Commonwealth Youth Programme

Diploma in Youth Development Work

Module 13

Sustainable Development and Environmental Issues

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The Commonwealth Youth Programme's Mission

CYP works to engage and empower young people (aged 15–29) to enhance their contribution to development. We do this in partnership with young people, governments and other key stakeholders.

Our mission is grounded within a rights-based approach, guided by the realities facing young people in the Commonwealth, and anchored in the belief that young people are:

- a force for peace, democracy, equality and good governance,
- a catalyst for global consensus building, and
- an essential resource for poverty eradication and sustainable development.

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Module contents

Module overview

Introduction

From the Rio Declaration on Environment and Development 1992:

> "**Principle 4**: In order to achieve sustainable development, environmental protection should constitute an integral part of the development process and cannot be in isolation from it…"
>
> "**Principle 21**: The creativity, ideals and courage of the youth of the world should be mobilised to forge a global partnership in order to achieve sustainable development and ensure a better future for all."

Welcome to Module 13 *Sustainable Development and Environmental Issues*. The purpose of this module is to:

- increase your knowledge of the sustainable development and environmental issues that affect youth around the world
- provide you with the skills that will enable you to contribute to positive change in the present state of the environment
- enable you to lead and support group activities that will help to promote environmentally sustainable development.

Module learning outcomes

Learning outcomes are statements that tell you what knowledge and skills you will have when you have worked successfully through a module.

Knowledge

When you have worked through this module you should be able to:

- outline key concepts related to the natural environment and its associated problems
- identify key social, economic and political factors contributing to environmental problems
- explain the concept of sustainable development
- describe various approaches to environmental protection and sustainable development around the world, including Agenda 21
- evaluate the opportunities and practical approaches provided by a range of agencies.

Skills

When you have worked through this module you should be able to:

- lead activities with groups of young people to develop their knowledge and understanding of environmental and sustainable development issues
- work with a youth group to design and undertake an environmental/ sustainable development-related project
- design a project that gives clear expression to the principles of sustainable development
- evaluate projects in terms of their contribution to sustainable development.

About this module

Module 13 *Sustainable Development and Environmental Issues* is divided into four units:

Unit 1: Understanding our environment

This unit aims to increase your awareness of key concepts related to our natural environment and its associated problems.

Unit 2: The social environment and the natural environment

In this unit, you will learn about our social environment and its relationship to the natural environment. You will examine some of the socio-economic and political issues that underlie environmental problems.

Unit 3: What is sustainable development?

In this unit, you will learn about the global call for the need to integrate the issue of the environment with issues of development and the principles of sustainable development. You will also learn about the opportunities for young people to participate in sustainable development activities.

Unit 4: Action for sustainable development

This unit further examines the meaning of sustainable development in practical activities and projects.

This table shows which units cover the different module learning outcomes.

Module 13 Learning outcomes		1	2	3	4
Knowledge					
1	Outline key concepts related to the natural environment and its associated problems.	x			
2	Identify key social, economic and political factors contributing to environmental problems.		x		
3	Explain the concept of sustainable development.			x	
4	Describe various approaches to environmental protection and sustainable development around the world, including Agenda 21.			x	
5	Evaluate the opportunities and practical approaches provided by a range of agencies.		x	x	x
Skills					
6	Lead activities with groups of young people to develop their knowledge and understanding of environmental and sustainable development issues.	x	x	x	x
7	Work with a youth group to design and undertake an environmental/ sustainable development-related project.		x	x	x
8	Design a project that gives clear expression to the principles of sustainable development.				x
9	Evaluate projects in terms of their contribution to sustainable development.				x

Assessment

Each module is divided into a number of units. Each unit addresses some of the learning outcomes. You will be asked to complete various tasks so that you can demonstrate your competence in achieving the learning outcomes. The study guide will help you to succeed in your final assessment tasks.

Methods

Your work in this module will be assessed in the following three ways:

- A written assignment of 1,750 words that records the initiation, design, delivery and evaluation of a project undertaken with a group of young people (worth 50 per cent of the final mark).
- A review of the learning journal you keep – see below (worth 20 per cent of the final mark).
- A written examination set by the institution in which you are enrolled for this Diploma programme (worth 30 per cent of the final mark).

