ROOTS

Environmental sustainability

Responding to changes in the environment and climate

tearfund

ROOTS 13

Environmental sustainability

Edited by Rachel Blackman and Isabel Carter

Contributions from Jude Collins, Sara Shaw, Mike Wiggins and Sarah Wiggins

Design: Wingfinger

We would like to thank Rachel Blackman, Rebecca Dennis, Dewi Hughes, Joanna Watson, and all the Tearfund staff who spent time reviewing drafts. Thanks also to all the Tearfund partner organisations who field tested this book.

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Introduction

The amazing world in which we live has huge variety and richness. However, humans are increasingly damaging what God has created. Our actions as a result of technological development, industrial pollution and increasing consumption are causing environmental degradation and climate change. The climate naturally changes over time, but in recent years climate change has accelerated and the world's leading scientists now agree that this is caused by human activity such as the use of fossil fuels and deforestation. Climate change is affecting weather patterns, by increasing global temperatures, causing erratic rainfall distribution, raising sea levels and intensifying cyclones.

Environmental degradation has a huge impact on the lives of poor people because they depend more directly than the wealthy on resources from the natural environment. The effects of climate change are already being felt most in poor countries, due to their geographical location and lack of capacity to cope. Excessive consumption and large unregulated industries certainly have a negative impact on the environment. However, there is also a need for development organisations to respond effectively and to ensure that their own work does not negatively impact the environment.

This book aims to raise awareness of environmental issues and equip development organisations to respond effectively. It is relevant to organisations that have no specific environmental projects as well as those that do. All the work we do has some link with the environment, regardless of the development issue we are addressing. Our projects have an environmental impact and are at risk from environmental degradation and climate change, though the size of this impact and risks faced will vary considerably. Our organisation's practices also have an impact on the environment. This book provides tools that can help organisations to become more environmentally sustainable.

There are many issues to consider if we want to ensure that our projects, organisations and lifestyles are environmentally sustainable:

■ We need to understand the science and principles related to environmental issues (Section 1).

■ We need biblical understanding of how God views creation and our biblical responsibilities in order to have guidance and motivation (Section 2).

■ Development based on the use of fossil fuels as an energy source has made a major contribution to climate change. We therefore need to consider using other sources of energy based on sustainable and renewable resources (Section 3).

■ We need to consider how our organisation can protect the environment in the non-project activities that it carries out, before we consider the impacts of our projects. Section 4 gives guidance on developing an environmental policy and carrying out an environmental audit that identifies the organisation's everyday impact on the environment. It also looks at how to encourage all staff to play a committed role to minimise the organisation's environmental impact.

■ Section 5 contains an assessment tool that can be used to assess the potential impacts of a project on the environment and the potential impact of the environment on the project. This will help us to adjust our project plans so that the link between our projects and the environment is positive or neutral rather than negative.

■ Advocacy work is essential to ensuring that authorities at local and national level provide long-term protection of both environmental resources and the lives of poor people. Governments also have a role to play in mitigating against the causes of climate change and helping communities to adapt. Section 6 looks at how we can carry out effective advocacy work in these areas.

■ The last section helps us to assess our own lifestyles so that at work and at home we can follow God's calling to be good stewards of his creation.

SECTION

1

Principles and definitions of environmental sustainability

The term 'environment' is used to describe our surroundings – both the natural physical surroundings such as the land, water, climate, plants and animals that we can see, and the places in which we live with their social, cultural, economic and spiritual dynamics (usually called the human environment). This book focuses on the natural physical environment – the way in which our practices and lifestyles affect it, and the ways in which it affects our lives.

People depend on the natural environment for survival. Our food, medicines, shelter, fuels and clothing are all sourced from it. For example, a farmer's crop relies on adequate water, sunshine, fertile soil, unpolluted air and soil, and balanced insect life and micro-organisms. Without any one of these, the crop is threatened and the farmer may not have enough food to feed the family or to sell in the market.

People in urban areas also depend on the environment but perhaps in a less direct way. Their food may come indirectly through markets and shops. They usually buy rather than collect fuel for cooking. Manufactured products rely on the environment for:

- the raw materials such as wood or plant fibres

- energy – usually from fossil fuels such as oil or diesel, to work the machinery

- water – factories often use a lot of water for manufacturing processes

- transport – over land by road and rail, across oceans or along rivers to customers.

Human interaction with the environment often has a negative impact. Sometimes poor management of one resource leads to other environmental problems. For example, over-exploitation of forest reserves increases deforestation which can lead to landslides, flooding and soil erosion. There could be a loss of biodiversity or soil fertility if the cleared land is not managed properly.

1.1 Poverty and the environment

Since the industrial revolution in Europe in the 19th century, human economic activity has consumed resources at a faster rate than the earth can replenish them, causing damage to ecosystems, decreased biodiversity, and climate change. The ongoing desire to become wealthier and consume more has meant that people have used the environment for their own benefit without considering the negative effects. For example:

- Land is being farmed too intensively, which can result in lower crop yields, loss of soil nutrients and increased desertification.

- High demand for water is drying up many rivers and lakes.

- Industry is causing pollution. This includes liquid waste (often disposed untreated into rivers and oceans, affecting marine life), solid waste (often dumped or buried in the ground, affecting human health through pollution and diseases spread by insect pests and vermin attracted by the waste), and air pollution (which can change climates locally and globally).

According to the United Nations Development Programme (UNDP), the richest two per cent of the world's adults own more than half of global household wealth, while the poorest 50 per cent of adults own only one per cent. The rich have benefited the most from global economic growth; poor people have generally benefited much less. Much of the environmental damage that has been caused by humans has been to serve the consumption of wealthy people. They usually have an indirect relationship with the environment, and so rarely see the damage they are causing. They are therefore likely to continue with their high consumption.

Many poor people in the South have a direct relationship with the environment. They often rely directly on natural resources to meet their basic needs through agricultural production, fishing and the gathering of resources such as water, firewood, and wild plants for consumption and medicine. Poor people's health suffers most when the environment is degraded, such as through water, air or land pollution. Many poor people are forced to live in areas that are environmentally fragile, such as on steep slopes or flood plains, making them more vulnerable to climatic hazards. Poor people are also particularly vulnerable to the losses that result from environmental damage (such as crop failure due to drought or flooding) and may not have the resources to adapt to a changing environment.

Poor people may be forced to exploit the environment, not usually through ignorance but in order for their families to survive. Although they may be aware of the damage they are doing, their immediate need for survival takes priority over long-term environmental sustainability. They usually lack access to information and technology to help them to reduce that damage. Climate change is an urgent and global issue, but environmental degradation also has an impact locally and globally, including changing rainfall patterns and reducing the ability of the soil to hold water. Understanding these pressures is key to helping people to conserve and, where possible, enhance environmental resources and restore environmental damage.

Coastal erosion in Honduras	The removal of vegetation along the shoreline of a thin strip of land in Honduras, for use as firewood and to clear spaces for houses and other purposes, has led to significant soil erosion. Homes, infrastructure and livelihoods are being lost as a result. Water supplies are affected, which is impacting people's health. Although this environmental degradation has long been recognised, it was not until community participatory tools were used that the nature and scale of the threat was clearly defined. Small groups of neighbours have since been replanting mangroves to protect the shore from further erosion. *MOPAWI, Tearfund partner in Honduras*

1.2   Sustainable development

Our dependence on a sustainable environment has been the focus of a number of international gatherings. In 1982 the World Commission on Environment and Development was established to look at the links between economic development and the environment. The report that was produced defined 'sustainable development' as, '*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*.[1]'

The 1992 Rio Earth Summit, as it became known, was the largest ever gathering of heads of government to discuss environmental issues. It resulted in historic agreements about a number of key principles related to sustainable development that have helped shape policies and practice over the last two decades:

■ economic development and environmental protection should be integrated

■ there should be more equity within countries and between rich and poor countries

■ scientific and technical knowledge related to sustainable development should be improved

■ governments should protect citizens from environmental problems

■ the polluter should pay to restore damage caused to the environment

■ environmental impact studies should be carried out before undertaking projects that are likely to have negative environmental consequences

■ recognise the particular roles of:

• women, who often play a vital role in environmental management and development

• young people, so that the needs of future generations can be met

• indigenous people, due to their knowledge and traditional practices related to environmental management.

Since the Rio Earth Summit, a number of agreements and plans related to sustainable development have been made at international level. For example:

■ *Agenda 21* is a plan of action to take forward the commitment to the Rio principles.

■ *Millennium Development Goal 7*, Target 9 is to ensure that principles of sustainable development are integrated into country policies and programmes to reverse the loss of environmental resources.

■ The United Nations *Framework Convention on Climate Change* aims to prevent dangerous climate change.

The above agreements indicate good progress in many areas on paper and in discussion, including a greater understanding of the importance of sustainable development. However, despite these international agreements, exploitation of the world's resources continues, mostly due to the demands of consumers in the North, increasingly at the expense of people in the South.

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1 Bruntland, H (1987) *Our Common Future*, WCED, UN Reports 1987

1.3   Our environmental footprint

Stewardship of God's earth should be considered within all areas of our work and life. We all have an influence on our environment. Often this is a negative influence, using up resources or causing pollution, but we can also take actions to ensure that our way of life has a positive impact on the environment.

Most things we do in life involve interaction with the environment, whether directly or indirectly. For example, providing a meal requires energy to grow the food and cook it. Catching a bus or driving a vehicle results in air pollution.

When we walk through mud, we leave footprints behind. As we walk through life, we leave behind a mark on the environment, an environmental footprint. Some of us are like elephants, trampling down the vegetation and leaving a trail of damage behind in terms of our consumption, pollution and use of energy. Others are like antelopes, walking delicately and lightly, leaving behind a trail that can hardly be seen.

This footprint can cause environmental degradation. It has consequences for other people. Climate change is a key example. Our use of fossil fuels and deforestation is causing climate change which has negative consequences for people all around the world, but it is poor people who are suffering the most.

We now look at two key environmental resources – water and forests. We then look at the issue of climate change – its causes, impacts and our responses. This will build a foundation for the following sections.

1.4   Understanding water resources

Plants and animals need water to survive. It is so precious that it is predicted that future wars will be related to control over, and access to, water.

More than 70 per cent of the earth's surface is covered by water, though most of it is in the oceans and too salty to drink. Some of the earth's water is held in glaciers and polar ice caps. Less than one per cent of the earth's water is fresh liquid water, held in lakes and rivers or below the ground. The total amount of water on earth
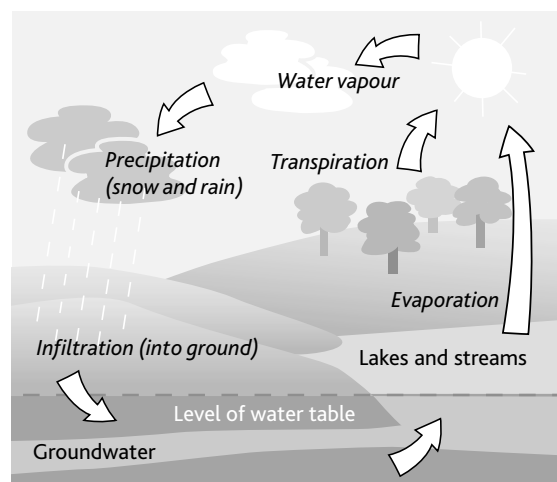
Water vapour

Precipitation
(snow and rain)

Transpiration

Evaporation

Infiltration (into ground)

Lakes and streams

Level of water table

Groundwater

remains about the same from one year to the next. It circulates between the oceans, land and atmosphere in a cycle of evaporation and precipitation as the diagram shows. This water cycle is fundamental to the functioning of the earth as it recycles water and has a key role in regulating the earth's climate.

The sun heats the water in oceans, lakes, rivers and soil. Some of this water evaporates into the atmosphere as water vapour. Cooler temperatures in the atmosphere cause the vapour to turn into clouds. The water particles in the clouds collide, grow and then fall out of the sky as rain, hail and snow, back into the oceans or onto land. Rain that falls on land may run into rivers that flow into freshwater lakes or into the sea, or it may soak into the ground. This groundwater may be stored in rocks for long periods of time and it may emerge in freshwater springs or be used by plants. The water cycle then starts again.

A huge amount of water cannot be used productively due to pollution from industry, untreated sewage, mining, oil extraction, the use of pesticides and fertilisers in agriculture, and the dumping of rubbish.

According to the International Water Management Institute in Sri Lanka, about a quarter of the world's population now live in areas of water shortage where water is being used for industrial, agricultural and domestic purposes, faster than the water cycle allows. In addition, about one billion people face water shortages because their governments lack the resources or the capacity to develop safe drinking water supplies.

Water shortages affect poor people the most. For example, in Orissa, India, where groundwater levels have dropped, some poor farmers cannot afford to sink deep boreholes to extract water. Poor people often lack access to safe water to drink, causing damage to their health or lost productive time in walking long distances to find safe water.

Climate change is damaging the water cycle on which we are dependent:

■ Increased temperatures are causing the polar ice caps to melt and sea water to heat up and expand, resulting in rising sea levels which threaten low-lying countries such as Bangladesh.

■ Melting glaciers will cause short term flooding and longer term water shortages, often in areas of high population along the flood plains of rivers such as the Indus and Brahmaputra in Asia.

■ Some areas of the world are experiencing more rain (sometimes falling in intensive storms and causing flooding), and other areas are experiencing less rain (sometimes leading to drought).

Deforestation is another issue that affects the water cycle (see Section 1.5).

REFLECTION

■ What are the water problems at local and national level in our country?

■ What do we consider to be the reasons for these problems?

1.5   Understanding forest resources

Trees have important natural and human benefits. They help to regulate the water cycle because they act as a sponge, soaking up rain and releasing water at regular intervals. Forests help to prevent flooding, erosion and landslides after heavy rain. Trees also provide and protect natural habitats for animals and plants. Many people depend on trees for food, fuel, shelter and medicines.

Forests cover around 30 per cent of the world's total land area. Yet, according to the World Resources Institute in the USA, in the last 300 years the global forest area has decreased by nearly half. This is due to the clearing of land for agriculture, roads and settlements, and due to high demand for timber.

Deforestation affects the local climate because forests influence the regional distribution of rain. As part of their life process, trees release moisture into the atmosphere, contributing to the formation of clouds. The clouds produce rain that falls back on to the forest. When forests are cut down, this process is reduced and the area can become arid within a few years.

Deforestation is also contributing to global climate change. The Intergovernmental Panel on Climate Change estimates that deforestation contributes 15–20 per cent of global greenhouse gas emissions. Trees store carbon because in order to grow, they withdraw carbon dioxide from the atmosphere. They are sometimes called 'carbon sinks'. If wood is burnt or left to rot, carbon is released back into the atmosphere. Although wood used for building or furniture continues to store the carbon, the carbon will eventually be released when the wood is no longer needed. The use of wood is not bad in itself if the trees cut down are replaced (this is called sustainable forest management). However, in many countries, laws governing forests are rare or poorly enforced, which leads to a decrease in tree cover globally.

CASE STUDY

> ### RENEWING TREE RESOURCES
>
> When the Maradi Integrated Development Project (MIDP) first started work in the Maradi region, Niger, there were very few trees because farmers traditionally cleared all their land in order to grow crops, and there had been much demand for wood for building. This meant that soils were exposed to the effect of wind, hot sun and fierce storms, and people were no longer able to harvest wood locally for cooking and building.
>
> MIDP promoted the practice of allowing tree stumps to re-grow and become productive. Farmers are encouraged to leave five shoots per tree, cutting one each year and letting another grow in its place. On removing a shoot the cut leaves are left on the ground which reduces soil erosion and improves soil fertility. Enough wood grows in the first year to provide firewood. In the second year, the branches are thick enough to provide wood to sell. The trees also provide fodder, edible seed pods and timber for construction. The presence of the trees reduces wind speeds and provides shade for the crops. The farmers now consider the trees to be an essential part of sustainable agriculture rather than a nuisance.

Climate change itself is affecting the wellbeing of forests. As global temperatures rise and rainfall patterns change, some areas of forest are becoming so dry that they are at risk of fire. Forest fires release huge amounts of carbon dioxide into the atmosphere, adding to global warming.

Since trees store carbon, they have the potential to help reduce climate change. The planting of new forests (afforestation) enables trees to remove carbon dioxide from the atmosphere. Political will and appropriate laws and enforcement systems are essential to ensure that forests are managed sustainably.

REFLECTION

■ What is the situation regarding tree cover and forest in your local area? Are more trees being planted than cut down? Are supplies of building timber and fuel wood sustainable?

■ What are the issues that lie behind the situation?

1.6   Understanding and responding to climate change

The impact of climate change on the environment is considerable and is increasing rapidly. We need to understand the causes and impact of climate change in order to respond effectively.

Understanding climate change

The greenhouse effect

Energy from the sun warms the earth's surface. Some of this energy is then sent back into space. Some remains within the earth's atmosphere, which is a narrow layer of gases surrounding the earth. This ability of the atmosphere to retain warmth from the sun (known as the greenhouse effect) helps to keep the earth at a comfortable temperature for life on earth (a global average of 15°C).

Radiation reflected by atmosphere

Infrared radiation reflected back to earth

Infrared radiation emitted by earth

Radiation reflected by earth's surface

Radiation absorbed by earth

Based on an image from the COMET program
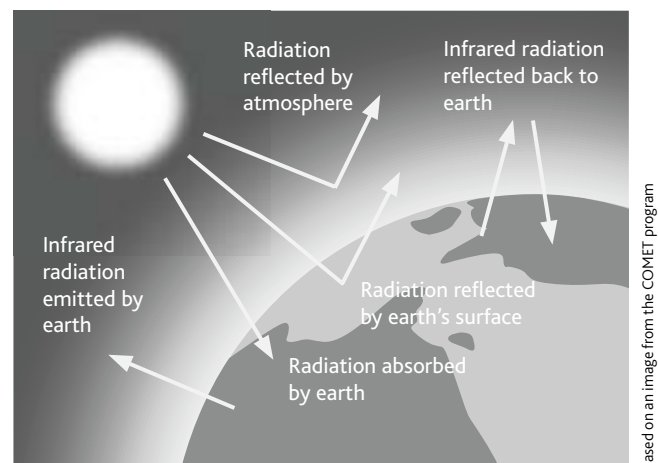
Climate change

Since the industrial revolution that began in Europe in the 1850s, the burning of fossil fuels for energy and manufacturing has increased the amount of certain natural gases in the atmosphere (known as greenhouse gases). The burning of coal, oil and gas produces large quantities of one

of these gases – carbon dioxide. At the same time, deforestation has increased, which releases carbon dioxide into the atmosphere. The amount of carbon dioxide and other greenhouse gases, such as methane and nitrous oxide, has been increasing steadily and in the past decade has increased dramatically. This means that more heat is being retained in the atmosphere. While changes to the climate occur naturally over time, the world's leading scientists now agree that climate change is becoming more rapid and is caused by human activity. Scientists have measured an average increase of about 0.76°C in global temperatures during the 20th century and up to 4°C in the Arctic. Although this does not sound very much, it is already having dramatic effects around the world, and by 2100, average global temperatures are projected to increase by between 1.8°C and 4°C, and perhaps by as much as 6.4°C depending on how effectively and rapidly we respond to the problem now. Althou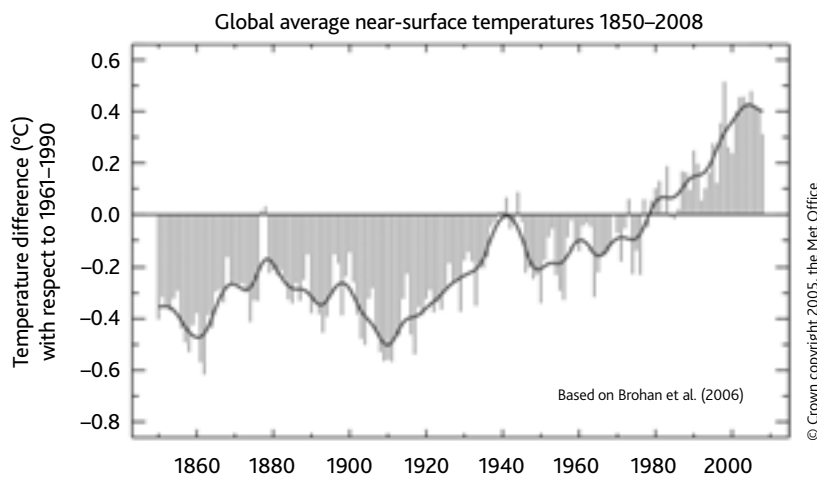gh global temperatures naturally increase and decrease over time, this rate of change is demonstrated to be the fastest ever recorded. If average global temperatures rise by more than 2°C, the impacts of climate change could become unmanageable.

