for life as we know it.

**Biodiversity** - the different types (species) of living things in an area

**Carbon Dioxide** - One of the gases that make up the air around us. Humans breathe in oxygen and breathe out carbon dioxide while plants take in carbon dioxide and give out oxygen. Carbon dioxide produced by humans, for example by burning fossil fuel, is one of the gases causing global warming.

**Carbon** - A chemical element that is present in all life forms on Earth. It is the biggest part of fossil fuels and plays a very important part in global warming.

**Century** - is a period of 100 years.

**Climate Change** - Long term changes in the weather due to increases in air and sea temperature as a result of more greenhouse gases (see below) like carbon dioxide being put into the atmosphere.

**Climate** - Average or typical weather experienced by a place over a long period of time.

**Coal** - Also a fossil fuel. Coal is mostly made up of the element carbon and when burn it produces large amount of energy as heat.

**Deforestation** - When people cut down forests and clear land for gardening.

**Eco-system** - is all the living and nonliving things in a certain area. All the plants and animals, even the micro-organisms that live in the soil, are living parts of an ecosystem. Air, water, and rocks are nonliving parts of an ecosystem.

**Endangered** - Some animal or plant species are in danger of being extinct. Some animals disappear because of the climate, are killed by their enemies and people are killing them or destroying their habitats.

**Equator** - An imaginary line that run through the earth. The farther away from the equator the greater the difference in temperature between seasons

**Erosion** - To wear away the coastline or river bank.

**Evaporation** - The process of water changing into gas (water vapour).

**Fossil fuels** - Coal, oil or gas that is dug out from the ground. It is made up of plant or animal material (carbon) that has been buried under pressure for millions of years. Burning fossil fuels releases high levels of carbon dioxide into the atmosphere.

**Glacier** - is a large piece of ice that moves slowly over land. It can form anywhere it cold enough for
snow and ice to remain all year around without melting. Coldest areas around the poles have the largest glaciers.

**Global warming**- Is the rising average temperature of the Earth.

**Greenhouse gas emissions**- A general term referring to the release of any of the gases that trap heat in the atmosphere. Carbon dioxide that is released when we burn fossil fuels is one type of greenhouse gas emission.

**Greenhouse gases**- Are natural gases in the atmosphere that trap heat from the sun. An excess of greenhouse gases makes the Earth hotter.

**Humidity**- How much moisture is in the air

**Hurricane**- Another word for a cyclone, commonly used in USA and Central America.

**Intensive farming**- A kind of agriculture that uses a lot of capital and labor in order to increase produce per area

**Polar**- has the coldest with temperatures always below freezing

**Precipitation**- Drops of water such as rain, snow, or sleet. Water vapour in clouds becomes too heavy and falls to Earth as precipitation.

**Species**- separate types of animals or plants that have been identified as different from another type.

**Temperate**- contains most of the earth’s land masses with more moderate temperatures and rainfall year-around.

**Temperature**- Refers to how hot or cold a place is. It depends on the amount of heat from the sun in the atmosphere.

**Tropical Cyclones**- Are powerful and destructive storms.

**Tropical zones**- has the warmest average temperatures and gets the most rain.

**Typhoon**- Another word for a cyclone commonly used in Asia.

**Vulnerable**- People or properties are easily to be affected by the risks of hazards and the impacts of climate change.

**Weather**- Is the day to day condition of the atmosphere at a particular place.