You will also do activities throughout this module that will help you to prepare for your major assignment, as well as for the final examination. You will find full details of the assignment at the end of the module.

Note: We recommend that you discuss the study and assessment requirements with your tutor before you begin work on the module. You may want to discuss such topics as:

- the learning activities you will undertake on your own
- the learning activities you will undertake as part of a group
- whether it is practical for you to do all of the activities
- the evidence you will produce to prove that you have met the learning outcomes – for example, learning journal entries, or activities that prepare for the final assignment
- how to relate the assignment topics to your own context
- when to submit learning journal entries and assignments, and when you will get feedback.

Learning journal

Educational research has shown that keeping a learning journal is a valuable strategy to help your learning development. It makes use of the important faculty of reflecting on your learning, which supports you in developing a critical understanding of it. The journal is where you will record your thoughts and feelings as you are learning and where you will write your responses to the study guide activities. The journal is worth 20 per cent of the final assessment. Your responses to the self-help questions can also be recorded here if you wish, though you may use a separate notebook if that seems more useful.

For this module, Assignment 2 – the learning journal – requires you to produce the following material:

1 The notes and records from the activities included in each unit

2 At least 10 'reflective' entries that record reflections on your paid or unpaid face-to-face work with young people and/or other aspects of your work as a youth development worker (e.g., staff supervision, networking with other organisations). Each reflective entry should use the following format:

   (a) Brief description of what happened and what you did

   (b) Brief reflection on why it happened and why you took the action

   (c) What ideas or theories explain (a) and (b)

   (d) What would you do differently next time? What would you do in the same way next time? Why?

Again, we recommend you discuss the assessment requirements with your tutor before you begin, including how your learning journal will be assessed.

Self-test

Take a few minutes to try this self-test. If you think you already have some of the knowledge or skills covered by this module and answer 'Yes' to most of these questions, you may be able to apply for credits from your learning institution. Talk to your tutor about this.

Note: This is not the full challenge test to be held by your learning institution for 'Recognition of Prior Learning'.

Put a tick in the appropriate box in answer to the following questions:

	Yes	No	More or less
Can you outline key concepts that underpin our understanding of the natural world (such as ecosystems or the flow of energy) and its problems (such as the greenhouse effect or global warming)?			
Can you explain some ways in which social, economic and political factors contribute to environmental problems (such as poverty or deforestation)?			
Can you give a definition of sustainable development?			
Can you explain the opportunities provided by a range of agencies to work in a practical way around environmental and sustainable development issues?			
Can you describe how to design a programme for young people to develop their awareness of the environment?			
Have you ever worked with a youth group on a project relevant to environmental and sustainable development concerns?			
Can you evaluate projects in order to measure their achievement of sustainable development objectives?			
Have you ever designed a project that has the principles of sustainable development as a primary focus?			

Learning tips

You may not have studied by distance education before. Here are some guidelines to help you.

How long will it take?

It will probably take you a minimum of 70 hours to work through this study guide. The time should be spent on studying the module and the readings, doing the activities and self-help questions and completing the assessment tasks.

Note that units are not all the same length, so make sure you plan and pace your work to give yourself time to complete all of them. For example, Unit 3 has a heavy reading schedule.

About the study guide

This study guide gives you a unit-by-unit guide to the module you are studying. Each unit includes information, case studies, activities, self-help questions and readings for you to complete. These are all designed to help you achieve the learning outcomes that are stated at the beginning of the module.

Activities, self-help questions and case studies

The activities, self-help questions and case studies are part of a planned distance education programme. They will help you make your learning more active and effective, as you process and apply what you read. They will help you to engage with ideas and check your own understanding. It is vital that you take the time to complete them in the order that they occur in the study guide. Make sure you write full answers to the activities, or take notes of any discussions.

We recommend you write your answers in your learning journal and keep it with your study materials as a record of your work. You can refer to it whenever you need to remind yourself of what you have done. The activities may be reflective exercises designed to get you thinking about aspects of the subject matter, or they may be practical tasks to undertake on your own or with fellow students. Answers are not given for activities. A time is suggested for each activity (for example, ‘about 20 minutes’). This is just a guide. It does not include the time you will need to spend on any discussions or research involved.