Rise in average global temperatures during the past 150 years

Global average near-surface temperatures 1850–2008

Temperature difference (°C) with respect to 1961–1990

Based on Brohan et al. (2006)

© Crown copyright 2005, the Met Office

The impacts of climate change

Since the 1970s there has been growing concern about rapid and unusual changes in the world's weather. This concern started among scientists, but has more recently become an issue of global importance that is discussed among many different people, from local farmers to national governments at international level.

Due to climate change, weather patterns are becoming more erratic. A rise in global temperature is resulting in less predictable rainfall patterns, more frequent droughts, stronger heat waves and more intense weather hazards, such as flooding and cyclones (typhoons/ hurricanes). These changes are already having a devastating impact on people's lives in many parts of the world, particularly in poorer countries.

According to the Intergovernmental Panel on Climate Change (IPCC)[2] and other leading researchers:

■ **SEA LEVELS ARE RISING**
As global average temperatures get warmer, the glaciers and polar ice caps are melting

2 IPPC Fourth Assessment Working Group II Report (2007) Climate Change 2007: Impacts, Adaptation and Vulnerability

and the sea is getting warmer and expanding. In the next 100 years, sea levels may rise by several metres. This is leading to increased flooding and tidal surges, deaths due to drowning, displacement of populations, salinisation of soil and fresh water, and loss of infrastructure and livelihoods. Many natural ecosystems, such as wetlands and coral reefs, are being badly affected.

■ **SEVERE WEATHER EVENTS ARE INCREASING IN BOTH FREQUENCY AND INTENSITY**
Warmer temperatures cause changes to weather patterns, such as strong winds and more extremes of rainfall because the water cycle speeds up. This results in increased frequency of droughts and floods. As well as the risk to human life, such events cause displacement of people, disease, soil erosion, reduced crop yields, wildfire, loss of livestock and wildlife, and widespread damage to homes, infrastructure, livelihoods, food and water supplies.

■ **HUMAN HEALTH**
Climate change affects the spread of well-known diseases that are sensitive to changing temperatures and rainfall. For example, malaria and dengue fever are spreading beyond the tropics, and flooding is promoting the spread of water-borne diseases such as dysentery. Droughts are encouraging white flies, locusts and rodents. The WHO say that 150,000 deaths a year may result from the health impacts of climate change.

■ **EFFECTS ON AGRICULTURE, FORESTS AND SEALIFE**
While agricultural yields in some colder places may increase in the short-term, areas of warmer countries are becoming too hot and dry to grow crops. Crop yields may fall due to higher temperatures, decreased water availability, flooding or increases in insect pests. Forests are affected by an increased number of forest pests that enjoy warmer temperatures, and are at risk of wildfire during drought. Increased ocean temperatures and acidity are affecting sea life, which is beginning to impact on people who rely on fishing for their livelihoods or for their nutrition.

■ **WATER SHORTAGES**
Up to four billion people could suffer water shortages if temperatures rise over 2°C. This is due to increased drought, unpredictable rainfall patterns, flood contamination of wells and boreholes and the loss of regular melt water from glaciers.

Past and current emissions of carbon dioxide and other greenhouse gases by rich, industrialised countries have made the largest contribution to climate change. Now emissions from some other countries are growing rapidly as well. Poor people and poor countries are the least responsible and yet they are most at risk from the impact of climate change. Changes are happening at such a rate that poor communities often lack the knowledge and resources to cope. As future weather patterns become less certain, traditional knowledge of the climate and local environment is becoming less useful to poor people.

Science can never be 100 per cent certain about any issue – there is always an element of uncertainty. However, climate change is one of the most well researched scientific subjects ever, and eminent scientists all around the world have reached a consensus that the recent and rapid changes in global warming are the result of humanly induced climate change.

Local impacts of climate change

'Rainfall is becoming more erratic and there is less each year. The streams and rivers are drying up – which are the source of drinking water … The water table is now lower than before.'
River of Life, Malawi

'After 1984, the really bad years started: we had severe drought, many animals died.'
Ibrahim, Niger

'The longest drought period used to be up to four months but now it can be for six to seven months.' *MOUCECORE, Rwanda*

'One of the health impacts as a result of changing weather patterns is that malaria mosquitoes are spreading into highland areas that were historically free from malaria.' *Tadesse Dadi, Ethiopia*

'The frequency of cloud-bursts is increasing, when there can be 60mm of rain in five minutes. There have been two of these in the last three years and these were not happening 30 years ago [in the northern mountainous areas].' *EFICOR, India*

'Higher tides in coastal areas are causing waterlogging and loss of crop land.' *HEED, Bangladesh*

'Previously, the rains fell during six months of the year [June – December]. Nowadays the rains come together at one time, causing floods and droughts. There are places in Honduras where floods occur every year. The time lapse between floods has been shortened from five years to one year.' *OCDIH, Honduras*

Source: Tearfund (2005) *Dried up, drowned out: Voices from the developing world on a changing climate*

REFLECTION

- **Is there evidence of climate change having any local or national impact in our country?**

- **What are the consequences on people's lives?**

Jim Loring Tearfund

During severe drought many streams and rivers dry up.

Responding to climate change

There are two main responses available to us in responding to climate change:

■ Reduce greenhouse gas emissions to limit further climate change. This is sometimes called **mitigation** and involves cutting the emissions of wealthy countries and rapidly developing countries such as China, India and Brazil, and enabling poor countries to develop in a sustainable way without high greenhouse gas emissions. Section 6 looks at how advocacy can support these changes.

■ Help communities to cope with the impacts of climate change. This is sometimes called **adaptation**.

Even if greenhouse gas emissions were completely stopped today, the effects of the emissions released over previous decades will affect the climate for about two centuries to come. Climate change adaptation is therefore essential. Here we introduce the main ways in which vulnerable communities can adapt to the effects of climate change:

■ Some **reduce the impact of natural hazards**, such as building dykes (walls) against sea level rise. Communities that are vulnerable to flooding can grow trees on slopes to reduce soil erosion by slowing down the run-off of water during heavy rains. Actions can be taken to reduce the need to cut down trees in the first place, such as by using efficient wood stoves or solar ovens.

■ Some adaptation methods **reduce the vulnerability of communities** to climate change, such as changing agricultural practices to make the most of the rainfall or introducing alternative ways of earning a living. Farmers can change the type of crops they grow to take account of different weather patterns or lack of water. In some situations irrigation could be introduced to ensure that water is available when needed. Rainwater could be harvested using tanks.

■ Other methods **reduce the damage caused by climate change**, such as constructing buildings that can withstand flooding or bridges that take account of sea level rise.

Where possible, adaptation strategies need to build on those already used by local people because they have knowledge about the local environment. They, or nearby communities, will know what strategies have been used before and what measures will not be appropriate. However, past experience can no longer provide a reliable guide to the future. Communities may not be aware of the likely future impacts of climate change as projected by scientists, or of new technologies or methods used elsewhere in the world that may be appropriate locally. Development organisations therefore have a role in developing local knowledge and capacity in these areas. To find our more about climate change adaptation strategies, see the **Resources and contacts** section of this book.

CASE STUDY

THE IMPACT OF CLIMATE CHANGE ON NOMADIC PEOPLE

Rainfall in the semi-arid Sahel region of Niger is becoming increasingly unpredictable, with changes in the timing, frequency and quantity of rainfall. Average temperatures are rising gradually. There have been several severe droughts since 1973, causing massive loss of livestock and food shortages. Climate change is having a major impact on natural vegetation, resulting in the spread of the desert and the loss of soil fertility.

The Tuareg people are well adapted to surviving in the Sahel's dry, marginal land. If pastures fail in one area they move on, taking their possessions with them. However, during the past 30 years many have lost their animals and have seen their traditional lands destroyed due to increased drought.

Jim Loring Tearfund

FIXATION SITES The Tuareg people decided that it was better to make some changes and adjustments now and lose only some of their traditions, than do nothing and lose their whole way of life. Tearfund partner JEMED has been helping them to establish 'fixation sites' since 1990. These fixation sites do not settle people permanently, but build upon a tradition that the Tuareg spend part of each year camped in a particular place. The sites enable communities to develop a social infrastructure and education, training, health and pasture management projects, while still keeping hold of many of their traditional pastoral ways. There are now 22 fixation sites, many with grain banks, wells, schools and small shops.

RAINWATER DYKES In 14 sites, JEMED has helped communities to conserve rainwater by building a low bank, bund or dyke of stones across a valley, usually about 120 metres in length. When the rains come, the stones slow the water flow, causing it to sink deeper into the soil. Behind the dykes, the Tuareg have been able to grow wild wheat and fodder for their livestock. In Intikikitan, an established dyke has increased moisture levels to the extent that plant species not seen for half a century have returned.

Many other communities in the area are now seeking to adopt the fixation site strategy. JEMED hopes that governments and NGOs will see the value of this approach and help it to be replicated.

By Jeff Woodke, JEMED, *Footsteps 70*

CASE STUDY

ALTERNATIVE CHOICES FOR PASTORALISTS IN ETHIOPIA

The Karayu clan in Ethiopia depend on herding cattle, camels, goats and sheep for their livelihood. They live in an area that is hot and semi-arid, with low rainfall. For generations, the Karayu have migrated to particular places at particular times of the year in order to provide pasture for their animals.

Scott Jones Mind the Gap

However, within one generation, this had changed. The development of sugar cane plantations and urban growth reduced the land area available to the Karayu. Increasing drought led to the death of large numbers of cattle, while population growth meant that the land had to support more households. It was clear that their way of life was under threat. Adapting to climate change was essential.

The Gudina Tumsa Foundation, a local Christian NGO, introduced two simple but important innovations that will, in the long-term, help the Karayu.

■ They re-introduced indigenous trees that can withstand the harsh ecological conditions of the area. Community leaders were consulted to ensure that the tree species chosen were indigenous and had multiple uses. For example, some trees were selected because they are resistant to termites and therefore good for house construction, while others had medicinal or nutritional value.

■ They established forage reserves by enclosing sections of the rangelands. These enclosed areas allow the grass to recover and provide forage for the livestock during the dry season.

A biblical perspective on the environment

Should Christians care about the environment? Christians are sometimes reluctant to take environmental issues seriously. In some cases this is because we do not understand environmental issues from God's perspective. This means understanding God's purposes for creation, from the beginning, through to the current time, and into the future. We should not forget that we are part of God's creation. Jesus died and rose again not just to reconcile us to God, but to reconcile the rest of creation to him as well. For this reason, our ministry to the environment should be taken seriously.

This section uses a number of Bible passages to help us to discover what God thinks about the environment and what our response should be.

2.1 Understanding the environment from God's perspective

Creation

The creation story may seem familiar to us. We often focus on *what* God created, but if we read closely, we can also see *why* and *how* God chose to create us and the world around us.

Read Colossians 1:16-17 *What was God's purpose in creating the world and everything in it?*

Read Genesis 1

- *How did God create?*
  See verses 3, 6, 9, 20, 24, 26.
  What does this tell us about God?

- *How do we know that God delights in his creation?*

- *Use these verses to consider how diverse and abundant God's creation is.*

- *What does this passage tell us about God as provider?*

These passages show God's view of creation as being wonderful and precious. See also **Job 38-39**. *How does this challenge our common view that creation is primarily for our own use and benefit?*

Read Psalms 19, 65, 104, 148 and **Romans 1:20** *What do these passages tell us about:*

- *God's character?*

- *the relationship between creation and God?*

- *the link between God's glory and his creation?*

- *How does this make us want to respond to God?*

The creation and role of human beings

Human beings are part of creation, but we have a unique role to play.

Read Genesis 1:26-28

- *What is special about God's creation of human beings, compared with the rest of his creation?*

- *What responsibility does God give to human beings, both men and women?*

Depending on the Bible translation, these verses use commands such as *rule over, subdue* and *have dominion*. God gives human beings authority to care for his creation:

- **Read Genesis 2:4-9, 15** *How did God create the first human being? What is God's intention for human beings?* In Hebrew, the word for man is *adam* and the word for ground is *adamah*, to show our connection with the earth. *How does understanding our connection with the world around us influence how we treat it?*

- **Read Psalm 24:1** *Does God's command to rule over his creation mean that we do it in isolation from him? Who is ultimately in charge? If we start to see creation as God's and not ours, how might we treat it differently?*

- In **Genesis 2:15**, God explains his command to us. Different Bible translations use words such as *work, serve, keep, take care, look after, guard* and *tend. How can this*

verse be used to challenge the idea of selfish rule? Consider **Philippians 2:5-7**

- As we are made in God's image, our rule should be modelled on God's rule and reflect his character.

- As human beings we have kingly authority over the rest of creation but we are to exercise it as servants of our creator God and of the earth and its creatures that he has given us to rule over.

- We have seen already how God loves his creation, enjoys it and cares for it. If we love God, we should want to be like him and care for the things that he cares for.

- *Do we have the right attitude towards our role on earth as humans in relation to God's creation?*

- *Do our practices reflect this attitude? What can we do to take God's command to care for his creation more seriously?*

- *How could we respond to someone who thinks they have the right to exploit the earth's resources?*

- *Consider areas where people may be unaware that they are not caring for creation. How can we raise awareness?*

Broken relationships

In the Garden of Eden God, humans and the rest of creation existed in perfect harmony.

Read Genesis 3:1-19 Due to human disobedience, relationships were broken. Look at what the passage says about how relationships changed between:

- *God and human beings*
- *God and creation*
- *Human beings and creation.*

- *Consider how these broken relationships are displayed locally, nationally and at international level.*

- *How do our own lives display these broken relationships? Is there anything for which we need to repent?* Pray about it!

Restored relationships

Our attitude to creation should be affected not only by God's original intentions for it, but also by God's promises for the future.

> Imagine having made something that you were proud of, and then someone comes along and breaks it. *How would you feel? What would your response be?*
>
> Amazingly, after people turned their backs on him and damaged what he had made, God had a loving attitude and sought to bring people back into a relationship with him.

Read Colossians 1:15-20 This passage talks about Jesus.

- *What is his role in creation?*
- *What is his role in transforming broken relationships?*

Read Matthew 27:51 and 28:1-2 Notice the connection between Jesus' death and resurrection and the earth. As a result of Jesus' death and resurrection, God's whole creation is reconciled to him (Colossians 1:19-20). This will be fully achieved when Jesus comes again:

- **Read Revelation 21:1, 2 Peter 3:13 and 2 Corinthians 5:17** Having dealt with sin and conquered death Jesus became the firstfruit of a new heaven and earth. The whole creation was renewed, is being made new and will be renewed through him.
- **Read Romans 8:19-23** This passage refers to Genesis 3 when relationships were damaged as a result of human disobedience.
  - *Is the hope of creation for the future any different from our own?*
  - *What will the whole of creation experience in the future?*

- *Is the groaning mentioned in verses 22 and 23 positive or negative? Consider the result of childbirth!*

At the present time we live in a sinful world, so our relationship with creation is still damaged.

Read Matthew 6:9-13

- *What is God's desire? (see verse 10) What does this mean?*
- *How do we know this should be our desire? (see verse 9a).*
- *Should that desire be expressed in words only? If not, how can we seek to see God's kingdom on earth?*

Our role at this time is not to wait passively but to work to see God's kingdom come on earth. Until God makes everything perfect, we should follow God's passion to see everything reconciled to him. This means that we should share the gospel with others, and model what it means to be in the kingdom of God that is here already, through good relationships with God, other people, and creation. We should take seriously our responsibility to rule the earth and its resources well as we are commanded to do in Genesis 2:15. We can do this in the sure hope that everything will be made new when Jesus comes again.

A family giving thanks to God for their food.

Marcus Perkins Tearfund

2.2   Understanding people from God's perspective

Humans depend on God's creation to survive. For example, we all need food to eat. The majority of the world's population depend directly on the land for growing crops to eat or sell. People living in towns and cities may buy their food from shops or markets, but they still depend indirectly on the land and other resources for this food.

- Make a list of aspects of God's creation, such as land and water.

- Some of these we call 'resources' because they are useful to us. Consider which of the aspects in the list are resources. Can you think of any more aspects of God's creation that are not resources, but simply interesting or beautiful in their own right?

- Consider which resources you depend on directly and which you depend on indirectly.

Sadly, humans do not have equal access to the world's natural resources. Poverty means that some people are not able to access the resources, due to social or economic injustice. People who are rich often use more than their fair share of resources, and as a result, other people may suffer. One example of this is unmanaged deforestation for timber production which displaces people and destroys biodiversity. Another example is the use of fossil fuels, mainly in the richer North, which have made a large contribution to global climate change. Climate change is already impacting poor people the most.

Learning from Old Testament law[3]

In the Old Testament we read that God laid down a set of laws so that the Israelites would be responsible to God for the land he gave them to live on and for each other.

Responsibility to God This included tithing and offering the firstfruits of the harvest to God (Exodus 23:14-19). Leviticus 25:23 is a reminder of God's ultimate ownership of the land and authority on how it should be used: '*The land must not be sold permanently, because the land is mine and you are but aliens and my tenants.*'

Responsibility to others This included letting the land rest and enabling others to enjoy it (Exodus 23:10-11), and enabling the poor to gather the gleanings of the harvest (Leviticus 23:22) and to benefit from the tithes (Deuteronomy 14:28-29, 26:12) in certain years. To stop people becoming wealthy at the expense of others, God did not allow land to be sold permanently. Instead, during the year of Jubilee (every 49 years), land which had been sold was to be returned to the original owner.

This ensured that future generations had access to land. It also meant that the price of land decreased as the Jubilee year approached, so that nobody was taken advantage of (Leviticus 25:14-17). Although these laws are to be put into practice in certain years (Deuteronomy 15:1-11), God calls us to have a good attitude towards poor people all the time.