The self-help questions are usually more specific and require a brief written response. Answers to them are given at the end of each unit. If you wish, you may also record your answers to the self-help questions in your learning journal, or you may use a separate notebook.

The case studies give examples, often drawn from real life, to apply the concepts in the study guide. Often the case studies are used as the basis for an activity or self-help question.

Readings

There is a section of Readings at the end of the study guide. These provide additional information or other viewpoints and relate to topics in the units. You are expected to read these.

There is a list of references at the end of each unit. This gives details about books that are referred to in the unit. It may give you ideas for further reading. You are not expected to read all the books on this list.

Please note: In a few cases full details of publications referred to in the module have not been provided, as we have been unable to confirm the details with the original authors.

There is a list of Further Reading at the end of each module. This includes books and articles referred to in the module and are suggestions for those who wish to explore topics further. You are encouraged to read as widely as possible during and after the course, but you are not expected to read all the books on this list. Module 4 also provides a list of useful websites.

Although there is no set requirement, you should aim to do some follow-up reading to get alternative viewpoints and approaches. We suggest you discuss this with your tutor. What is available to you in libraries? Are there other books of particular interest to you or your region? Can you use alternative resources, such as newspapers and the internet?

Unit summary

At the end of each unit there is a list of the main points. Use it to help you review your learning. Go back if you think you have not covered something properly.

Icons

In the margins of the *Study Guide,* you will find these icons that tell you what to do:

Self-help question

Answer the question. Suggested answers are provided at the end of each unit.

Activity

Complete the activity. Activities are often used to encourage reflective learning and may be a practical task. Answers are not provided.

Reading

Read as suggested.

Case study

Read these examples and complete any related self-help question or activity.

Studying at a distance

There are many advantages to studying by distance education – a full set of learning materials is provided, and you study close to home in your own community. You can also plan some of your study time to fit in with other commitments like work or family.

However, there are also challenges. Learning at a distance from your learning institution requires discipline and motivation. Here are some tips for studying at a distance.

1 **Plan** – Give priority to study sessions with your tutor and make sure you allow enough travel time to your meeting place. Make a study schedule and try to stick to it. Set specific days and times each week for study and keep them free of other activities. Make a note of the dates that your assessment pieces are due and plan for extra study time around those dates.

2 **Manage your time** – Set aside a reasonable amount of time each week for your study programme – but don't be too ambitious or you won't be able to keep up the pace. Work in productive blocks of time and include regular rests.

3 **Be organised** – Have your study materials organised in one place and keep your notes clearly labelled and sorted. Work through the topics in your study guide systematically and seek help for difficulties straight away. Never leave this until later.

4 **Find a good place to study** – Most people need order and quiet to study effectively, so try to find a suitable place to do your work – preferably somewhere where you can leave your study materials ready until next time.

5 **Ask for help if you need it** – This is the most vital part of studying at a distance. No matter what the difficulty is, seek help from your tutor or fellow students straight away.

6 **Don't give up** – If you miss deadlines for assessment pieces, speak to your tutor – together you can work out what to do. Talking to other students can also make a difference to your study progress. Seeking help when you need it is a key way of making sure you complete your studies – so don't give up!

If you need help

If you have any difficulties with your studies, contact your local learning centre or your tutor, who will be able to help you.

Note: You will find more detailed information about learner support from your learning institution.

We wish you all the best with your studies.

Unit 1: Understanding our environment

Unit introduction

Welcome to Unit 1 *Understanding our environment*.

Most of us are more likely to be motivated to support important causes if we understand them. The young people with whom you work are more likely to want – and also be able – to protect the environment if they understand the important issues at the heart of environmental conservation and sustainable development.

Environmental conservation and sustainable development are unified processes. This is because on the one hand we need to make use of the physical environment in order to survive, and on the other hand we need to maintain that environment so that future generations can have an equivalent or better quality of life than ours. To achieve this, we have to behave intelligently, and therefore we have to make use of the available scientific knowledge.

Unfortunately, most development activities have tended to deplete the Earth's raw materials while at the same time releasing huge quantities of waste energy and toxic materials back into the environmental system. This pollution is damaging the air, soil and water. It is also causing global warming and damaging the ozone layer that protects our atmosphere from harmful ultraviolet solar radiation. To continue in this way probably means that we will eventually destroy the environmental conditions that enable us – and most of the living things around us – to exist.

Fortunately, scientific research is pointing very clearly to the things that can and must be done to prevent this happening. Economic analysts are also speaking out to explain that a relatively small economic commitment to change now could save us and the Earth from the frightening costs of doing nothing.

In this unit, you will be introduced to themes developed further in later units:

- the concepts underpinning our understanding of the natural environment
- the major environmental problems facing the world today
- the need for education about the environment and sustainable development.

When approaching this information, it may help you in your studies to think carefully about your own circumstances or situation. For example, do you have experience of the problems and policies described? Which of the topics discussed do you already know about? Finally, as you are covering these different areas, think about what issues you feel are essential for your groups of young people to know about.

Unit learning outcomes

When you have worked through this unit, you should be able to:

- describe the major processes and relationships regulating the local and global environment
- identify the main environmental problems affecting the world today
- describe the implications that these have within your own national and local context
- consider approaches to discussing these issues with young women and men.

What is our environment?

Simply put, our environment means our surroundings. At the most basic level, it refers to our home, our community and our workplace. Ultimately, however, it includes the whole world, which is a unified physical and social system. The term 'environment' refers to the natural and social surroundings and conditions in which people, animals and plants live. This includes all the living and non-living things that affect the life of an individual organism or population.

In this unit, we will discuss our natural or physical environment and take a brief look at global environmental problems that face the world and young people today. In later units, we will look more closely at the relationship between our social and physical environments.

Our natural or physical environment

Our natural or physical environment supports all life on Earth and has four layers:

1 atmosphere – a mixture of gases surrounding the Earth, for example, oxygen (O2) and carbon dioxide (CO2)

2 hydrosphere – the water on or below the surface of the Earth, for example, lakes, seas, rivers, underground streams and aquifers

3 lithosphere – the hard, rigid upper crust of the Earth, for example, rocks, minerals, soil, fossil fuel

4 biosphere – the zone where life exists, for example, plants, insects, fish and animals (including, of course, people). The biosphere consists of the lower part of the atmosphere, the hydrosphere and the upper part of the lithosphere. It is approximately two kilometres thick.

We are now going to look at some of the ways in which these different elements interact and form the relationships that govern our environment.

Ecosystems

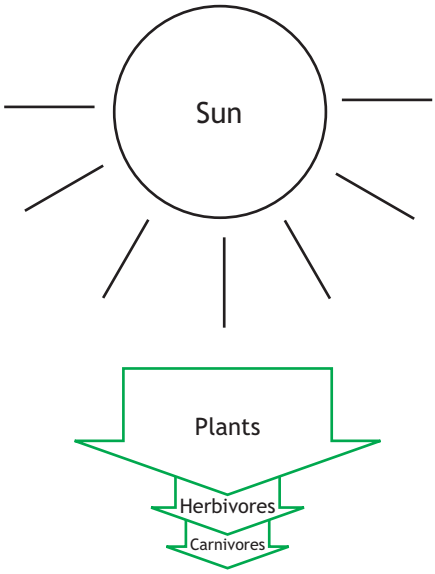
The natural environment operates as an ecosystem. An ecosystem is a natural, functional unit. In it, living things such as micro-organisms, vegetation and animals (including people), co-exist and interact with non-living things such as air, water, soil and minerals to form a stable and self-sustaining system. These interactions are based on the exchange of materials and energy.

Note that an ecosystem is not always naturally formed. It can be artificially created. An artificial ecosystem can be part of our built environment or even a spaceship. A few years ago, in many countries, you could buy a terrarium: a large glass jar with a closed ecosystem of plants, insects, soil, air and water existing inside.

The interaction of living and non-living things within an ecosystem involves the flow of energy, the recycling of matter and the regulation of populations of organisms. These processes are explained below.