- *What do these passages tell us about:*
  - *the equal value of people?*
  - *the importance of not accumulating too much personal wealth?*
  - *the importance of relationships within the community?*
  - *the importance of rest for people and the earth?*

- *What practices or systems exist today that work against these principles?*

- *What can we do about it – personally and organisationally? What practical action can we take? Is there any advocacy work that we should do?*

3 Based on C Wright (2004) *Old Testament Ethics for the People of God*, IVP

Learning from the teaching of Jesus

There is a lot to learn from Jesus' teaching in the New Testament about our responsibility to each other.

Read Mark 12:28-31

■ *We would not want to be treated unjustly, so what does it mean to love someone who is being treated unjustly? What kinds of injustice do people experience today? What kinds of injustice related to environmental issues do people experience today?*

■ *How do we contribute to this injustice? Consider whether our lifestyles are contributing to climate change. What attitude do we have towards our natural environment?*

■ *How would Jesus want us to respond?*

Read Luke 10:25-37

■ *Who is our neighbour?*

■ *In terms of the environment, who is our neighbour?*

■ *What are the consequences of environmental degradation for people around the world and for future generations?*

■ *What action can we take to ensure that we can provide for everyone's present needs in a way that will ensure that the needs of future generations are met?*

2.3 Practical response

There is much that we can do to put our biblical understanding of God's creation and our role in caring for it into action in our work practices and in our own lives. Christians do not care for the environment purely for practical reasons, or for humanitarian reasons. We are also motivated by the desire to love, understand and protect the environment in order to glorify our creator God.

Sometimes caring for the environment and the needs of others can be costly. We may discover that there is little that we can do ourselves, and our efforts may seem fruitless against the size of the environmental problems that exist. Here are some issues to consider at such times:

■ God is in control (Psalm 46).

■ God has commanded us to live this way (Genesis 1:28; Mark 12:28-31).

■ We will be rewarded for our efforts (Colossians 3:23-24).

■ God wants to help us. We should pray about the issues we face (Luke 11:1-10).

Sections 5 will help us to understand the need to ensure environmental sustainability in our work and provide us with a tool that can help us. Section 6 will help us to put our beliefs into practice through advocating for a more just approach to the present and future use of environmental resources.

REFLECTION

■ **Having studied the Bible passages in this section, have we learnt anything new? How have our views of the environment been challenged?**

■ **How could we use these passages to inspire others – at national or local church level, or with our Christian friends?**

SECTION 3

Sustainable energy

Economic development based on the burning of fossil fuels is making a major contribution to climate change because their use results in the emission of greenhouse gases such as carbon dioxide and methane. We need to consider all opportunities to generate energy from sustainable or renewable resources.

Many of the world's poorest people have little or no access to energy other than traditional biomass fuels such as wood, agricultural residues and dung. Where people cannot find these fuels, they are increasingly using other materials such as plastics and clothing as fuel, which release dangerous toxins. The use of such fuels causes environmental problems and can impact on people's health and quality of life. In many countries of the South, people want to use the same fuels as people in the North, such as gas, diesel and petrol. However, most of this energy is produced from fossil fuels, which are contributing to climate change (and are also usually very expensive). In this section we look at options available to enable people to access energy in a sustainable way, both in the North and South.

3.1   Energy and development

According to the World Bank:

- nearly 2.4 billion people use traditional biomass fuels for cooking and heating

- around 1.6 billion people have no access to electricity

- four out of five people without access to electricity live in rural areas.

Yet energy is critical for development. Energy is not just required for national, industrial and economic development. Access to energy can have a huge impact on the lives of poor people. For example, electricity allows small businesses to develop within communities. Access to energy also impacts on other aspects of poverty. For example, lighting in the evening means that children can study after dark and achieve higher grades at school. Efficient wood burning stove technologies mean that women need to collect less firewood, and the family's health improves as they are not breathing in wood smoke. The World Health Organisation is encouraging the use of efficient stoves because the smoke that traditional stoves produce is having a major impact on family health. The use of efficient stoves also has a positive impact on the local environment, and gives women more time for income-generation activities and social interaction.

The World Bank estimates that two-thirds of the increase in world energy demand over the next 25 years will come from countries of the South. This is likely to speed up deforestation, which will increase the rate of climate change. Industrial growth through the use of fossil fuels in the North has already made a major contribution to climate change. It is really important that the growing demand for energy in the South and in the North is met by using more sustainable sources of energy whenever possible. Governments at international level have recognised this and under the UN Framework Convention on Climate Change, countries of the North must provide funding and technology transfer for poor countries to develop in a sustainable way

and become more energy-efficient. For more information about advocating on this issue, see Section 6.

Sustainable energy

Sometimes people confuse the term 'energy' with the generation of 'electricity'. Electricity is just one type of energy. Other types include heating, lighting and vehicle fuel. In the past few decades, electrification of rural communities has sometimes been seen as the answer to their energy needs. However, technological development has meant that there are now other energy systems that can be implemented more quickly and provide communities with heating, lighting and fuels for machinery. Where provision of electricity is required, there are now many options available for generating it within the community from renewable resources. The choice of options should be based on community assessment of their energy uses, needs and opportunities.

There are three key issues to consider in relation to use of energy in a way that is sustainable:

PROVISION – in some places, people do not have access to the energy they need. They should decide whether energy that is generated from fossil fuels or from renewable resources is best for the future of their community.

EFFICIENCY – sometimes people do not use the energy they have in the most efficient way, which puts pressure on energy supplies. This usually requires awareness-raising within the community about the need to use energy efficiently. Community members could be encouraged to use or design equipment that can help them to use energy more efficiently.

CONSERVATION – some of us are so used to having energy when we need it that we may waste it. In some places, people who have electricity, a vehicle or air conditioning may leave them running even when they are not needed. Even if the energy is generated in a 'clean' way, this issue needs to be addressed. The need to conserve energy is a big issue in countries of the North where the most energy is used. Countries of the South should be aware of this issue as increasing demand for energy is met.

3.2   Renewable and sustainable energy resources

In the long-term, technologies that use renewable resources have a much lower impact on climate change. However, although their manufacture, transport and installation does result in some greenhouse gas emissions, their long-term use results in very low emissions.

In communities which lack existing energy facilities, renewable energy sources are recommended wherever possible.

In communities where energy is already generated, we should ensure that the equipment is well maintained. When it can no longer be maintained efficiently, or when additional capacity is required, it should be replaced or extended with renewable energy technologies.

Here we look at some options for energy provision that rely on renewable resources. Many natural resources are readily available, such as the sun, wind and sometimes water. While many options exist, we focus here on technologies that are relatively low-cost to set up, operate and maintain and which could meet the kind of needs that poor communities may identify.

Solar water panels

Solar water panels use the sun's energy to heat a fluid which is used to transfer heat to a heat storage vessel or water tank. It can then be used for heating a room or for supplying hot water.

Solar panels are relatively simple to make and can be manufactured and maintained by local people if they have sufficient training.

Even simpler solar technologies can be used to disinfect contaminated water for drinking (see SODIS www.sodis.ch).
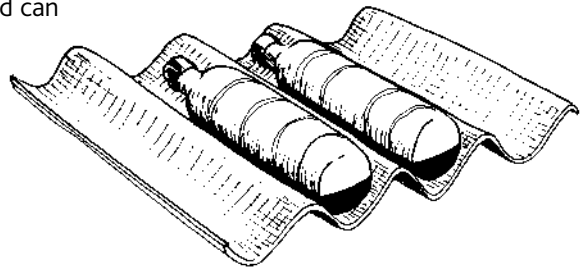
Solar voltaic panels

'Photovoltaics' is a technology that converts the light of the sun into electrical power. This technology is sometimes expensive and local maintenance can be difficult. However, small lower-cost solar panels are now available that can power a torch, a single light bulb, or a mobile phone (see Light Up the World www.lutw.org and Solar Aid www.solar-aid.org). Low-cost solar-powered refrigerators have been developed, which are of great benefit to health centres for storing medicines.

This technology is developing fast, and flexible, lighter and lower cost panels are likely to become widely available within a few years.

Efficient wood stoves

Improved stoves are well established technologies, readily available and easy to implement. Efficient wood stoves use fuel more efficiently than traditional stoves. They enable burning to take place within an enclosed space with a flue system to remove vapour and gases to the outside. This means that a higher amount of useful energy is obtained from the same amount of fuel. (See Household Energy Network www.hedon.info). Investment in efficient wood stoves is one of the most important energy projects a development organisation can do, because it can make a big difference to reducing deforestation and carbon emissions, and improves human health.

Geoff Crawford Tearfund

Wind power

Wind power should not generally be relied upon for constant power. However, it can be useful for pumping water for irrigation and it can be used to charge batteries to store power for later use. These technologies can be expensive and are most effective in locations with a plentiful supply of wind. Smaller turbines are cheaper, but generate less electricity. Although failures may occur more often than with some other electrical systems, small wind turbines can be easier to repair using local knowledge and skills.

Hydro-electric power

Electricity can be generated by using the flow of a river or stream to rotate a turbine. This 'micro-hydro' technology is not appropriate in areas vulnerable to drought or where most water is needed for consumption and irrigation. It is a well established and reliable technology, and turbines can usually be easily repaired by trained local people. An added benefit of this technology is that power generated at night could be used to pump water to a storage tank in order to supply water to other communities.

Biomass power

Biomass is biological material such as plant or animal waste that can be used as fuel for energy production. Some biomass comes from crops grown specifically for energy purposes, which, if not sustainably managed, can contribute to existing local food insecurity. For example, it could become more profitable for farmers to grow energy crops than food crops. However, biomass can be a useful source of energy if it is implemented in a sustainable way, such as from the residues of crops that have been grown for food. For example, in 'closed loop agriculture', different parts of a plant, such as sweet sorghum, are used for food, fuel and animal feed. Crop and animal waste are then used as fertiliser for future crops.

Bio-digesters

The production of methane gas from the anaerobic decomposition of animal and human waste can provide a very appropriate source of gas for cooking and heating. The methane gas produced is not released into the atmosphere since it is used up as a fuel, so this does not contribute to greenhouse gas emissions.

3.3 Developing an energy project

Energy provision is a new area for many development organisations. If communities identify the need for energy in a needs assessment, we could find out whether there are other existing local organisations that would be better placed to work with the community on that issue. If there are none, we could consider employing staff or local consultants with technical knowledge and experience, or identify local training opportunities. Consider what role the local church could have. Perhaps the local church could demonstrate technologies to enable the community to choose what would be best, such as installing solar-powered lighting in the church building, or the church could provide a maintenance and repair service to community members.

When considering carrying out an energy project in a community, it is important to ask community members exactly what they need energy for. This will help to identify the technology that would be of most use. For example, people may ask for a diesel generator, but they might identify the main benefit as having light in their homes so their children can study after dark, or they can charge mobile phones and use them to look for work. Solar lighting is likely to be

much more sustainable and cost-effective over time to install and use than the purchase of a diesel generator.

The need for energy provision and its intended uses will vary among men, women and children, so it is important to gain everyone's views. Encourage community members to decide priorities on the basis of what would have the most benefit for the community as a whole. For each energy need, ask whether there are alternatives such as changing the time of day they carry out an activity or in the way they do it, so that energy is not being supplied unnecessarily. Also encourage them to consider the benefits of energy for health, income-generation, educational improvement, gender issues, the local environment and social and cultural issues. Find out if energy is one of the community's greatest needs. If there are more urgent issues to address, such as flooding or drought, these should be addressed first.

Once community members have decided their priority energy need, present a number of technological options for them to compare, if there are more than one. Consider the renewable resources available locally and ensure that their use will not have a negative environmental impact. For example, a river may be diverted, lined or obstructed to generate hydro-electric power, which could affect animals and fish. Activities may need to be introduced, such as installing channels for fish so their breeding route is not interrupted. Consider how easy and low-cost it would be to buy or make the equipment, and whether local people can be trained to maintain and repair it, providing local livelihood opportunities. Also consider indigenous technologies and whether these can be adapted in any way to improve energy provision. Find out about projects that have been carried out in other communities. There may be some useful learning about the technologies that were used and how sustainable the work was.

In order to decide whether a project is appropriate, find out about local or national government plans to expand energy provision. Discover whether these plans apply to the local community, and when and how likely it is that they will be achieved. Funding and support may be available for certain technologies, but if these technologies are offered to the community, accepting them must be based on their relevance and appropriateness, not because they are free.

Here is a list of key questions that will help development organisations to consider what energy projects would be appropriate for a community.

■ What are the development needs of the community? Will any of the priority needs require energy provision?

■ Which needs, if met, will result in the greatest impact on the community in terms of health, income-generation, educational improvement, gender equity, the local environment and social and cultural issues?

■ What appropriate technologies are available that can meet the priority energy need? Could indigenous technologies be improved?

■ What are the costs of each technology in terms of their installation, operation, maintenance and repair?

■ Could the technology be made, installed, maintained and repaired by local people? Could this project be developed into a livelihoods programme to supply the technology to the community and neighbouring communities?

- Will the project be environmentally sustainable? (See Section 5)

- How can the church be involved to ensure the project is sustainable and genuinely meets community needs?

- What are the risks associated with the project?

CASE STUDY

RESTORING ENVIRONMENTAL SUSTAINABILITY IN RWANDA

Ninety per cent of the people who MOUCECORE work with depend on agriculture and livestock for their livelihoods.

MOUCECORE carried out a needs assessment. Poor farming practices, infertile soils due to soil erosion, land slides and flooding were mentioned as the major causes of inadequate food supplies and low income among community members. Deforestation was also felt to be a key issue contributing to local climate change and environmental degradation. Firewood is the source of energy for over 90 per cent of the Rwandan population.

MOUCECORE trained Church and Community Mobilisers, one from each local church, in basic environmental good practice. Their training included terracing, making contour barriers, collecting rainwater, intercropping trees with crops and developing tree nurseries.

Mobilised community members were organised in small groups with the spirit of helping each other in digging and terracing land. Around 2500 group members are now involved in these activities. As a result:

- soil erosion and run-off has been reduced. The rain no longer washes away the fertilisers added to the garden, leading to better yields.

- rainwater collected in the fields helps crops such as coffee and bananas to grow well.

- people are using alternative sources of energy to burn bricks in order to stop cutting down trees.

A useful first step if the community or project want to move forward, would be to carry out a feasibility study that would research costs, appropriate options, import costs, transport to site, installation issues and commissioning. It should also look at maintenance, service and repair costs (including sourcing of spare parts), and other operational costs such as fuel and labour.

Ongoing issues to consider are what prices should be set for the power, how much income might be generated, not forgetting to include ongoing cost recovery to provide funds for servicing and replacement. How will decisions be made to ensure the whole community benefits and not just a few powerful individuals?

Are there ways of engaging with the private sector to encourage them to set up an energy project – rather than the church or development organisations pursuing this option? Investigate whether the church could then offer to support the private sector in targeting particularly needy social groups. This could make all the difference about whether and how the private sector development goes ahead.

In addition to providing energy to communities, development organisations could also become involved in advocacy work, to encourage national governments to hold wealthy countries accountable for providing funding and technology transfer for energy provision. For more information, see Section 6.

REFLECTION

- What sources of energy do people use in the communities in which we work?

- Are these energy sources sustainable?

- Have community members mentioned energy in needs assessments? If so, is this an area that we should explore?

SECTION

4

Organisational environmental sustainability

All the work we do as organisations has an environmental footprint, whether that relates to the projects we carry out or to our organisation's internal practices. This section looks at how organisations themselves can measure and reduce their environmental footprint. If our organisation wants to do environmentally sustainable projects, it is important that we make sure our organisation is in order first. The actions of individual staff often have considerable impact, so policies, processes and awareness-raising may therefore need to be put in place to ensure that the organisation as a whole can become environmentally sustainable.

It is increasingly becoming a requirement of donors that we have an environmental policy in place to demonstrate that we are proactively measuring and reducing the impact of our organisation on the environment.

4.1 Modelling good stewardship

Christian organisations should seek to ensure that they model good practice in terms of environmental sustainability. Our livelihoods are all based on the natural resources provided by God and we have been given the responsibility of maintaining, preserving and appreciating the world that God has created, not just for our own generation but for generations to come.

Christian organisations should start by reflecting on biblical teaching related to God's creation, stewardship and care for others. This will motivate people to bring change in existing organisational practices. The Bible studies in Section 2 could be used for this purpose.

4.2 Issues to consider

Offices would be unable to function efficiently without using natural resources and having some kind of environmental impact:

■ Water provision for staff may include flushing toilets, water for washing hands and cooking.

■ Computers, printers and lighting all require electricity, whether that comes from a power station, generator, or renewable sources.

■ Some waste is inevitable, whether this is waste water, paper, food or food wrappings.

■ In order to manage projects effectively, staff need to travel to project sites. Unless it is possible to visit all projects on foot or by bicycle, these visits will result in greenhouse gas emissions, either from the organisation's own vehicle or from public transport.

However, it is important that we understand the impact we are having on the environment and look for ways in which we can reduce it.

There are several issues for all organisations to consider when looking at their environmental footprint:

■ the use of **energy** within buildings – such as electricity for lighting, running computers, heating or cooling systems and cooking

■ **transport** – both for work purposes and for staff travel to work

■ **goods** such as equipment, stationery and food products

■ **water** consumption

■ production and processing of **waste**

■ **building design** including cooling and insulation.

The use of energy and vehicles and the production of goods both have an environmental impact because they use resources, and an impact on climate change because they usually involve the use of fossil fuels. Part of assessing their usage therefore involves looking at their 'carbon footprint' – measuring the amount of carbon released as a result of using energy, fuel for transport and the energy involved in producing and transporting people and goods.

Although the use of some resources and production of waste is unavoidable, organisations can take action to ensure that their environmental and carbon footprints are as small and sustainable as possible. There are often examples of unnecessary use of office resources. There are a number of reasons why this may be the case:

■ Staff are not personally responsible for paying for these resources, so there is little incentive for them to reduce waste.

■ In larger organisations in particular, it is not always easy to see who is using resources unnecessarily, so it is difficult to keep staff accountable.

■ Staff may not be aware of environmental issues and do not practise good stewardship.

Although the actions of a few staff can make a difference, organisations that make big environmental improvements tend to have the commitment of all staff. Staff therefore need to be aware and motivated, and structures need to be in place to support and measure their efforts. It is important that senior management lead by example.

4.3   Benefits of good stewardship

Good stewardship of resources by organisations has many benefits:

CONSERVATION OF RESOURCES Limiting the use of paper, plastics, metal, and water helps to reduce depletion of natural resources.

COST SAVINGS Where resources are used more efficiently and only when necessary (such as turning lights off when there is no one in the room), organisations could save substantial amounts of money that could be spent on projects instead.

HEALTH IMPROVEMENTS   Buildings that are ventilated or insulated will stay cooler in high temperatures and warmer in colder temperatures, reducing the need for air-conditioning and heating. Staff who work in well ventilated offices are likely to be more productive and stay healthy.

IMPROVED PROJECTS   Organisations that take account of environmental issues are more likely to plan projects that have minimal impact on the environment and that take account of possible impacts from the environment. The effectiveness and sustainability of projects is therefore improved.

REDUCTION OF CARBON EMISSIONS   Reducing the use of fossil fuels through conserving energy and using efficient methods of transport, will reduce carbon emissions and therefore greenhouse gases.

ENHANCED REPUTATION   Better stewardship of resources improves the organisation's reputation among donors, peers and the community who view the organisation as caring and responsible. Organisations may also experience an increase in financial support as a result.

MEETING NATIONAL GUIDELINES AND TARGETS   National governments are increasingly concerned about environmental issues, and they are now starting to be held accountable for their actions by international agreements, particularly in relation to climate change and carbon emissions. Governments will be putting pressure on industry, the public sector and citizens to contribute to the achievement of national targets. In the long term, the achievement of these targets should be good for everyone, so development organisations should seek to play their part.

4.4   Good practice in office-based environmental stewardship

All offices should be working towards:

- **reducing the use of energy and associated greenhouse gas emissions** by:
  - sourcing goods and services locally wherever possible
  - ensuring that all electrical equipment is turned off when not in use (not left on standby, which still uses lots of electricity) and switching off lights, air-conditioning, fans and heating when not needed
  - using energy efficient light bulbs
  - opening windows or having meetings outside rather than using air conditioning, when possible.

- **reducing staff travel** by:
  - co-ordinating visits by different staff members to project sites to reduce the number of trips and distance travelled, and to enable staff to travel together
  - sharing vehicles or combining travel with other NGOs to adjacent sites
  - walking or using public transport as much as possible
  - making more use of low fuel transport when possible – such as motorbikes rather than four-wheel drive (4WD) vehicles

- reducing the number of flights and using phones, internet technology and video conferencing, wherever possible, as alternatives to travelling to meetings.

■ **reducing the use of other resources** by:

- avoiding printing out emails or documents unnecessarily
- using both sides of paper
- re-using envelopes and packaging
- encouraging electronic correspondence and file sharing
- reducing how often project vehicles are washed.

■ **reducing waste and pollution** through:

- separating rubbish to allow composting and recycling (provide separate bins)
- banning the use of plastic bags
- using biodegradable chemicals where possible.

In many situations there may not be the opportunity to recycle materials. However, paper, cardboard and glass may be of value to poor people who make their living from collecting and selling them. Organise regular collection points for them. Kitchen and food waste can usually be collected either for compost or animal feed to avoid waste. Consider establishing a recycling project.

Other ideas, which might require more time and resources to implement, include:

Energy-saving strategies including investing in renewable energy supplies (such as micro-hydro, solar panels or wind turbines), installing better building insulation or natural cooling, and fitting mosquito netting over windows so natural ventilation can be used.

Improved water management such as installing rainwater harvesting tanks, reducing toilet cistern volumes with water displacement devices (e.g. a brick or a plastic bottle full of water) and fixing any dripping taps.

Ethical purchasing such as choosing local products and materials over imported ones, whenever possible, to reduce transport-related emissions, sourcing products only from companies that are seeking to reduce their own environmental footprint, using timber from sustainably managed forests, and encouraging contractors to take account of the organisation's environmental policy when carrying out work.

Community participation from an environmental perspective, such as a commitment to take part in and support improvements to the local area (e.g. waste management and tree planting), participation in discussions and the sharing of ideas about environmental issues, and a commitment to advocate for change when the best environmental options are not available or adequate.

These efforts to ensure office-based environmental stewardship should be written down in an environmental policy. (See Section 4.5)

4.5   Developing an organisational environmental policy

An environmental policy is a statement of an organisation's commitment to good environmental stewardship and outlines the key activities that the organisation will carry out to make it happen. Such a policy recognises that, however large or small the impact, an organisation's operations do have an impact on the environment.

The policy enables the organisation to communicate its environmental objectives to staff and also to donors, the people it serves, stakeholders and other organisations.

The organisation's leadership must always own an environmental policy. The policy should be developed by members of staff with an understanding of environmental issues and a good understanding of the internal workings of the organisation. All staff will need to take ownership of the policy that is agreed as they will be the people who put it into practice. There may be benefits in using an external consultant to work with staff in developing an environmental policy as they may bring fresh ideas, experience and the ability to identify key areas of concern.

Practical tips in producing an environmental policy

Ensure that the policy is appropriate for the organisation

- The objectives in the policy should relate to the organisation's operations.
- The objectives need to be realistic and achievable.

Encourage staff to read and own the policy

- Keep the policy short (e.g. one or two pages).
- Avoid the use of jargon.
- Display the policy where staff can see it.
- Translate it into local languages if some staff do not speak the organisation's main language.

Encourage staff to implement the policy

- If the policy is signed and promoted by the leadership, staff are more likely to take it seriously.
- Leaders should set an example to staff by implementing some objectives as soon as possible.
- Help staff to understand the policy by holding awareness-raising events and training.

As a general rule, the policy should contain a commitment to continuous improvement, together with awareness-raising, participation and training for staff in environmental matters. The policy should also include a combination of quick solutions, such as printing double-sided, and longer-term solutions that make the greatest difference, such as reducing the number of flights or planting trees.

Example of an environmental policy

Here we provide a sample environmental policy for an imaginary development organisation called Help and Hope.

Help and Hope's environmental policy

Basis Help and Hope believes that the whole of creation belongs to God and that all believers should appreciate God's varied and wonderful creation, and care for the environment in order to sustain it for future generations.

Staff training and education Help and Hope is committed to encouraging and helping all staff to understand and take action on issues of environmental sustainability.

Work in the community Help and Hope will work with those it serves to ensure that all projects are environmentally sustainable. Help and Hope's partner churches will be encouraged to have services that focus on environmental concerns and stewardship on at least two occasions each year.

Travel Help and Hope will encourage staff to make use of the least polluting method of travel possible by walking, cycling, using public transport, and minimising the use of cars and air travel.

Office practice Help and Hope will conserve energy wherever possible within its buildings with particular emphasis on heating, lighting, ventilation and office equipment. Water will be used efficiently and with care. The use of renewable energy will be encouraged.

Waste management Help and Hope is committed to reducing, re-using and recycling waste as much as possible. This will include the recycling of scrap paper, cans, plastic and CDs. The organisation is also committed to reducing the creation of waste. In order to achieve this, the purchase and use of items made from plastic and polystyrene which are not bio-degradable will be discouraged.

Stationery management Help and Hope will source recycled office stationery wherever possible and use printers and printing inks which take environmental factors into account. Paper consumption will be monitored and ongoing measures will be taken to minimise the quantity used. Recycling of paper products will be actively encouraged. Electronic communication will be used in preference to paper whenever possible.

Purchasing and trading Help and Hope's purchasing activities should always take environmental factors into account. Though cost issues are important, preference should be given to local suppliers who take good environmental practice and sustainability seriously.

Policy management and monitoring The organisation will appoint a member of staff as a part time Environmental Officer who will be responsible for developing and reporting on an annual action plan.

Environmental audit Help and Hope will carry out a full environmental audit once a year and will make the results openly available for others to see.

4.6   Encouraging staff ownership

If the organisation is large, representatives from each department could be brought together to encourage staff to implement the policy. They should meet regularly to discuss progress and new issues to focus on. They could arrange regular events to remind staff of the policy, such as quizzes, competitions, and sharing facts. They could put up signs, posters and cartoons to remind staff about particular actions.

The group could also organise some one-off events, such as spending the afternoon planting fruit trees in the office grounds or local community, or giving a prize to the individual or team that has the best idea for conserving resources.

The implementation of the policy should be carefully monitored and regularly reviewed against targets set by an environmental audit.

4.7   An environmental audit

The need for organisations to carry out a regular environmental audit should be included within the environmental policy. An environmental audit measures the organisation's performance in reducing its negative environmental impact and involves collecting accurate, comprehensive and meaningful information. The first environmental audit can be used to establish a baseline against which progress can be measured.

An environmental audit can be carried out by staff or by an independent auditor. Alternatively, two organisations might agree to audit each other and then review the results together, which enhances the learning process. This is known as a 'peer review'.

For many organisations, the end of the financial year is the best time to carry out an environmental audit when other records are updated. Most measurements are best audited on an annual basis so that holiday periods (when offices are closed) and seasonal weather patterns (likely to affect the amount of heating, cooling and other energy used) do not cause widely varying measurements. Many of the measurements should be fairly straightforward to collect, such as noting the electricity reading, logging the number of staff miles travelled and checking the amount of paper and envelopes used. (These should be recorded monthly to make the audit easier.) Sometimes staff surveys will need to be included as part of the audit, such as when finding out how staff travel to work. Where measurements are missing, an estimate can be made based on measurements from similar organisations, if they exist. New record-keeping practices can then be established for the following year. It is important to use consistent methods of measurement between one audit and the next so that progress can be accurately monitored.

At the start of an audit a meeting should be held with all members of staff to explain the audit activities and what is required of them. Emphasise the reasons for carrying out the audit so staff are happy to participate and understand that it is not being carried out to shame or penalise any individual or team.

The table below contains some ideas on what to include in terms of meter readings and measuring waste. (On page 89 there is a blank template to photocopy.) Calculating the totals will involve careful gathering and checking of information, particularly if there are many staff. This will take time during the first audit, but gathering this information for subsequent audits will be quicker, particularly if recording of the data becomes part of routine office practice.

For each measurement, a target should be set for the following year. Once an audit has been completed, compare the measurements with those of last year to see whether improvements have been made and targets met. Efforts will need to be made to address the areas where the targets have not been met.

Sample environmental audit

Table 1 Part A Environmental footprint

Resources	Amount used per year	Amount sustainably sourced per year	Target reduction per year
Mains tap water	litres		5%
Bottled drinking water	litres		10%
Paper	reams		10%
Other stationery			10%
Food	tonnes		10%
Other			

Recycling	Amount per year in tonnes	Amount or % recycled	Annual target for recycling
Paper			25% increase
Cardboard			15% increase
Plastic			8% increase
Glass			5% increase
Non-recyclable			5% decrease in non-recyclable rubbish produced

Table 1 Part B
Carbon footprint

The second part of an audit looks at the amount of carbon dioxide equivalent produced by the organisation through energy use and travel. (On page 90 there is a blank template to photocopy.)

These figures are correct as of March 2009 and are taken from the 2008 Guidelines to Defra's GHG Conversion Factors.

Please check up-to-date figures for your country each time you complete this table.

FUEL	Amount of fuel used per year	Multiply by this to convert to Kg of carbon dioxide equivalent	Total carbon dioxide equivalent emissions in Kg
Mains electricity supply in kilowatt hours (kWh)	kWh	0.537	
Mains gas (in cubic metres)	Cu M	2.2	
Bottled gas	litres	1.495	
Diesel supply from generator in litres (1 gallon = 4.546 litres)	litres	2.63	
Sourced from renewable energy, such as solar panels, wind or water turbine	Nil		Nil
VEHICLES	Distance travelled	Multiply by this to convert to Kg of carbon dioxide equivalent	Total carbon dioxide equivalent emissions in Kg
Small motorbike (50 to 125cc engine)	Km	0.073	
Small petrol car (up to 1.4 litre engine)	Km	0.1809	
Medium motor bike (125 to 500cc)	Km	0.0939	
Medium petrol car	Km	0.2139	
Large motorbike (500cc engine and above)	Km	0.1286	
Large petrol car or 4WDrive	Km	0.2958	
Small diesel car (up to 2.0 litre engine)	Km	0.1513	
Large diesel car (over 2.0 litre engine)	Km	0.2580	
PUBLIC TRANSPORT	Distance travelled	Multiply by this to convert to Kg of carbon dioxide equivalent	Total carbon dioxide equivalent emissions in Kg
Rail travel	Km	0.06	
Bus travel	Km	0.1073	
Long distance bus or coach	Km	0.029	
PLANE TRAVEL (distances are hard to calculate so instead work out hours of flying time)	Hours flown	Multiply by this	Total carbon dioxide equivalent emissions in Kg
Total of all flights worked out in terms of actual hours flown	hours	250	
ORGANISATIONAL TOTAL FOR CARBON DIOXIDE EQUIVALENT EMISSIONS IN KG			

It is vital that the outcomes of the audit are recorded and that a report is produced. This report could include a description of the office or offices being audited, the type of organisation, details about issues covered, results, and an action plan for the way forward. The results should show any gaps in information or poor environmental practices and can be used to develop targets for reducing impact in the future. The report should be made available to all staff and board members, as well as the community and donors.

When an audit is completed, it is good practice to identify the biggest sources of emissions and put an action plan or policy in place to reduce these, year on year. For example, each team or department could be given a travel or paper budget which they must reduce each year.

It can prove very helpful to share audit information to provide some comparisons with other similar organisations. This enables organisations to review how well they are performing and to share useful ideas.

REFLECTION

■ Do we ever consider our organisation's environmental footprint?

■ Which organisational practices are damaging to the environment and should be changed?

■ Should we develop an organisational policy? Who could do this?

■ Should we carry out an environmental audit? Who could do this?

SECTION

5

Environmentally sustainable projects

All development work and activities have environmental impacts. We need to develop our understanding of how to reduce any damaging environmental impacts so that our work reflects our care and stewardship of creation. This section looks at how to make all of our projects environmentally sustainable.

Readers may want to carry out specific projects in response to environmental degradation and climate change. We will not look in detail at specific environmental projects in this book, though we do provide information and case studies that will help organisations to understand the issues better and identify appropriate responses. Environmental projects are often quite technical, so organisations should seek the advice of both technical experts and the community before carrying out such work. The box below provides information about two tools developed by Tearfund that could be useful for organisations that wish to carry out specific work in response to environmental issues. Organisations wishing to engage in advocacy work in this area should refer to Section 6 of this book.

Tools developed
by Tearfund

CLIMATE CHANGE AND ENVIRONMENTAL DEGRADATION RISK AND ADAPTATION ASSESSMENT (CEDRA) helps development organisations access and understand the science of climate change and environmental degradation. They are then helped to combine this knowledge with local community experience of environmental change. Agencies can then prioritise which environmental hazards may pose a risk to their existing projects and project locations. This enables them to make decisions to adapt or stop projects, or start new ones.

Adaptation options are discussed and design-making tools are provided to help in planning responses to the identified hazards. It provides options for taking practical action. It can be used to consider consequences within one or several climatic zones which have similar physical geographical characteristics.

Strategic decisions that can be made in response to **CEDRA** are:

- to make changes to current development projects or programmes
- to stop some current projects or programmes of work
- to start new projects or programmes of work
- to focus on more vulnerable geographical areas or people.

PARTICIPATORY ASSESSMENT OF DISASTER RISK (PADR) enables communities that experience or anticipate disasters to identify and analyse their vulnerabilities and capacities, and to develop and implement an action plan to respond to those disasters. These disasters may not be linked to the environment, but many disasters are caused or made worse by environmental factors. PADR is described in full in *ROOTS 9: Reducing the risk of disaster in our communities*.
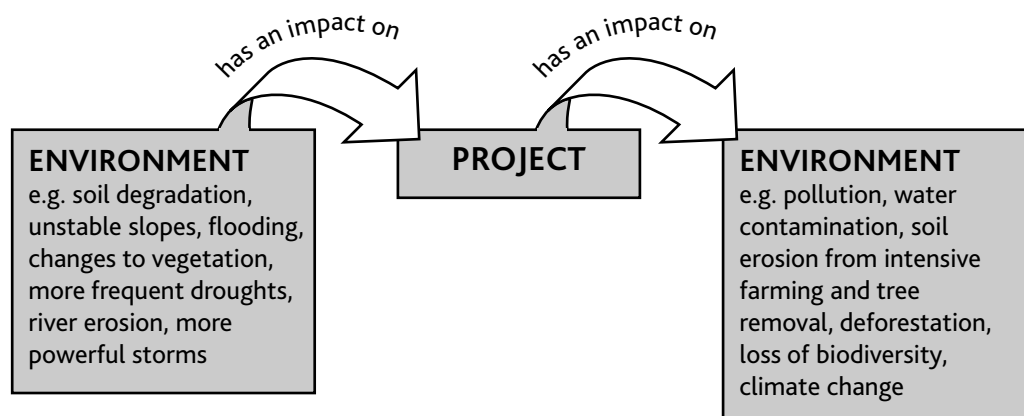
Both these tools, and many others are available on Tearfund's international website: www.tearfund.org/tilz

Even if we do not carry out specific environmental projects, as stewards of God's creation, it is crucial that the work we do is environmentally sustainable. This involves recognising that all of our projects will have an environmental footprint whatever the development issue our work addresses. In this section we look first at why it is important to make our projects environmentally sustainable. We then introduce a tool called 'environmental assessment' that we can use during project planning.

5.1 The benefits of environmentally sustainable projects

As the diagram below shows:

■ Degradation of the environment together with recent and future changes in the earth's climate are likely to impact our projects.

■ At the same time, all types of projects are likely have some kind of impact on the environment, whether positive, neutral or negative. For example, a small clothing co-operative may use electricity for lighting and power to run machines, causing carbon dioxide emissions (negative). However, if they can use solar voltaic power they will no longer produce carbon emissions for power (neutral). In addition, by planting trees around the factory and workers' homes, they are restoring the environment.

■ Many people believe that because their work is urban or has no agricultural focus, they do not need to consider environmental issues. However, consider a project that provides micro-credit and support for people living with HIV in an urban area. The provision of medication, the use of a venue for micro-credit meetings and staff transport to a project site, all impact on the environment. For example, the production of medical drugs will involve the use of electricity, plastics for packaging and the use of fuel in transporting them. Storage of some drugs requires refrigeration, consuming electricity. Electricity is also likely to be used to run lighting or fans in an office building. Staff transport is likely to use petrol or diesel to run motorbikes, vehicles or public transport. All of these activities will result in carbon emissions.

has an impact on *has an impact on*

ENVIRONMENT
e.g. soil degradation, unstable slopes, flooding, changes to vegetation, more frequent droughts, river erosion, more powerful storms

PROJECT

ENVIRONMENT
e.g. pollution, water contamination, soil erosion from intensive farming and tree removal, deforestation, loss of biodiversity, climate change

It is essential that during the project planning process, the potential impact on the environment is considered. The following table outlines some of the consequences of not considering environmental sustainability in our work.

Consequence if environmental sustainability is not considered for projects	Examples
Projects may harm natural environmental resources, which could in turn harm local people	■ A carpentry training project could encourage local deforestation which could affect soil quality and contribute to local crop failure ■ A sanitation project could pollute drinking water which could increase ill health
Projects may increase the exposure of local people to natural hazards	■ Clearing large areas of vegetation for farming can increase soil erosion, interrupt the water cycle, and increase the likelihood of drought ■ Clearing mangroves to provide access for fishing could expose a community to flooding and coastal storms
Project activities could be inappropriate and ineffective if environmental problems affecting local people are not also addressed	■ In an education project, children may stop attending school during a drought because they have to walk further to collect water ■ An HIV project may find the people it works with are affected by malnutrition due to local land degradation and poor harvests
Projects may not be completed or fail to bring sustainable change because activities are affected by environmental problems	■ Flooding or mudslides could destroy buildings constructed as part of a project ■ New wells may be polluted by chemical fertilisers and pesticides contaminating the ground water
Project costs may increase if the initial project design does not consider environmental issues because new activities may need to be brought in to keep the work on track	■ An HIV project may find that the people it works with require nutritional support during high rainfall when their vegetable gardens are flooded
Projects may lose the support of local or neighbouring communities if they cause harm to the environment	■ A project that pollutes a river and contaminates drinking water can affect people's health and fish stocks downstream. This could lead to conflict
Projects could miss opportunities to improve the local environment and community life	■ Rather than providing fans or air-conditioning in a new school, buildings could be designed to encourage natural cooling and trees could be planted outside to give shade to the classrooms

An environmentally sustainable project:

■ takes account of current and future environmental issues that may affect the project

■ avoids harming the environment

■ benefits the environment wherever possible

■ practises sustainable resource management – ensuring that environmental resources are used in a way that does not compromise their future availability and are being replaced over the same period.