The flow of energy

All life forms require energy to maintain their bodies and perform their activities. The primary source of energy is sunlight. Plants capture and store light energy and turn it into chemical energy (carbohydrates, sugars, proteins, waxes and oils) through a process called photosynthesis. Plants are eaten by animals, which are in turn eaten by other animals. So energy is exchanged from one living thing to another. The diagram below helps show this process:



Food chains

The key concept that we need to learn from food chains is the transfer of energy. For all life on Earth there is only one available source of energy: the sun. Moreover, only plants can change this energy into a form that can be used by animals. All animals rely either directly or indirectly on plants for their energy.

Plants 'feed' on sunlight and can convert energy from sunlight into food that they and animals use. Plants, then, are at the first feeding

level. Feeding levels are also called trophic levels (the word 'trophic' is a Greek word for nourishment). To determine the trophic level, we count the number of energy transfers involved. Green plants are at the first trophic level because there has been only one transfer of energy – from the sun to plants. Plants are therefore referred to as 'primary consumers'.

Plant eaters or herbivores are at the second trophic level. The energy used by the plant eaters has been transferred twice – from the sun to the plants and then from the plants to the herbivores. They are 'secondary consumers'.

The next level of the food chain or food web consists of either carnivores or omnivores or both. Carnivores such as cats are meat eaters that only eat the flesh of other animals. Most carnivores are predators that hunt and kill their food (or 'prey'), or they are scavengers. Predators play a very important role in controlling the number of herbivores in any ecosystem. If herbivores were not hunted and killed, the populations of these animals would increase to the point where they would eat all the plants. Because plants create oxygen as they convert sunlight into plant fibre, a reduction in plants would mean a loss of oxygen in the air, which would ultimately lead to the dwindling of other animal populations, including humans.

Omnivores, such as human beings, are animals that eat both plants and other animals. Omnivores have an advantage in an ecosystem because they seldom have trouble finding food. Because of their ability to eat a great variety of foods, omnivores often belong to several food webs and different levels of food chains. An omnivore's diet usually changes with the seasons and the type of food available in a particular ecosystem. The most common omnivores on Earth are, of course, ourselves.

Note that the flow of energy is not a cyclical process. Energy is not returned to its source. Instead, it flows through the ecosystem in a linear (or straight line) process. Each ecosystem sustains countless food chains, which usually consist of three to four levels.

Activity 1.1

(10–15 minutes)

Take a few minutes to think about how people utilize energy from a food chain. Try to identify at least one animal or plant at each level of the food chain in which we are involved.

Now think about your own position in the food chain. In your learning journal, describe or illustrate the food chain that you are a part of.

If you are part of a study group or tutorial group, you can discuss your ideas within the group. If you do not participate in a study group, talk with your peers, friends, family and co-workers to get their ideas about this activity.

The cycling of matter

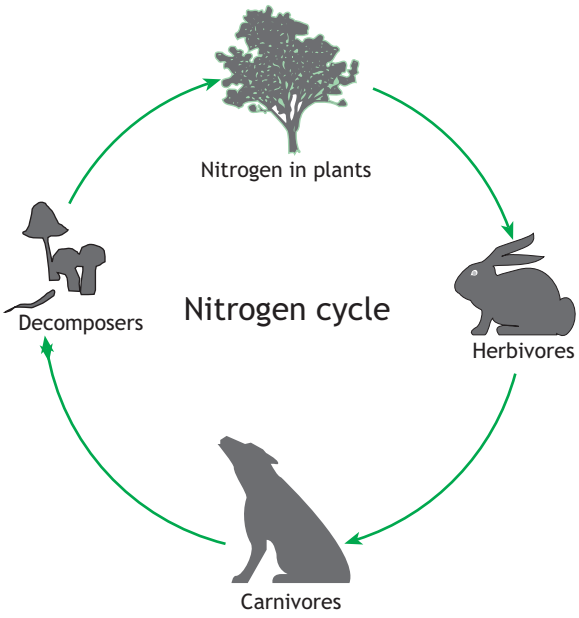
Matter consists of many elements that combine to make up gases, vitamins, proteins, minerals and other nutrients of life. The total amount of matter in the world is constant and cycles through both living materials (plants and animals) and non-living materials (air, water, rock, etc.). The cycling of matter is driven by the sun and facilitated by the exchange of energy.