5.2 How to carry out a basic environmental assessment

Once you have read this section, the basic environmental assessment can be carried out using the information in Parts 1 to 5.
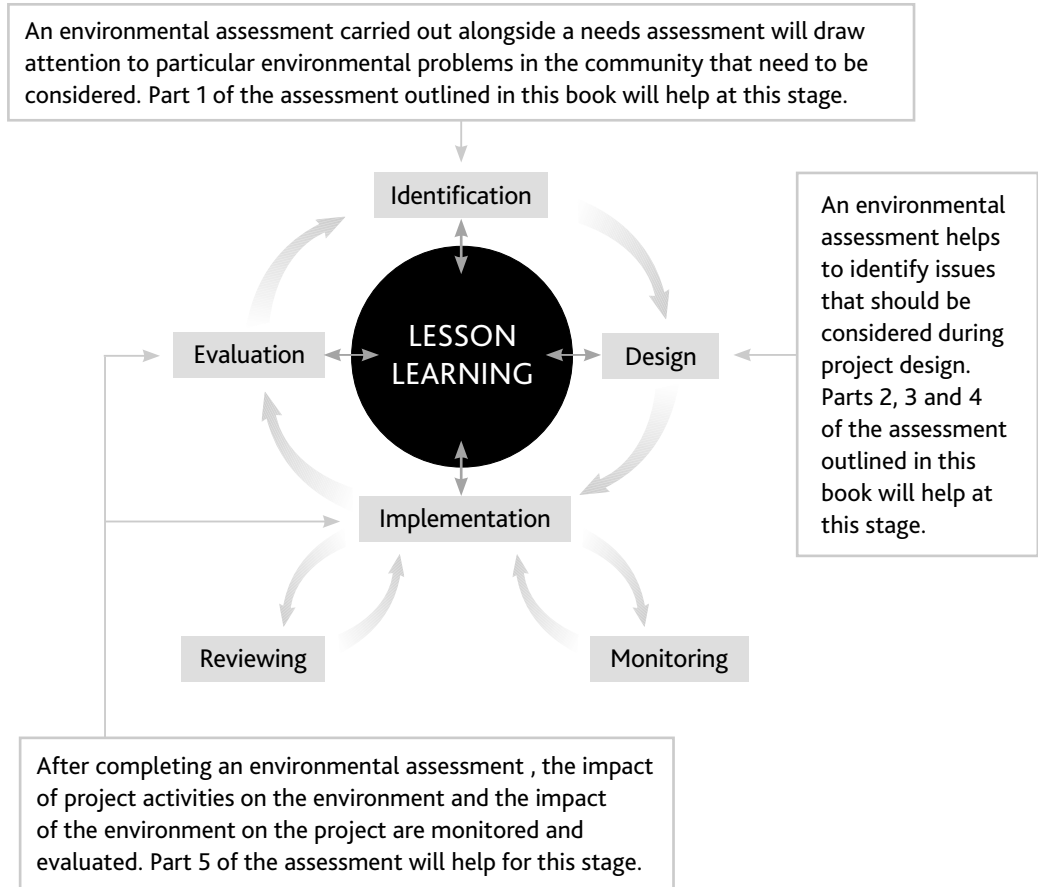
An 'environmental assessment' is a tool that can help us during the planning process to make our projects environmentally sustainable. Confusingly, the term 'environmental assessment' is used in many contexts and means different things to different people. Other related terms are environmental impact assessment, rapid environmental assessment, strategic environmental assessment and environmental analysis. These usually relate to different user needs and to different sizes of project, but are often used interchangeably which is confusing.

In this book we explain how to carry out a basic environmental assessment. It is intended for projects that do not appear to have a direct link with the natural environment. These include interventions in education, advocacy, health, gender, child development and support for people living with HIV. Projects that have a more obvious direct link with the environment may require a more detailed and thorough environmental assessment, which is usually carried out by a technical specialist. Examples include agriculture, water and sanitation, manufacturing projects that produce solid or liquid waste and those that involve the construction of buildings, roads, dams, etc.

This basic environmental assessment is designed to be completed as part of the project cycle. For more detail about the project cycle, see *ROOTS 5: Project cycle management*. The following diagram shows the links between the basic environmental assessment and the project cycle.

It is important to undertake an environmental assessment with the community so they contribute and are involved in decisions taken that affect the project design. The purpose and outcome of the environmental assessment should be explained. This is their community and they must own the knowledge that they share as part of the assessment. The original copy of the environmental assessment should remain in the ownership of the local community and copies should only be made with their permission. They will find the assessment useful to refer back to when undertaking other projects in the area.

How environmental assessment fits within the project cycle

An environmental assessment carried out alongside a needs assessment will draw attention to particular environmental problems in the community that need to be considered. Part 1 of the assessment outlined in this book will help at this stage.

Identification

LESSON LEARNING

Evaluation

Design

Implementation

Reviewing

Monitoring

An environmental assessment helps to identify issues that should be considered during project design. Parts 2, 3 and 4 of the assessment outlined in this book will help at this stage.

After completing an environmental assessment , the impact of project activities on the environment and the impact of the environment on the project are monitored and evaluated. Part 5 of the assessment will help for this stage.

After considering the impact of the environment on the project and the impact of the project on the environment, we may decide that we need to:

- adapt our project activities

- change the project location

- stop some project activities

- start new project activities.

Basic environmental assessment

The basic environmental assessment is carried out in five parts:

Part 1 Assess the current condition of the local natural environment

Part 2 Assess the impact of the environment on the project

Part 3 Assess the impact of the project on the environment

Part 4 Identify appropriate action

Part 5 Develop a monitoring and evaluation plan

PART 1 Assess the current condition of the local natural environment

Action

Read the Background section below, then complete Assessment part 1 on page 54.

Background

The project design should take into account the condition of natural environmental resources, and current and predicted pressures on the resources as a result of environmental degradation and climate change. The table opposite shows the most important natural resources that are needed for the wellbeing of community members.

Community discussion on environmental change

'The soil was more fertile 30–40 years ago.'

'It does not rain like it used to. Rains used to be a yearly average of 1000mm over six months but are now 600–700mm a year and over only three months. This means more intense rain runs off the land too quickly, washing away the fertile soil. Crops also fail as they need six months of rain to grow.'

'There is much less vegetation than there used to be and many plant and animal species have disappeared.'

'A cereal bank was set up 17 years ago. It was originally stocked by growing crops in a communal field, but now all the young men have moved to the city in search of work and the old men cannot keep up the work. ODE loaned them 300 sacks of grain to restart the cereal bank.'

'Rice prices have nearly doubled (from CFA12,000 to CFA20,000) over the last year.'

Comments gathered during an environmental assessment in Song-Naaba, Burkina Faso

Caroline Kassell Tearfund

Natural resources needed for community wellbeing

Natural resource	Main community use of the resource
Water Consider groundwater, rivers, lakes, sea, ponds Consider use of water for drinking and irrigation Consider water availability, quality and pollution	Drinking: for health and life Cooking: for health and life Washing and sanitation: for health and hygiene Irrigation: for food security
Land and soil Consider use of land: crop yields, livestock and waste disposal Consider soil cover and quality Consider soil erosion and contamination from fertilisers, industry or sewage	Growing crops to eat and for income Grazing livestock to eat and for income Land that is free from waste and contamination helps to retain health, creates a sense of wellbeing (no smells or bad views), enhances livelihoods (e.g. attracts people to visit shops) and protects biodiversity
Air Consider pollution from smoke, gas, chemicals or sewage; smog	Breathing clean and fresh-smelling air: for health and sense of wellbeing
Flora (vegetation) e.g. forest, shrubs, grass, agricultural crops Consider coverage of vegetation Consider use of vegetation, such as crops to eat and trees for timber Consider clearance of vegetation for grazing or building Consider the effects of deforestation and removal of mangroves or other natural resources	Shade: for preserving crops and preventing heat-related illnesses Preserving the natural water cycle Benefiting from nutrient-rich soil that flora coverage ensures: for growing crops to eat and for income Materials for building shelters and homes Wood for heating and cooking Personal safety as vegetation cover can prevent flooding and landslides
Fauna (animals, birds, fish, insects) Consider migration and depletion Consider pests and invasive species	Raising of livestock for food and income Fertilisation of crops and other plants

In some areas, certain natural resources have always been vulnerable, and local people will have developed ways of coping. For example, in a desert where water has always been in short supply, people may have nomadic lifestyles so they can move to wherever water is available at different times of the year. However, in many places, natural resources are experiencing new pressures as a result of human activity and climate change.

IMPACTS OF HUMAN ACTIVITY ON THE LOCAL ENVIRONMENT

It is normal for the environment to change gradually over time. However, human activity can bring rapid changes to the environment. Often these changes are negative. Environmental degradation is usually the consequence of past and present generations of people using up more natural resources than can be replaced during their generation. This could be driven by poverty, greed or ignorance about the damage being done. The table below lists the most common types of environmental degradation and the impacts they may have on other environmental resources and people's lives.

Degradation and its impact

Nature of environmental degradation	Impact
Land degradation Possible human causes: deforestation, fires, mineral abstraction, over-intensive farming and grazing, overuse of chemical fertilisers and growth or movement of populations.	Choking water run-off channels and flooding; destruction of natural vegetation and biodiversity; soil loss; declining crop yields; desertification; population displacement; increased health risks e.g. malaria; increased carbon emissions when fires are used to clear land.
Reduction in water availability Possible human causes: building dams, diversion of rivers, over-abstraction of water, inefficient irrigation.	Sedimentation and flooding; destruction of plants, trees, animals and fish; damage to livelihoods; conflicts about water use; increased risk of drought; reduced crop yields; increased workloads, especially for women; poor drainage and run-off of water; population displacement.
Reduction in water quality Possible human causes: chemical or sewage contamination and other pollution, poor community and local government management of water resources, destruction of natural coastal defences such as mangroves.	Decreased water quality; increased disease vectors; increased ill health; increased mortality; destruction of plants, trees, animals and fish; salinisation of soil and aquifers.
Deforestation Possible human causes: logging – to sell wood; land clearance – including through burning forest and shrubs.	Less availability of water (interrupted water cycle); soil erosion; flooding due to silting of rivers and water channels; landslides; destruction of plants, trees, animals and fish; destruction/ depletion of natural resources such as food, fuel, shelter and medicines; impact on livelihoods; increase in global carbon emissions due to removal of 'carbon sinks' (forests) or through burning forests (which emits carbon).
Desertification Possible human causes: overgrazing, land clearance, over-intensive farming and extensive logging.	Increased water scarcity; food insecurity; increased conflict; reduced water quality; displacement / disease; reduced biodiversity.
Loss of biodiversity Possible human causes: deforestation, over-abstraction of water, the destruction of natural resources due to conflict or building new roads, planting large areas of single crops, clearing the land surface of plant or crop waste.	Natural water barriers and soil retention harmed; rapid water run-off; soil degradation due to altered nutritional quality of soil; loss of agricultural livelihoods and other livelihoods dependent on natural resources; poverty; ill health; loss of breeding or migration routes for flora and fauna; conflict between communities.
Pollution Including pollution to land, air and water from industry, sewage, solid waste and farming chemicals.	Decreased water quality; contamination of water resources, increased vulnerability in a drought; decreased crop yields; increased ill health – respiratory diseases; increased mortality; acid rain; smog; destruction of plants, trees, animals and fish.

IMPACTS OF CLIMATE CHANGE ON THE LOCAL ENVIRONMENT

Climate change threatens every aspect of development. It will cause ongoing stresses such as rising temperatures and extreme weather. The impact of these stresses on the local environment will make existing problems worse, such as food insecurity or lack of access to safe water. Climate change will also increase the frequency of hazards such as floods, landslides and droughts, and the severity of cyclones (hurricanes/typhoons).

Sometimes, impacts of climate change may be beneficial. For example, temperature rises may lead to better crop conditions in cooler mountainous areas. However, these benefits may only be temporary and such areas are likely to also experience negative impacts of climate change. The table below lists the likely impacts of climate change. Only some of these will be experienced in any one particular location.

Likely impacts of climate change

Nature of climate change	Likely impact
Increased temperatures	Reduced agricultural yields in some warmer regions; new crop possibilities; increased number of crop pests; increased risk of wild fires; increased water demands; increased yields in some crops; loss of biodiversity; water quality problems; increased mortality due to heat and disease including malaria; more flash floods due to melting glaciers.
Increased rainfall with changes in distribution and intensity	More floods, or floods at different times of year; damage to crops; soil erosion; inability to cultivate land due to water logging of soils; adverse effects on quality of surface or groundwater; contamination of water supply; increased risk of deaths, injuries, infections, respiratory and skin diseases; disruption of settlements, commerce, transport and societies due to flooding; pressure on urban and rural infrastructure; loss of property.
Increased droughts	Increased risk of food or water shortage; increased risk of malnutrition and famine; increased risk of diseases / deaths; more widespread stress on water quality, supply and availability; lower water table causing wells to dry up; desertification; soil degradation and lower crop yields / crop damage or failure; increased livestock deaths; increased risk of wild fire which could cause destruction of infrastructure, homes and livelihoods and would lead to increased carbon emissions; conflicts about water or other natural resources; increased displacement of people; reduction in tourism; reduced fish stocks or fishing areas.
Increased severity of cyclone and storm surges	Increased risk of deaths and injuries; damage to infrastructure, assets and livelihoods; damage to water and sanitation systems; pollution of water sources; increased disease; loss of livestock; damage to crops and trees; destructive mudslides; disruption of settlements, commerce, transport and societies; increased displacement of people; tourism disrupted.
Sea level rise and more frequent and severe floods	Increased risk of deaths and injuries; increased coastal erosion and land loss; potential for displacement of populations and infrastructure; salinisation of soils, irrigation water, estuaries and fresh water systems and decreased freshwater availability; increased displacement-related health effects; greater vulnerability to storms, hurricanes and tidal surges leading to loss of assets, infrastructure and livelihoods.

The aim of this part of the assessment is to understand the environmental issues in the community where the project will be implemented. This can be carried out alongside or as part of a needs assessment ('identification phase' of the project cycle) or as part of the research carried out after a project has been identified ('design phase' of the project cycle). The information produced will be useful during parts 2 and 3 of the assessment when the project itself is the focus.

Action

- Copy the table below, or photocopy the template on page 91. For office based projects, consider the immediate surroundings. For community based projects in rural areas, walk around the project site with community representatives.

- Note the positive and negative conditions of each type of natural resource. The table on page 51 provides many useful ideas of what to assess.

- To identify stresses on each resource, it can be helpful to ask the following questions:
  - Is the resource being used in a non-renewable way?
  - Is the resource being affected by environmental degradation and changes in the climate, and are the impacts likely to get worse?
  - Is the community highly dependent on the resource? Why?
  - What is the probability that increased stress on the resource will occur?
  - Is the stress likely to last a long time?

Assessment part 1

Natural resource	Notes on condition of the resource
Water	
Land and soil	
Air	
Flora	
Fauna	
Other, such as clay, coal, minerals	

The table below shows some examples of the notes that could be written. In a real assessment, it is likely that there will be more notes for each resource.

Natural resource	Notes on condition of the resource
Water	■ The local well has dried up on several occasions due to low rainfall. The nearest alternative drinking water supply for the community is three miles away.
Land and soil	■ Soil in the region is less fertile because livestock numbers have fallen due to lack of rain. There is therefore less manure to use as fertiliser. ■ Higher temperatures and less rain mean increased crop failures and higher food prices.
Air	■ Smoke from a factory nearby sometimes pollutes the air, causing coughing and sore eyes.
Flora	■ There is a well managed forest nearby, providing good supplies of firewood. ■ Household plots are growing well, despite heat and lack of rain. ■ Grazing land is over-grazed leading to soil erosion. ■ Five species have been identified as having completely disappeared from the area during the last seven years.
Fauna	■ Health of livestock is deteriorating because there is not enough water for them to drink. ■ Meat supplies are more expensive and often unavailable. ■ With increased population density, the hunting of wild animals for meat has greatly reduced stocks, and is impacting on biodiversity. ■ Three species of bird are no longer seen in the area.

If time allows:

■ Conduct interviews or participatory discussions with people living on or near the project site, including those whom the project serves. Ask open questions such as 'What is the quality of water like at the moment? How has it changed over the last ten years / since you were a child?' Ask the same questions with different people to build up a fuller picture of changes.

■ In order to ensure that what we observe and are told is valid, we can consult scientific records about the condition of the resources in the local area and the impact of climate change and environmental degradation. These can be found in some local government offices, university libraries and obtained from other development organisations.

The Tearfund tool CEDRA provides more details on carrying out scientific research (see www.tearfund.org/tilz).

PART 2 Assess the impact of the environment on the project

Action

Read the Background section below, then complete Assessment part 2 on page 58.

Background

The aim of this part of the assessment is to consider the impact that the environment may have on the project. This requires thought and discussion because sometimes the link is not immediately obvious. Here are some examples.

EXAMPLE 1 A health project may be put under pressure as a result of over-intensive farming. This is because:

Over-intensive farming is leading to soil infertility

Soil infertility is leading to crop failure

Crop failure is increasing malnutrition levels

Malnutrition rates increase and the health project struggles to cope with serious cases of child malnutrition
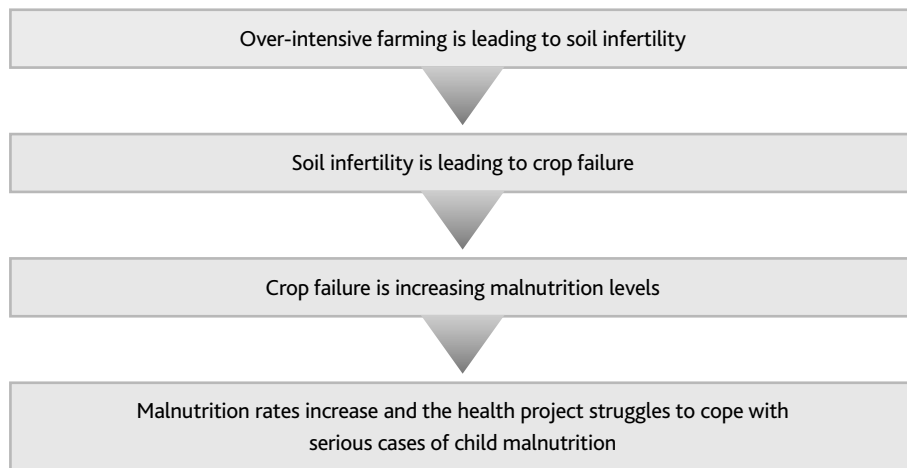
EXAMPLE 2 An education project could become less effective due to the development of a dam up-stream. This is because:

The building of the dam is reducing the flow of water downstream to the community

Community members have to walk three miles further to collect water

Children go to fetch water rather than attending classes
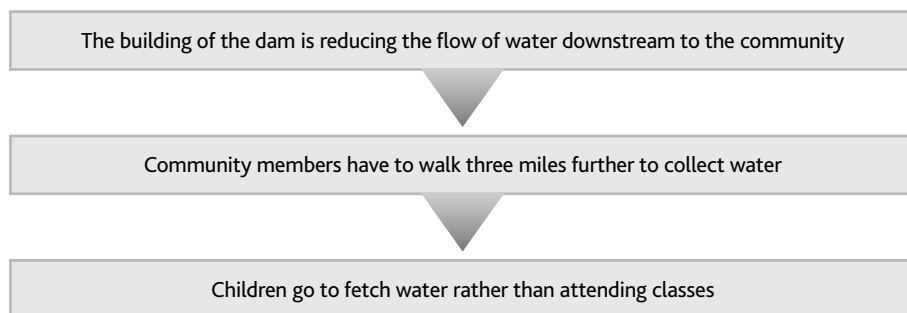
EXAMPLE 3   An enterprise development project could fail due to the cutting down of coastal mangroves. This is because:

Lack of mangroves means that tidal flooding reaches further inland

▼

Tidal flooding undermines the foundations of new hotel buildings and contaminates fresh water supplies

▼

Tourists are discouraged from visiting the area, so there is no market for the project's products
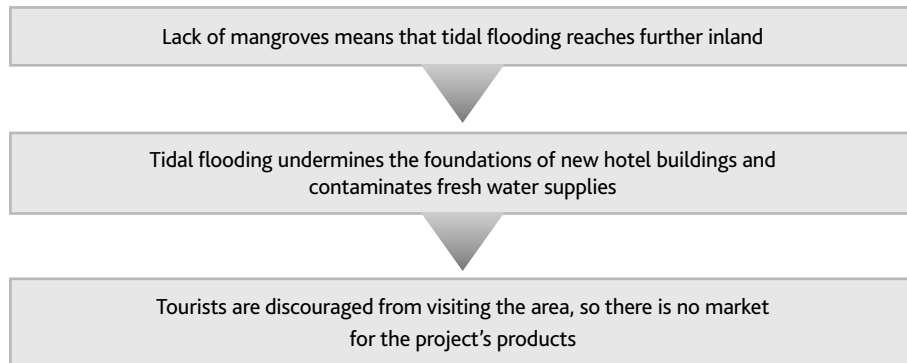
This part and the next part of the assessment are useful when a logical framework or action plan are being developed during the design phase of a project.

■ The logical framework lists key activities that will lead to achieving project outputs that will in turn achieve the project's purpose. The issues identified in this part of the assessment could be inserted into the 'assumptions' column of the logical framework.

■ The action plan lists more detailed activities that will need to be included as part of the key activities in the logical framework. For more information about these, see *ROOTS 5: Project cycle management*.

This part and the next part of the environmental assessment should consider activities listed in both the logical framework and the action plan.

Action

■ Copy Assessment part 2 on page 58, or photocopy the template on page 92.

■ Refer to the project's logical framework or action plan and transfer all the activities into the left-hand column of the table.

■ Refer to the information collected in part 1 of the assessment. For each activity, consider the environmental impact that could affect the activity. The impact could be positive or negative and they could be current or predicted for the future. Provide details of the impact in the right-hand column. It is possible that some activities will not be impacted by the environment.

Assessment part 2

Project activities	Impact of environment on activities

EXAMPLE of part 2 in use

This example relates to a project that provides support for children and young people affected by HIV. It will consist of a safe area for young children to play. There will be opportunities for children to play and learn about hygiene and nutrition after school. There will also be a workshop where school-leavers can learn carpentry skills.

Project activities	Impact of environment on activity
Manage community centre	The community centre is located near some diseased trees which could fall on the building
Put up new walls in the community centre to provide a play room, a workshop, toilet facilities and a project office	The smaller rooms may become too hot and will get even hotter if temperatures continue to increase Reduced water supplies may impact on hygiene at the centre
Decorate the new rooms	None identified
Employ staff to run the centre	Increased flooding may make it difficult for staff to reach the centre
Buy equipment for the office and the play room	None identified
Clear a small area of land outside the community centre for growing vegetables	There is a plot of land that could be used, but it has not been farmed for some time due to lack of fertility Rainfall may be too low and unreliable for growing vegetables
Buy wood materials for the workshop	The well-managed forest nearby provides a sustainable source of timber
Train ten young people in carpentry	Since farming has become harder over the last few years, many young people are leaving the community as soon as they leave school hence reducing the potential number of students

PART 3   Assess the impact of the project on the environment

Action

Read the Background section below, then complete Assessment part 3 on page 60.

Background

The table on page 51 shows the main natural resources upon which communities rely. If our projects harm these resources, use them in a non-renewable way or put extra pressure upon the resources, then our intervention could fail and the people we are seeking to serve could suffer.

Natural environmental resources are either renewable or non-renewable:

- Renewable resources can replenish themselves. Some are living (such as fish, animals, plants and trees). Soil and water are also renewable. These resources, if used within reasonable limits, are replaced. However, if renewable resources are consumed at a faster rate than they can replace themselves, they will disappear, unless we intervene. Some renewable resources are not affected by human activity and cannot be exhausted, such as the sun, tides, wind and the heat inside the earth.

- Non-renewable resources such as rock, oil or gold, exist in fixed amounts and cannot be regenerated. The main example is fossil fuels (coal, oil and natural gas), which form under the ground.

Recent rapid increases in global warming are primarily caused by the use of fossil fuels and deforestation. For more information, see Section 1. We should be aware of our greenhouse gas emissions and try to reduce them wherever possible.

SUSTAINABLE RESOURCE MANAGEMENT (SRM) is one approach that can help us to make sure our projects do not harm the environment or climate, and even do some good. SRM prevents or at least reduces environmental degradation. SRM means ensuring that environmental resources are used in a way that does not compromise their future availability, and ensuring that what is used is within the amount that is being replenished over the same period. For example, sustainable fishing of a lake would involve catching fish without damaging the capacity of breeding fish stocks to replace the fish that are caught.

Efforts to manage resources sustainably have developed over generations and have often become traditional practices that are part of everyday life in many communities. We should be aware of the impact of our projects on local sustainable resource management and wherever possible protect and support those practices.

Here are some examples of how some local natural resources can be impacted by project activities. Activities can be unsustainable, or can be made sustainable or positively beneficial. Notice how little may need to be done to make an activity sustainable or beneficial in its impact.

Activity	Unsustainable impact	Sustainable impact	Positive impact
Clear site area	Removal of trees	Replace each tree elsewhere in local area	Plant more trees than are removed
Develop household gardens	Use of chemical fertilisers to help vegetables to grow, which has long-term effect on soil and ground water quality	Use organic compost to help vegetables to grow	Grow legumes to improve soil quality Rotate crops Plant trees or shrubs to protect vegetables and soil – this will also benefit other environmental resources
Buy wood	Timber comes from unmanaged forests	Ensure timber is sourced from sustainable sources or replant adjacent to project site	Use timber from sustainably managed forests and plant additional trees
Transport of staff and materials to project site	Release of greenhouse gases from transport	Source building materials as locally as possible Encourage staff to use bicycles, public transport or share transport, and limit the number of visits to project site if possible	Project is expanded to form a sustainable closed loop agriculture project where crop is used locally for food and animal feed. Waste parts of the crop are converted to biodiesel to run the new community bus

Action

The aim of this part of the assessment is to consider the impact that project activities may have on the environment.

- Copy Assessment part 3 below, or photocopy the template on page 93, and transfer all the activities in the logical framework and activity plan to the left-hand column. Alternatively, add a column entitled 'impact of activity on environment' to the right of Assessment part 2.

- Refer to the information collected in part 1 of the assessment. For each activity, write down the impact that it could have on the environment. These impacts could be positive or negative.

- In addition, consider transport usage (fuel consumption) and levels of waste. In some projects these will be the areas where the project has the most impact on the environment.

Assessment part 3

Project activities	Impact of activity on environment

EXAMPLE
of part 3 in use

This example follows on from the example used in part 2.

Project activities	Impact of activity on environment
Manage community centre	
Put up new walls in the community centre to provide a play room, a workshop, toilet facilities and a project office	The walls use wood, depleting local forests Toilet facilities could impact local land and water quality This work could produce a lot of waste
Decorate the new rooms	Left-over paint could pollute land and water quality Flooring materials will be needed
Employ staff to run the centre	Environmental impact through travelling to work
Buy equipment for the office and the play room	Cheaper play equipment is plastic and imported, creating greenhouse gas emissions during manufacture and transport Broken computers and similar equipment will be difficult to recycle Offices could use a lot of paper and energy
Clear a small area of land outside the community centre for growing vegetables	Shrubs and grass may need to be removed Vegetables need a lot of water that will impact on supplies that are already limited The land could become more fertile if vegetable crops are rotated
Buy wood materials for the workshop	Use of wood could lead to local forest depletion if not sustainably managed
Train ten young people in carpentry	The presence of trained carpenters could encourage local people to buy more wood products. This demand for wood could negatively affect local forest resources or it could raise the value of forests meaning they become better sustained

PART 4   Identify appropriate action

Action

Read the Background section below, then complete Assessment part 4 on page 63.

Background

Parts 2 and 3 of the assessment helped us to identify the main ways in which our project is affected by the environment and the way it impacts on the environment. In part 4 of the assessment we consider ways that we can make the project more environmentally sustainable.

Often the changes we can make will be obvious as soon as we have identified the environmental impacts. Sometimes research or discussion with the community or a technical specialist may be needed to identify appropriate ways to change activities. For example:

- In a livelihoods project we may realise that the enterprise is dependent on a particular natural resource which is under threat. We could discuss with community members what other types of enterprise might be more appropriate and consider whether we can take action to protect the natural resources.

- In a food storage project we may decide to build the grain store on stilts to protect it from flooding.

- In an education and literacy project, we could choose to have classes that look at environmental issues in order to enable our project to have a positive environmental impact.

We may need to bring in new activities to deal with impacts that threaten the project. These can be added to the logical framework as a risk management plan. For example:

- In areas prone to storms and flooding, we may want to consider the location, design and orientation of the buildings.

- In a health project, we could train health workers in diseases and health issues which are likely to increase as a result of climate change.

- In areas prone to drought, we may want to consider rainwater harvesting for a community centre or tree planting to improve the local micro-climate.

It will not always be possible to address all of the issues identified in parts 2 and 3 of the assessment. It is best to identify those that will have a major impact on the success of the project. Time and costs also need to be taken into consideration.

Action

- Examine the table or tables completed in parts 2 and 3 of the assessment. For each activity, ask the following questions:
  - Should we proceed with the activity? If not, will this affect the entire project? Could we move the project to another location?
  - Do we need to alter the activity so that negative impacts from the environment are avoided or reduced? If so, how would we do that?
  - Do we need to alter the activity so that the impact on the environment is positive? If so, how would we do that?

- Consider whether any new activities could be introduced to address some of the impact.

- Discuss potential actions with community members and, if possible, with professional experts such as government technical advisers or other development workers.

- Choose which actions to take, based on criteria that are important to the local community and the organisation.

- Incorporate actions into existing action plans or by revising the logical framework. Alternatively, create an action plan which outlines what needs to be done, who will do it, and a completion date.

Assessment part 4

Project activities	Impact of environment on activity (part 2)	Impact of activity on environment (part 3)	Appropriate actions (part 4)

EXAMPLE of part 4 in use

In the example below, most of the actions could realistically be carried out. Some of these involve doing things differently, such as sourcing materials locally. Others involve new activities such as harvesting rainwater.

Project activities	Impact of environment on activity (part 2)	Impact of activity on environment (part 3)	Appropriate actions (part 4)
Manage community centre	The community centre is located near some diseased trees which could fall on the building		Cut back branches, or cut down trees and plant new ones
Put up new walls in the community centre to provide a play room, a workshop, toilet facilities and a project office		The walls use wood, depleting local forests	Source wall materials sustainably
		This work could produce a lot of waste	Ensure that building waste is disposed of responsibly
	The smaller rooms may become too hot and will get even hotter if temperatures continue to increase		Plant trees around the building to provide shade
	Reduced water supplies may impact on hygiene at the centre	Toilet facilities could impact local land and water quality	Choose an appropriate location and technology for toilets
			Harvest rainwater
Decorate the new rooms	None identified	Left-over paint could pollute land and water quality	Ensure that paint is disposed of responsibly
		Flooring materials will be needed	Find local and sustainable sources of flooring materials
Employ staff to run the centre	Increased flooding may make it difficult for staff to reach the centre	Environmental impact through travelling to work	Try to recruit local staff

table continues

63

Part 4 continued

Project activities	Impact of environment on activity (part 2)	Impact of activity on environment (part 3)	Appropriate actions (part 4)
Buy equipment for the office and the play room	None identified	Cheaper play equipment is plastic and imported, creating greenhouse gas emissions during manufacture and transport	Try to find play equipment that is durable, made from natural materials and sourced locally
		Broken computers and similar equipment will be difficult to recycle	
		Offices could use a lot of paper and energy	Raise awareness among staff of the need to conserve resources
Clear a small area of land outside the community centre for growing vegetables	There is a plot of land that could be used, but it has not been farmed for some time due to lack of fertility	Shrubs and grass may need to be removed	
	Rainfall may be too low and unreliable for growing vegetables	Vegetables need a lot of water that will impact on supplies that are already limited	Consider the use of wastewater for watering vegetables
		The land could become more fertile if vegetable crops are rotated	Consider the use of vegetables that need less water and rotate with other crops to maintain soil fertility
Buy wood materials for the workshop	The well managed forest nearby provides a sustainable supply of timber	Use of wood could lead to local forest depletion if not sustainably managed	Ensure that wood comes from local sustainable forests
Train ten young people in carpentry	Since farming has become harder over the last few years, many young people are leaving the community as soon as they leave school hence reducing the potential number of students	The presence of trained carpenters could encourage local people to buy more wood products. This demand for wood could negatively affect local forest resources or it could raise the value of forests meaning they become better sustained	Advertise the training as soon as possible, before more young people move away
			Consider training young people in a different kind of skill

PART 5   Monitoring and evaluation

Monitoring and evaluation help us to measure the effectiveness of our work. Based on the project's logical framework, monitoring and evaluation assess to what extent the goal, purpose and the various outputs, have been met.

MONITORING is carried out while the activities are being implemented. It enables us to ensure the activities are being carried out appropriately and are yielding the intended results. It also enables us to measure the environmental changes that are taking place. It is important to take these changes into account, because they may threaten the project. Monitoring can involve:

■ informal observation of environmental conditions by community members, such as decreasing depth of water in wells, amount of sediment in streams, frequency of heavy rain storms

■ structured monitoring such as field surveys or collecting and testing samples to identify changes in environmental conditions and the presence of pollutants.

As a result of the findings we may need to improve activities, stop activities or introduce new activities.

EVALUATION is carried out when the implementation phase of a project or activity has ended. It finds out whether the intended benefits have been achieved, whether there were any negative outcomes and what lessons can be learnt.

Action

Monitoring and evaluation of the environmental issues related to projects should be integrated with monitoring and evaluation of the project as a whole. For more information about monitoring and evaluation of projects, see *ROOTS 5: Project cycle management.* Here we outline how the environmental assessment can be used.

■ Use the information collected in Parts 1, 2 and 3 of the environmental assessment as a baseline. This means that progress can be measured against what the situation was at the beginning of the project.

■ Consider how, when and by whom the following will be monitored and evaluated:

• the impact of the project on the environment (positive, neutral and negative). Individual activities that aimed to reduce the impact should be considered.

• the impact of the environment on the project (positive and negative). Individual activities that aimed to reduce the impact should be considered. Note that it is difficult to measure activities related to possible future environmental impacts if the hazard has not yet occurred. In this case, we should not think our activity was not needed. Instead, we should consider whether the hazard is still likely.

■ If any negative impacts are found after monitoring, consider whether the activity needs to be adjusted or stopped, or whether a new activity should be introduced.

■ Use the findings of the final evaluation to learn for next time. Consider what did and did not work. Consider whether the problems were due to the location or whether they should be considered in all other projects that the organisation carries out.

SECTION 6

Using advocacy to help protect the environment

Advocacy is about influencing people, policies, structures and systems in order to bring about change. It is about communicating with those in power and persuading them to act in more just and equitable ways. At the core, it is about building relationships. It is about tackling the root causes of poverty and promoting justice. Advocacy can be done by, with, or on behalf of, those affected by injustice. Anyone can carry out advocacy work – it should not be left to professionals or experts.

An example of an advocate is Queen Esther in the Bible. The people asked her to represent the Jews before the King because she had the relationship with him. She had the potential to influence him for the greater good. Like her, we can influence people in power when we have a relationship with them and the potential to influence them.

Advocacy involves action or processes that can complement other development work. It is critical in relation to environmental issues because many environmental problems cannot simply be addressed by good development practice within communities. For example:

■   if a community is suffering because of environmental pollution by a local factory, it may be appropriate to address the problem through advocacy work. Advocacy work at the local level would involve influencing the decision-makers in the factory through showing them the impact of the pollution, and asking them to stop the pollution. This can be done positively by explaining the health benefits of no pollution. At the national level, advocacy might involve asking for changes to the laws related to pollution by industry.

■   as climate change is a global problem, governments around the world need to work together to find a solution. Development organisations can support national governments by carrying out research and collecting data related to local impacts of climate change. There may be opportunities for some organisations to attend international meetings to talk to delegates from many different countries about the problem of climate change.

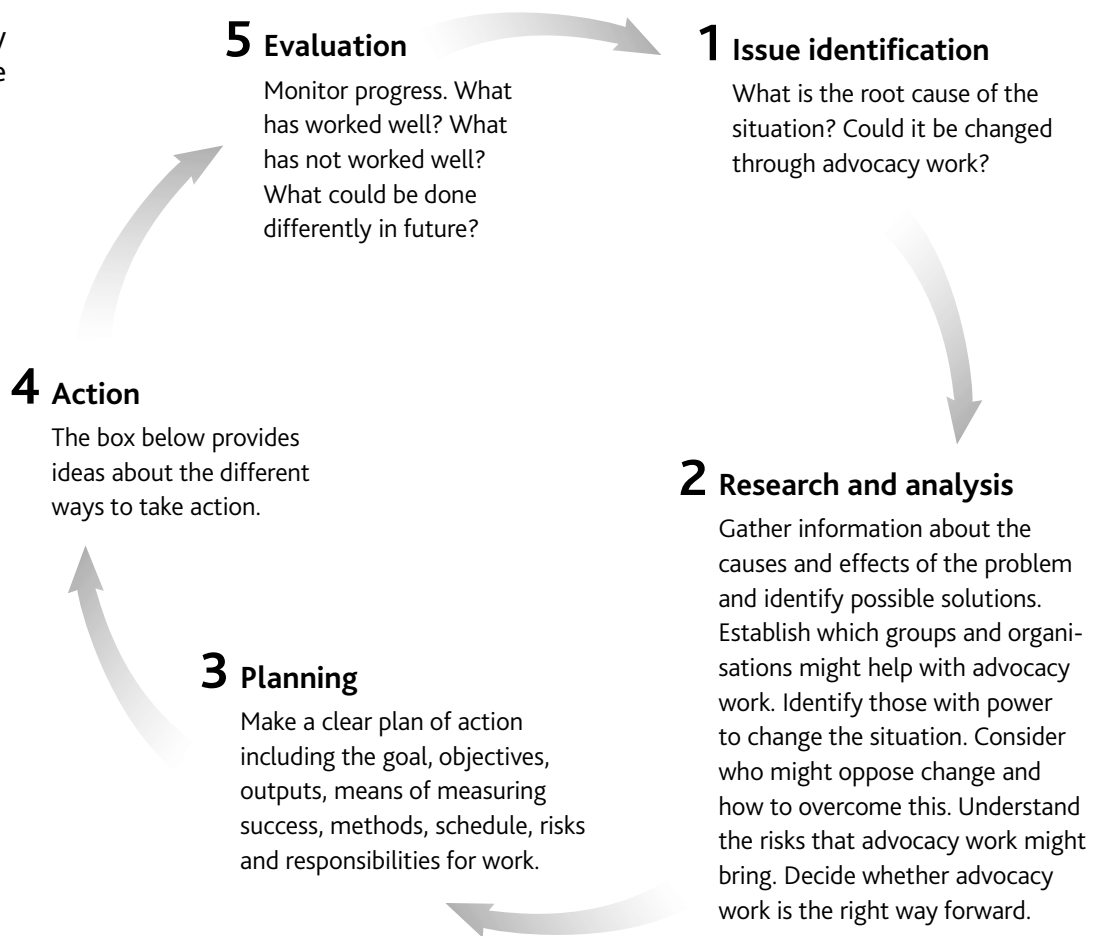## 6.1   Introduction to advocacy

It is part of the mission of the church to carry out advocacy work through speaking out against injustice, defending the cause of poor people, holding those in power to account, and empowering people to speak out for themselves. Advocacy is a way of showing that our God is a God of justice. Advocacy:

■   tackles root causes of poverty and injustice and brings long-term change

■   sees people as agents of change in their own communities

■   can help to generate more resources for development work

■   can change power structures and systems of injustice.