When the micro-organisms that decompose matter at the end of a cycle release it in the form of minerals, these are returned to the soil and air. The roots of plants then absorb these minerals from the soil. Thus the nutrients are eventually returned to the plants, which pass it on to the herbivores, then to the carnivores, and the cycle continues.

There are various forms of the cycling of matter.

The nitrogen cycle

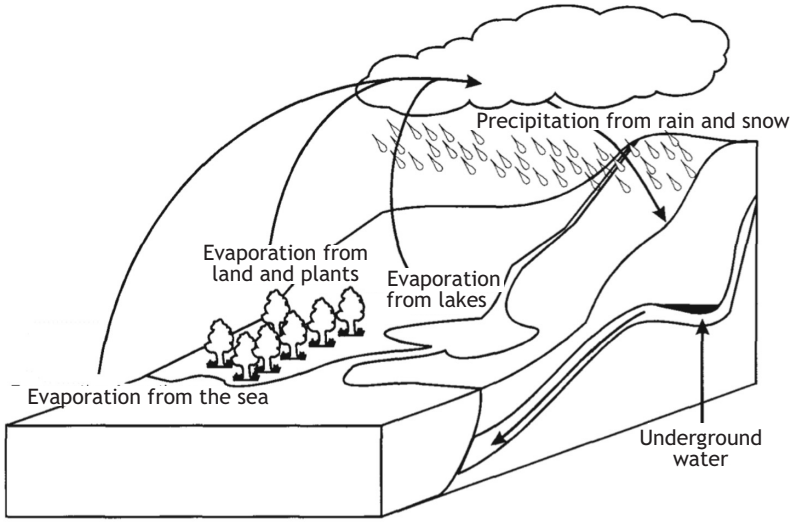
An important example is the nitrogen cycle. Nitrogen is one of the major elements required for plant and animal growth. One of the main gases in the air, it is transformed into a soluble form by bacteria living in soil or water. Plants can then use this form of nitrogen to make protein. The protein is absorbed by the soil as the plant matter dies and decays, releasing the nitrogen back into the air and soil. Animals also obtain nitrogen by eating plant material, and they release nitrogen in their excreta and when their bodies decay. The nitrogen is again returned to the atmosphere as a gas by the action of bacteria – thus completing the cycle.



(Morrow, 1993)

The water cycle

Another important cycle is the water cycle. Water is essential to all life on Earth. When rain falls on the land, some of it quickly evaporates back into the atmosphere. There is constant evaporation from streams, lakes, the oceans and the bodies of plants and animals. There is a lot of evaporation from trees. The energy for most of this evaporation comes either directly or indirectly from the sun. Of the rest, some water is absorbed by plants or is drunk by animals. Some of it runs off the surface of the land into streams and lakes, and some percolates down through the soil to accumulate as ground water. The water in streams and lakes, as well as the surface ground water, eventually finds its way to the ocean.



The endless cycling of water – in the form of precipitation as rain, snow and hail, its return to the atmosphere through evaporation, its subsequent return to the Earth as rain – maintains the various sources of fresh water necessary for life on land. The water cycle also plays a

major part in modifying temperatures – for example, by the formation of reflected sunlight, by the cooling clouds formed in forest evaporation, and by the process of transporting many chemical nutrients through ecosystems.

The carbon cycle

Forests are often referred to as the lungs of the world because trees, like other plants, absorb carbon dioxide (CO2) from the air and use it to create food through photosynthesis. The photosynthesis process captures carbon from the carbon dioxide, which is then used by the plants to help them grow, and the whole process releases oxygen (O2) back into the air.

Animals, insects, etc. use oxygen, either breathed from the air or absorbed from water, and produce carbon dioxide as a waste product of the respiration.

Of course, carbon dioxide can also be produced by any process that breaks down carbon-based material such as oil, coal and wood. The most obvious examples are when cars break down petrol (a fuel created out of fossilised material) to covert it into mechanical energy, or when industry also burns fossil fuels such as coal and gas.

Activity 1.2

(about 5 minutes)

In your learning journal, draw the carbon cycle. Use the diagrams above to help you.