Advocacy work includes many different activities, such as those mentioned in the diagram below. It can be carried out alone, with a group of people, or as part of a network, coalition or alliance. It can be a one-off intervention or an ongoing process. Whatever the context and whatever the advocacy looks like, there will always be a relationship at its core.

Effective advocacy work requires planning. It works best when it fits around, and complements, other development work, and when it concerns an issue that is central to the entire work of an organisation or church. The advocacy cycle below shows the stages that need to be considered before going ahead with any advocacy work.

The advocacy cycle

5 Evaluation

Monitor progress. What has worked well? What has not worked well? What could be done differently in future?

1 Issue identification

What is the root cause of the situation? Could it be changed through advocacy work?

4 Action

The box below provides ideas about the different ways to take action.

2 Research and analysis

Gather information about the causes and effects of the problem and identify possible solutions. Establish which groups and organisations might help with advocacy work. Identify those with power to change the situation. Consider who might oppose change and how to overcome this. Understand the risks that advocacy work might bring. Decide whether advocacy work is the right way forward.

3 Planning

Make a clear plan of action including the goal, objectives, outputs, means of measuring success, methods, schedule, risks and responsibilities for work.

For more information about how to plan and carry out advocacy work, see *ROOTS 1 and 2: Advocacy toolkit*.

Some examples of advocacy methods

DIRECT INFLUENCING (sometimes called lobbying)

This is about increasing the awareness of someone in a position of power about an issue and suggesting potential solutions. It is important to provide them with information and evidence to support your argument. Direct influencing can be done orally or in writing. It could involve writing letters to officials, or it could involve meeting with them individually or in public meetings. Relationship-building is often an effective activity. It is important to include people who are directly affected by an issue in influencing those in power, whether that means involving them in research, consulting them about what needs to be done, or enabling them to speak directly to those in power.

MOBILISING THE PUBLIC (sometimes called campaigning)

This is about telling the public about a situation – the problem and the potential situation – so that they are encouraged to take action. Sometimes this involves telling people about how a situation may affect them. It could include arranging public meetings, taking part in demonstrations or marches, writing newsletters, asking people to sign petitions, or preaching. Methods that are appropriate in some countries may not be appropriate in others. For example, public demonstrations may be appropriate in some countries but ineffective or dangerous in others.

MEDIA

This is about informing people about a problem, identifying those who are responsible, and suggesting solutions for those who have the power to change the situation. Media work could include writing an article or letter for a newspaper or magazine, talking on the radio or TV, telling journalists about the situation or producing a press release.

PRAYER

Prayer should support every kind of action – prayer for advocacy can happen in small groups, at a church service or individually. Prayer is one of the things that makes Christian advocacy work distinctive. We can also pray about issues on which we lack the capacity or opportunity to carry out advocacy.

Advocacy is not about confrontation; in fact quite the reverse. The best advocacy very often involves gently influencing those with power to bring about change. It is important to first find issues which you both agree on. Spend time supporting them and building good relationships. Once you have done this they are more likely to be sympathetic to your requests for changes in other areas.

The rest of this section focuses on particular environmental issues and how advocacy can be used to make a difference.

6.2 Advocacy and sustainable management of natural resources

Good management of forests, fresh water, pastures, soils and other resources is essential if communities are to develop in ways that do not damage their natural environment. There is increasing competition for land, wood for fuel or for timber (industry and export) and for water for drinking, agriculture and industry. These challenge efforts to manage the natural environment so that it does not become depleted and damaged.

When deciding to carry out advocacy in relation to this issue, it is very important that the causes of a particular problem impacting a community or country are fully analysed (see Section 4). Usually, government responsibility for resource management is divided between different departments and administrative levels. Understanding the most effective way to use advocacy is therefore very important. Sometimes resource management issues can result in conflict between local people and large multinational companies, with government sometimes taking the side of the companies. Resource management issues can also cause conflicts within communities as people struggle for scarce resources such as water or land.

Problems related to natural resources are usually interconnected – what happens to forests affects water supplies and soil qualities and so on. Communities may only experience impacts in relation to one resource, but the resources in other communities may also be affected.

Getting involved in advocacy on natural resource management

Advocacy on natural resource management can be an effective area of advocacy work for local communities who may be affected by problems such as the management of surface or ground water, or deforestation. Severe problems arising due to drought and floods, as well as ongoing issues, such as the distribution of water between small farms and commercial enterprises, could be addressed.

Consider how to develop the capacity of communities that feel strongly about such issues and help them to speak out. Consider also how to work with other stakeholders such as people from environmental or conservation organisations. Although they may have a different perspective, they bring valuable expertise related to managing resources and preserving biodiversity. Be aware that the more complex the issue, the more stakeholders there tend to be. This may also mean many conflicting priorities, so be careful when deciding who to work with.

Once you have identified the issues on which to advocate and the causes of the problem, consider the following questions:

■   Does the government have national laws to protect forests or land ownership? Or to protect and manage lakes, rivers and groundwater? If not, can we campaign for laws to be put in place?

■   If there are laws, do the authorities have the capacity to implement them and effectively manage natural resources? Is advocacy needed for more funding from government or better regulation about how money is spent? Is there potential to help local authorities understand the issues, so that they can influence the national government about providing the money and spending it wisely?

■ If there are laws, are they enforced by local and national governments? Could we bring a case in the courts if we think a law is being, or will be, broken?

■ If business (whether local, national, or international) is damaging natural resources or preventing community access to them, should we target the company itself, by boycotting their goods and services or by protesting?

■ Can we use the media to persuade the government to take action by exposing environmental damage?

Then develop a plan, identifying your goals and targets, and work out what advocacy methods are appropriate.

6.3 Advocacy and waste management

The issue of waste, such as rubbish and excreta, overlaps with natural resource management. If waste is not properly managed it can cause damage to water supplies, reduce soil or air quality over time and attract disease carriers such as rats. The best solution to the rubbish problem is to avoid creating it in the first place. However, we all need to produce some rubbish, and disposal of excreta is an issue for every living person. Waste management is often a challenge. Leaving rubbish on the street can be a health hazard; burning it pollutes the air; dumping it in rivers or lakes pollutes water and can damage fish stocks; and burying it pollutes the soil and the water supply, causing long lasting pollution that is difficult to clean up. Local and national governments should have clear strategies related to how they deal with rubbish, and how human excreta are processed, to avoid polluting the environment.

Advocacy related to waste management could therefore include ensuring the provision of improved sanitation facilities, or ensuring the safe collection and disposal of rubbish. We can also advocate for a reduction in the amount of rubbish people need to throw away by challenging shops on the amount of packaging (especially plastic) they produce and by encouraging people to recycle their rubbish.

There is often a need for local level education to raise awareness of the need for effective and safe sanitation. We can raise awareness of the need to address the problem of sanitation and encourage advocacy at local and regional level.

CASE STUDY

LA MOYA ECOLOGICAL RESERVE

Ayaviri is a small town in the Andes mountains in Peru. It surrounds an ecological reserve called La Moya. Two indigenous communities live on the edge of La Moya. In recent years, the reserve has become polluted:

- People from the town dump their rubbish there.
- People wash their clothes in the river because running piped water is available for only a few hours each day in Ayaviri.
- People use the green space for sports, which is turning some of the reserve to dust
- Ayaviri is on a slope, and there is no drainage system to stop all the dirty water and rubbish from the town flowing into the reserve.

Pastor Eron from the Bible Institute of Ayaviri started raising awareness about the need to protect the reserve. Tearfund partner organisation Paz y Esperanza (Peace and Hope) helped the Bible Institute to produce awareness-raising materials and to plan for change. As a result of their campaign, the mayor passed laws to prevent the dumping of rubbish in La Moya reserve and to establish an 'ecological patrol' which will guard the reserve and fine people for dropping litter or urinating there. The Bible Institute also mobilised local people to clear rubbish from the reserve and distribute leaflets to urge people to protect their local environment. Regular environmental education programmes were broadcast on the local radio.

Local people are now much more aware of the need to protect La Moya. There is still work to be done to address some of the underlying causes, such as providing alternative places to put rubbish, and stopping infected and polluted water flowing into the reserve. Advocacy related to these issues continues.

Getting involved in advocacy on waste management

When thinking about getting involved in advocacy on waste management, here are some questions you could consider:

- How is rubbish collected and disposed of locally/nationally? Are there laws governing this, and are they enforced? Who is responsible locally, and are they effective? If not, why not?
- Are people aware of the problems caused by dumping rubbish, and do they need to be educated about the need to protect the environment from pollution?
- How is human excreta dealt with? Who is responsible, and are there any laws in place? Are people aware of the health hazards of open defecation?
- Millennium Development Goal (MDG) 7 is about ensuring environmental sustainability. It includes a target to 'Reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation'. Micah Challenge is a Christian Alliance working on the MDGs with national campaigns in many countries. Why not work with them to ensure the government improves access to safe water and sanitation (www.micahchallenge.org).

Then develop a plan, identifying your goals and targets and work out what advocacy methods are appropriate.

CASE STUDY

> ### A CO-COMPOSTING PLANT IN KUMASI, GHANA
>
> Urban environmental sanitation is a serious issue for governments in most developing countries. The city of Kumasi in Ghana has one million inhabitants. It used to have ineffective sanitation systems. In 1999, the government approved an Environmental Sanitation Policy to encourage local authorities to regulate environmental sanitation and prevent pollution, allowing them to use decentralised and simple methods.
>
> Co-composting means the composting of two or more raw materials together. In Kumasi, solid waste from rubbish and faecal sludge were used. The higher temperatures reached during the composting process kills diseases. The composting results in a safe soil conditioner and fertiliser.
>
> A pilot plant was established in 2002 at Buobai, 15km from Kumasi. Here there are tanks to collect the sewage and waste, a composting area, a packaging area and offices.
>
> It takes between 10 and 12 weeks to process the waste into compost. There is high demand for compost in the Kumasi area, mainly from farmers. However, the price they are willing to pay is less than the production costs, mainly because there are also plentiful supplies of poultry manure. The findings of a pilot study indicated that the ideal production size of a co-composting unit would produce between ten to 45 tons of compost a year.
>
> Co-composting is an effective way of dealing with human faecal waste. However, a good marketing strategy is necessary to encourage sustainability.
>
> Adapted from a report by Anthony Mensah, Olufunke Cofie and Agnes Montangero, Ghana

6.4 Advocacy and sustainable energy

Energy is critical for development. Lack of access to clean, sustainable energy sources can result in many environmental and non-environmental problems. Poor communities need access to financial resources and technology to enable them to develop sustainably.

Under the UN Framework Convention on Climate Change, rich countries must provide funding and technology for poor countries to use energy to develop in a clean way, and to become more energy-efficient. At present, wealthy countries are not doing this. Advocacy can therefore be used in order to hold wealthy countries to account, by asking for increased funding and transfers of technology.

Getting involved in advocacy on sustainable energy

When thinking about getting involved in advocacy on sustainable energy, consider the following questions:

- In our country, how do people generate power for heating, lighting and transport? Consider urban areas and rural areas. How many people have access to clean sources of energy?

- Does the government have a policy or strategy for generating power? Is it environmentally sustainable or does it need changing?

- Can we lobby our government in relation to the UN process to ensure poor country access to finance and technology for sustainable energy and energy efficiency?

- Can we educate our local authorities about how to put pressure on the national government to provide sustainable energy?

Then develop a plan, identifying your goals and targets and work out what advocacy methods are appropriate. This area can fit well with work related to climate change, and it also overlaps with natural resource management.

REFLECTION

- Should we develop our capacity to carry out advocacy work on environmental issues?

- What local environmental issues require advocacy work?

6.5 Advocacy and disaster risk reduction

Environmental disasters affect poor people more than any other type of disaster, but there are many things that governments and communities can do to reduce people's vulnerability to environmental hazards, such as floods and droughts. As climate change and environmental degradation accelerates, the intensity of these extreme hazards is predicted to increase. Advocacy related to disaster risk reduction (DRR) can have a key role in saving lives and livelihoods.

Governments and local authorities have a responsibility to protect their citizens and there are many things they can do to reduce risk of disaster, such as:

- making DRR a priority in their development policies

- developing laws on DRR that involve participation from all levels of society

- allocating resources for work related to DRR

- developing contingency plans at all levels of government

- working with local communities to carry out disaster risk assessments and take action to be prepared in the event of a disaster risk.

Around the world, development organisations are working with poor communities to reduce their vulnerability to disasters. However, with increasing poverty and global climate change, only governments and inter-governmental agencies (such as the UN) have the capacity to ensure that disaster risk reduction approaches are used within communities on a wider scale.

In 2005, in Kobe, Japan, 168 governments met at the UN 'World Conference on Disaster Reduction'. They agreed a set of goals to be achieved by 2015, which were set out in the Hyogo Framework for Action 2005–2015. These are:

- ensuring that DRR is a priority at national and local levels

- identifying, assessing and monitoring disaster risk and enhancing early warning

- using knowledge, innovation and education to build a culture of safety and resilience at all levels

- reducing underlying risk factors

- strengthening disaster preparedness for effective responses at all levels.

Achieving these goals is the responsibility of all governments. Governments in the North must invest more funds in DRR in developing countries, while governments in the South must act on these agreements and be held accountable for achieving them.

Getting involved in advocacy on DRR

As a first step, find out which other organisations in the country or region are carrying out advocacy work related to DRR and arrange to meet with them. Try to gain a clear understanding of the national context for DRR by researching the existing policy frameworks and structures. Useful questions to ask could be:

- How are local communities affected by disasters? What could local authorities be doing to minimise the impacts of disasters? How can we influence them to make sure they do all that they can?

- What is our government's policy and strategy related to DRR? Where can we find our government's policy and strategy for DRR? Are there any laws in place that relate to DRR, such as land use and building codes?

- What are the strengths and weaknesses of our government's policies on DRR?

- Has our government signed up to the Hyogo Framework for Action?

- Does our government recognise linkages between DRR and climate change?

Then develop an advocacy plan, identifying goals and targets, and work out what advocacy methods are appropriate.

CASE STUDY

> ## STORING RAINWATER IN RAJASTHAN
>
> In India, staff from the organisation Discipleship Centre have carried out participatory disaster risk assessments with many vulnerable communities. These assessments help communities to consider likely hazards (such as drought or cyclones), and assess who and what would be affected. Discipleship Centre then helps them to plan how to reduce the risks, with an emphasis on using the skills, resources and abilities that already exist within the communities.
>
> One Village Development Committee (VDC) in Rajasthan decided to build rainwater cisterns that would be helpful during times of drought. In that area, the frequency and duration of droughts is increasing. The cisterns are three to four metres wide, about four metres deep and can store 40,000 litres. During the rainy season, rainwater is collected through channels which run into the cistern. When full, the cistern can provide drinking water for several families throughout the year. The cisterns can also be used to store water brought in by tankers in times of drought.
>
> Discipleship Centre provided training and materials to build one cement cistern. However, one cistern was not enough to meet community needs. Motivated by their new awareness and understanding, the VDC decided to take their cause to a local government meeting. Discipleship Centre staff helped the committee to make a formal application and provided advice about how to present their case. As a result of this application, the government has promised to build another ten cisterns in the village.

6.6 Advocacy and climate change

Climate change is one of the most urgent and pressing issues facing the world today. In Section 1 (page 16) we discussed two main responses that can be addressed through advocacy work. The first relates to 'adaptation' and the second to 'mitigation'.

Adaptation is about the need for funding and technology transfer to help poor communities to adapt to the unavoidable impacts of climate change. At a local level, this might involve helping those with power in the community, such as local officials or local agencies, become aware of what is happening and encouraging them to take action so that communities can adapt to climate change and develop more sustainably. At a national level, advocacy work might involve urging governments to access the necessary funding and technology transfer, or working to support or influence national governments' National Adaptation Programmes of Action (NAPAs).

Mitigation is about reducing greenhouse gas emissions to a 'safe' level globally. Rich countries must make the most reductions, while poor countries must be able to gain access to funding and technology to develop sustainably, for example by receiving incentives to protect their forests. At a local level, advocacy work could involve informing local authorities about how to engage with national level processes, and educating them about potential mitigation options, such as using renewable energy. At a national level, advocacy work might involve asking governments to access the funding and the technology needed to help communities develop in a way that is more sustainable.

Organisations that have experience in advocacy work could try to influence decision-makers at international level through the United Nations Framework Convention on Climate Change (UNFCCC). This could be done by forming relationships with government officials who are involved in international negotiations and providing them with information so that they are fully informed about the issues at local and national level. Some organisations may be able to attend international meetings in order to lobby officials or to support their governments. Examples of this are given in the following boxes.

United Nations Climate Change Talks

The United Nations Framework Convention on Climate Change (UNFCCC) was established at the Rio Earth Summit in 1992, and countries have met every year since 1995 to work together to address climate change. These annual meetings are known as 'COPs' (Conference of the Parties). In 1997, a separate protocol to the Convention was agreed, although it did not take effect until 2005. This is called the Kyoto Protocol which sets out binding emissions reductions for developed countries – known as Annex I countries.

As developed countries are responsible for most of the greenhouse gas emissions that cause climate change, it is fair that they should make large cuts as early as possible. The first phase of emission reduction targets that run from 2008 to 2012 are quite weak. They tend to be based on what countries are willing to do, rather than what is needed to seriously tackle climate change. In December 2007 an agreement was reached on a process to agree a framework to take effect when the first phase of the Kyoto Protocol ends in 2012. Negotiations are establishing new targets for Annex 1 countries for the next commitment period up to 2020. Some rapidly developing countries are also considering what action they can take to reduce greenhouse gas emissions.

The discussions at international level also cover adaptation to climate change. A number of UN funds exist to help poor countries adapt to climate change – the Least Developed Countries Fund, the Special Climate Change Fund and the Adaptation Fund. However, the money in these funds is very small compared to the scale of the funding required.

Also covered during discussions at international level is the issue of how to reduce emissions from deforestation, how to ensure that environmentally sustainable technology can be accessed by developing countries and how to provide finance for developing countries to develop in a clean or environmentally friendly way.

Getting involved in advocacy on climate change

When thinking about getting involved in advocacy on climate change, consider the following questions:

■ Can we join a regional climate change action network group?

■ How can we keep records about the local environment, such as temperatures, rainfall, drought? Is there a Northern NGO we can give the information to, for them to use in advocacy on climate change?

■ How has the climate changed in our region and how is this affecting the lives of local communities? Is there a need to explain climate change to local communities and how it may affect them?

■ What could be done by local authorities or local leaders to help people to cope with changes in the climate? What opportunities can we create for community members to talk to local decision-makers?

■ Do we need to learn more about climate change in our organisation or at a governmental level to understand what we need to do?

■ Does our country have a National Adaptation Programme of Action (NAPAS – see website www.unfccc.int/adaptation/napas/items/4583.php)? If not, what needs to be done to ensure that it develops an effective plan? If it does have one, does it need to be improved, and how is it being implemented?

■ Is our government including adaptation measures in its development planning and programming? If not, what can we do to encourage it?

■ What is our country's position on key issues discussed at international level? What does it think about adaptation funding and good practice, about targets for reducing greenhouse gas emissions and about best ways to get access to sustainable technology?

■ How can we positively influence our government's position at the UN talks, or help it to be more effective? This might involve lobbying and campaigning at a national level, or attending the UN talks to learn about the process and to gain experience of direct advocacy.

Try to work with others who work on this issue. Plan carefully and target people and organisations that have power to bring about change. Tearfund's advocacy staff can provide support in helping identify key targets.

CASE STUDY

> **TEARFUND PARTNER ROLE AT UN CLIMATE TALKS**
>
> David Kamchacha from the Evangelical Association of Malawi went to the UN Climate Talks (COP12) in Nairobi in 2006. His expertise was in disaster risk reduction and he did not know much about climate change and UN processes. He joined members of Tearfund's advocacy staff to lobby participants at the talks. David met and built relationships with the Malawian delegation and other key African delegates. He used these opportunities to lobby officials on the issue of adaptation for poor countries, and was able to use information from Tearfund reports to support his lobbying. David says that he often felt 'like a lion waiting in ambush' as he waited for opportunities to speak out.
>
> David learnt a lot during the talks and maintained a strong and effective relationship with the Malawian government when he returned home. As a result, the following year, he was invited to attend the talks as a member of the Malawian government delegation. At the UN Climate Talks (COP13) in Bali in 2007, adaptation was a crucial issue. David was able to have a strong voice within his own government during the talks.

SECTION
7

Personal lifestyle

In this book so far, we have looked at how staff in organisations and projects can look after God's creation. But what about individual followers of Christ? Whatever our lifestyle and background, God asks us to care for the world that he has made, and to love our neighbours as ourselves (see Section 2). This means that we need to take action when we work, when we go to church and when we are at home. Although consumption of the earth's resources and carbon emissions vary from home to home and country to country, God is honoured by any action to love his creation and other people. If everyone made even small actions, the world would rapidly become much more environmentally sustainable. Our lives should reflect our practical care for creation.

This section gives some ideas of ways in which we can personally change our lifestyles in order to care for God's creation better. It is important to remember that we should change our actions out of a desire to serve God, and not just as a tick-list which we want to complete.

Lifestyle changes

The things we do each day involve consuming the earth's resources. This includes the goods and services such as food, drink, clothing and household equipment and the energy involved in their production, packaging and transportation. Although we cannot live without using resources, we can easily use them needlessly or throw them away. The box on page 81 shows strategies that can be used to deal with waste.

There are also actions we can take to reduce our personal environmental footprint. This includes using less energy.

In the home we can:

■ use more efficient ways of cooking, such as using improved stoves, covering pans, cooking several items together in an oven or pan, and boiling only the amount of water we need for hot drinks.

■ turn off lights when we leave a room and switch off electrical appliances such as televisions, mobile phone chargers and computers when not in use. Although energy-efficient light bulbs are more expensive to buy, they are cheaper overall because they last a long time.

■ wear more clothes in cold weather rather than using heating. Open windows or use curtains or window blinds rather than using air conditioning in hot weather.

■ invest money in renewable energy for heating water and generating electricity, such as solar panels.

■ recycle items such as paper and glass where possible.

For transport we can:

■ walk or cycle, share transport or use public transport.

■ drive more efficiently (light use of brakes and accelerator) and ensure cars are well maintained, for example, keeping tyres at the correct pressure. Switch engines off when stationary.

- live close to our workplace, church, friends and family.

- reduce the number of flights.

To identify areas of high carbon use and to monitor progress over time, use the table on page 43 to measure your household's carbon footprint. Most households also have indirect carbon emissions related to products that we buy. For example, food that is bought in a market or supermarket has emissions associated with it through transport, processing, packaging and so on. These indirect household emissions tend to be much higher in the North and among wealthier households.

Changing our personal actions in terms of how we consume resources requires sacrifice. This sacrifice needs to be a lot bigger for people who already consume much, such as those in countries of the North and wealthy people living in urban areas. However, whoever we are, our actions will make a difference locally, nationally and internationally. Let us continue to make steps to love God's creation and to love others. By doing so we can point people towards our creator God and glorify him.

Advocacy

It can be much harder to speak out for our own personal beliefs than to advocate with an organisation. People may not understand what we are saying or criticise us because they think we are judging them. God calls us to speak out on issues of injustice. We need his help to speak with wisdom, humility and love so that positive action results. Here are two ways to advocate:

- There is a lot we can do through leading by example – by minimising our use of the earth's resources and reducing our carbon footprint. This can put us in a good position to gently suggest similar action to our friends, neighbours, churches and schools.

- To have a bigger impact, we can join a campaign with others in the local area. Many environmental organisations need local advocates to support their causes through building relationships with people in power, getting signatures on a petition and helping with awareness-raising events.

Management of waste – reduce, reuse and recycle

- **REDUCE** Many materials take a long time to decay so the best solution is to reduce the rubbish we make in the first place, such as by avoiding products with a lot of packaging and only buying things that we really need. We should try to repair broken items rather than replacing them with new items. Do not use plastic bags or bottles if possible.

- **REUSE** Use items such as boxes or bags as many times as possible or make them into new items. For example, make furniture out of scrap wood and use glass jars to store food and office supplies.

- **RECYCLE** If items such as glass bottles, metal and tin cans, newspapers and plastics cannot be reused, it may be possible for them to be recycled. Some countries have factories that will recycle these materials. Organic, uncooked waste from kitchens and gardens can be composted and used to improve the structure and water-holding capacity of soil.

CREATIVE WAYS OF REUSING MATERIALS   For further ideas see *Footsteps 59*
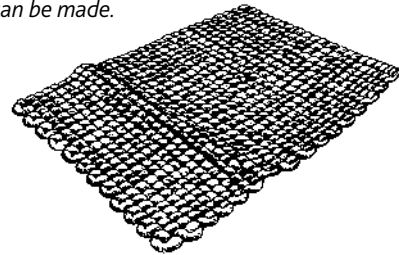
Plastic bottle packaging
Use the bottoms of two bottles, one to make the container and the other to make the lid. Make four vertical cuts around the lid and make them into petal shapes. Smooth down the rough edges and put the lid on.
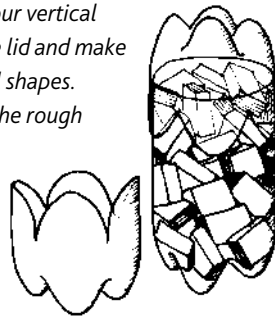
Plastic bag mats
When plastic bags can no longer be used as bags because of holes, they can be knotted or woven into mats. If coloured plastic bags are used, patterned mats can be made.
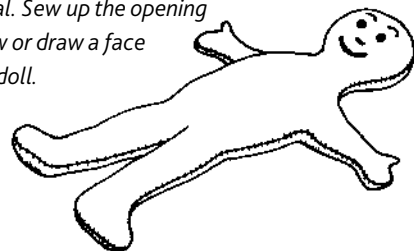
Doll
Cut out two doll shapes from a piece of cloth and sew the edges together, leaving a small opening. Turn the doll inside out and stuff with scraps of material. Sew up the opening and sew or draw a face on the doll.

Plant container
Cut off the side of a car tyre and line the base to use for growing plants.

- **HAZARDOUS WASTE** Dangerous rubbish includes chemical rubbish such as batteries, many cleaning products and insecticides. Medical waste, such as needles, syringes, old medicines and soiled bandages can also be dangerous. Governments around the world are slowly persuading industries to make waste less hazardous. We should avoid pouring toxic liquid, such as used motor oil, paint and pesticides into rivers or lakes or down the sink and instead find the nearest site that will take them and get rid of them safely.

Resources and contacts

Blackman R (2003) ROOTS 5: *Project Cycle Management*, Tearfund UK
www.tearfund.org/tilz or email **roots@tearfund.org**

Bruntland H (1987) *Our Common Future*, WCED

Gordon G (2002) ROOTS 1 and 2: *Advocacy toolkit*, Tearfund UK
www.tearfund.org/tilz or email **roots@tearfund.org**

IPPC Fourth Assessment Working Group II Report (2007) *Climate Change 2007: Impacts, Adaptation and Vulnerability*
www.ipcc.ch/ipccreports/ar4-wg2.htm

Spencer N, White R (2007) *Christianity, Climate Change and Sustainability*, SPCK

Tearfund publications about climate change, including: *Two degrees, one chance* (2007); *Adaptation and the post-2012 framework* (2007); *Dried up, drowned out* (2005)
http://tilz.tearfund.org/Research/Climate+change+reports/
or email **ppadministrator@tearfund.org**

Tearfund publications about disaster risk reduction, including: *Why advocate for disaster risk reduction?* (2007), *Turning practice into policy* (2007)
http://tilz.tearfund.org/Research/Disaster+Risk+Reduction+reports/

UNFCCC (2007) *Climate Change: Impacts, Vulnerabilities and Adaptation to Climate Change in Developing Countries*
http://unfccc.int

Venton P, Hansford B (2006) ROOTS 9: *Participatory assessment of disaster risk*, Tearfund UK
www.tearfund.org/tilz

Wright C (2004) *Old Testament Ethics for the People of God*, IVP

Useful websites related to environmental issues

www.ashdenawards.org/case_studies Case study database of successful sustainable energy projects

www.eldis.org/go/topics/resource-guides/environment Policy website giving information about natural resource management

www.gnesd.org UN Environment Programme website about sustainable energy

www.grida.no/UNEP/GRID-Arendal Information and maps about themes related to the environment such as deforestation, biodiversity and poverty

www.iied.org International Institute of Environment and Development

www.povertyenvironment.net Poverty Environment Net shares knowledge and resources related to poverty and the environment

www.practicalaction.org Contains practical ideas related to issues such as sustainable energy, climate change adaptation and disaster risk reduction

www.proventionconsortium.org DRR consortium established by the World Bank

www.tearfund.org/tilz Climate change and Environmental Degradation Risk Assessment (CEDRA) – a tool developed by Tearfund to give development organisations a detailed understanding of the risks that affect their development goals and the adaptation options they can take

www.unep.org United Nations Environment Programme

www.unisdr.org UN International Strategy for Disaster Reduction

www.vitalgraphics.net/waste/index.html A UN resource giving information and statistics about waste management

www.wri.org World Resources Institute

Useful websites related to climate change

www.adaptationlearning.net Adaptation Learning Mechanism – includes predicted climate changes and impacts by country, with potential adaptation measures

www.amberlinks.org Links to many organisations working to respond practically to climate change

www.climatenetwork.org Climate Action Network – a global network of NGOs

www.linkingclimateadaptation.org Linking Climate Adaptation – information about climate adaptation

www.maindb.unfccc.int/public/adaptation A database of adaptation strategies

www.unfccc.int/adaptation/napas/items/4583.php Information about the impact of climate change and National Adaptation Plans of Action (NAPAS) for different countries

www.unfccc.int/national_reports/non-annex_i_natcom/items/2979.php Contains information about greenhouse gas emissions and national vulnerability to climate change

Glossary

This glossary explains the meaning of certain words according to the way they are used in this book.

adaptation	taking action to cope with climate change and environmental degradation
advocacy	seeking with, and on behalf of, the poor to address underlying causes of poverty, bring justice and support good development through influencing the policies and practices of the powerful
atmosphere	the layer or envelope of gases surrounding the earth made up mostly of nitrogen, oxygen, carbon dioxide, ozone and water vapour
aquifer	underground rock which holds water enabling it to travel underground, sometime for long distances
biodiversity	the variety of plant and animal life on the earth or in a specific area
carbon dioxide	a naturally occurring gas as well as a by-product of burning fossil fuels and other industrial processes
carbon footprint	the impact a person, project, organisation or country makes in the world in terms of the 'carbon dioxide equivalent' they emit, usually measured annually
climate	the average weather in an area, including temperature, air pressure, humidity, precipitation, sunshine, cloudiness, and wind
climate change	any change in climate over time, sometimes due to natural variability but in this book it refers only to changes that are a result of human activity
climatic zone	a geographical area which has distinctive vegetation, cropping systems and biodiversity due to sharing the same climatic conditions
cyclone	a violent tropical storm with very strong winds and heavy rain in Southeast Asia. See also typhoon and hurricane
deforestation	the reduction in forest cover, by humans or natural processes
desertification	degradation of land in dry areas resulting from unsustainable land or water use, made worse by climate change
disaster	when a hazard impacts on a vulnerable community, causing damage to life, property and livelihood
disaster risk reduction	measures taken to make a disaster less likely, such as reducing exposure to hazards, reducing people's vulnerabilities and increasing their capacities
displaced	forced to move away from one's usual home
drought	an extended period of time when a region does not have enough water
ecosystem	communities of plants, animals and other living things, together with the non-living parts of the environment such as rocks and weather, which together form a working system
environmental footprint	the impact a person, project, organisation or country makes in the world defined in terms of the world's resources they use up, usually measured annually

environmental policy	a statement produced by an organisation regarding the management of their environmental impact
evaporation	the transformation of water from liquid to vapour
exploit	to make use of something, often in a damaging or unsustainable way
fauna	animal life
flora	plant life
fossil fuels	fuels such as coal, oil and gas that formed from the mineralised or otherwise preserved remains of dead plants and animals over many years
glacier	very compacted snow which becomes frozen ice in high mountains
global warming	the increase in the average temperature of the earth's atmosphere and oceans in recent decades and its projected continuation. (Global warming is now better described as 'climate change' due to regional variations in all forms of weather.)
greenhouse gases	gases in the atmosphere that absorb and emit radiation from the sun. Carbon dioxide, nitrous oxide, methane and ozone are the primary greenhouse gases
hazard	a natural or man-made event or situation which could lead to danger, loss or injury
hurricane	a violent tropical storm with very strong winds and heavy rain in the Atlantic Ocean and Caribbean Sea. See also cyclone and typhoon
livelihood	the capabilities, assets, resources and activities required for a means of living
mitigation (climate change)	reducing greenhouse gas emissions to a 'safe' level globally (aiming to keep average global temperature increases to below 2°C)
natural resources	naturally occurring products and substances that are of value to people
pollution	contamination of a natural resource
precipitation	rain, snow or hail
rainwater harvesting	collection and storage of water from rain or melted snow from roofs or other suitable catchments
replenish	to restore something to its previous level or condition
run-off	the flow of water from rain or melted snow over the surface of the land
salinisation	the build up of salts in soil or water, usually through irrigation, sea level rise or intensive chemical use, which may make the land infertile for agriculture
sustainable development	development which meets the needs of the present without compromising the ability of future generations to meet their own needs
tidal surge	an offshore rise of a body of seawater, usually associated with a tropical cyclone or typhoon
typhoon	a violent tropical storm with very strong winds and heavy rain in the China seas and west Pacific. See also cyclone and hurricane
vermin	animals or birds which are considered harmful to crops or domestic animals, or which carry human disease
water table	the level of ground water beneath the earth's surface

Index

Templates

Environmental footprint

Resources	Amount used per year	Amount sustainably sourced per year	Target reduction per year
Mains tap water	litres		5%
Bottled drinking water	litres		10%
Paper	reams		10%
Other stationery			10%
Food	tonnes		10%
Other			

Recycling	Amount per year in tonnes	Amount or % recycled	Annual target for recycling
Paper			25% increase
Cardboard			15% increase
Plastic			8% increase
Glass			5% increase
Non-recyclable			5% decrease in non-recyclable rubbish produced

Carbon footprint

These figures are correct as of March 2009 and are taken from the 2008 Guidelines to Defra's GHG Conversion Factors. Please check up-to-date figures for your country each time you complete this table.

FUEL	Amount of fuel used per year	Multiply by this to convert to Kg of carbon dioxide equivalent	Total carbon dioxide equivalent emissions in Kg
Mains electricity supply in kilowatt hours (kWh)	kWh	0.537	
Mains gas (in cubic metres)	Cu M	2.2	
Bottled gas	litres	1.495	
Diesel supply from generator in litres (1 gallon = 4.546 litres)	litres	2.63	
Sourced from renewable energy, such as solar panels, wind or water turbine	Nil		Nil

VEHICLES	Distance travelled	Multiply by this to convert to Kg of carbon dioxide equivalent	Total carbon dioxide equivalent emissions in Kg
Small motorbike (50 to 125cc engine)	Km	0.073	
Small petrol car (up to 1.4 litre engine)	Km	0.1809	
Medium motor bike (125 to 500cc)	Km	0.0939	
Medium petrol car	Km	0.2139	
Large motorbike (500cc engine and above)	Km	0.0939	
Large petrol car or 4WDrive	Km	0.2958	
Small diesel car (up to 2.0 litre engine)	Km	0.1513	
Large diesel car (over 2.0 litre engine)	Km	0.2580	

PUBLIC TRANSPORT	Distance travelled	Multiply by this to convert to Kg of carbon dioxide equivalent	Total carbon dioxide equivalent emissions in Kg
Rail travel	Km	0.06	
Bus travel	Km	0.1073	
Long distance bus or coach	Km	0.029	

PLANE TRAVEL (distances are hard to calculate so instead work out hours of flying time)	Hours flown	Multiply by this	Total carbon dioxide equivalent emissions in Kg
Total of all flights worked out in terms of actual hours flown	hours	250	

ORGANISATIONAL TOTAL FOR CARBON DIOXIDE EQUIVALENT EMISSIONS IN KG

ASSESSMENT PART 1 Condition of resources

Natural resource	Notes on condition of the resource
Water	
Land and soil	
Air	
Flora	
Fauna	
Other, such as clay, coal, minerals	

ASSESSMENT PART 2 Impact of environment on activity

Project activities	Impact of environment on activity														

ASSESSMENT PART 3   Impact of activity on environment

Project activities	Impact of activity on environment													

ASSESSMENT PART 4   Action plan

Project activities	Impact of environment on activity (part 2)	Impact of activity on environment (part 3)	Appropriate actions (part 4)

Action plan continuation sheet

Project activities	Impact of environment on activity (part 2)	Impact of activity on environment (part 3)	Appropriate actions (part 4)