Ecological interdependence

This process of cycling energy, elements and matter points to an important characteristic of ecosystems: inter-dependence. The organisms within an ecosystem depend on one another. The organisms and the non-living things are also inter-dependent. Thus, when an ecosystem has become properly established, each life form is finely balanced in relation to those living and non-living things from which it receives sustenance or shelter.

To an extent, these relationships also exist between ecosystems, at the point where one ecosystem meets another. However, the interchanges of energy and materials between ecosystems are usually less complex than those within ecosystems.

Self-help question 1.1

(about 15 minutes)

Take a few minutes to think about your own part in the ecosystem. Write down your answers to the following questions.

1 What type of consumer are you?

2 How do you contribute to the cycling of materials in this ecosystem?

3 If you see a tree growing in your garden, how do you think it has been formed? What is the relationship between humans and trees? How does the destruction of trees affect the ecosystem?

Compare your answers with those provided at the end of the unit.

Population regulation

Population regulation is an important aspect of a balanced ecosystem. Predators are nature's way of regulating population or controlling the numbers of any given organism in an ecosystem. For example, ducks eat snails. Ducks are thus predators of snails, or perhaps one of several predators. Read the case study below for another example.

Case study 1.1

Floating weeds

Floating weeds, originating from the Amazon Basin in South America, once freed from the controlling influence of their natural enemies, spread unchecked. The weeds form thick mats of vegetation on the waterways, causing water quality to deteriorate, fish populations to drop, irrigation and drainage schemes to become clogged and navigation to be hindered.

The Commonwealth Science Council has worked with other organisations on various forms of control and has found that introducing the weed's natural enemies or predators – certain insects from the Amazon – reduces the spread of weeds.

Commonwealth Currents, 1992: 3.

You can see here how ecosystems, like that in the Amazon Basin, control their internal populations of plants or animals by using predators and other means.

- Predators play an important role in controlling the rate at which organisms multiply, and in maintaining the balance of nature.
- When we destroy the predators of an organism, this can lead to the organism multiplying rapidly – a population explosion. This may result in damage to the environment and/or depletion in the numbers of the animals or plants that the organism feeds on.

In a well-functioning ecosystem, numbers stay in balance. For example, by feeding on 'plant producers', herbivores control the population of plants. Similar control takes place at each level of the ecosystem, with carnivores controlling populations of herbivores, and 'detritus feeders' controlling the level of organic wastes.

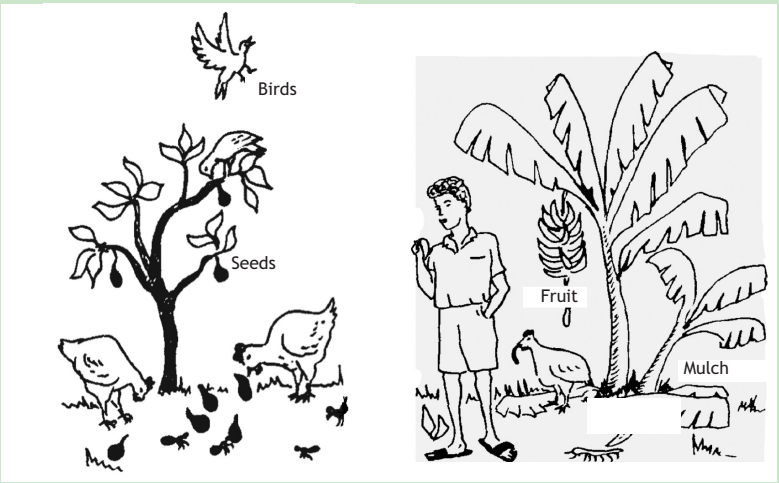
Without nature's system of control, populations would grow beyond the capacity of their environment to support them.

Activity 1.3

(about 10 minutes)

Look at the illustration below. In this ecosystem, insects and chickens eat the fallen fruit and seeds. The worms and bacteria decompose the chicken manure and rotting fruit, releasing nutrients. The plants use nutrients released into the soil. Write the answers to the following questions in your learning journal.

- What place do humans have in this ecosystem?
- Using the concept of population regulation, discussed above, suggest how population regulation takes place in this ecosystem.
- Describe what might happen if the man stopped eating chicken.



Self-help question 1.2

(about 10 minutes)

To review the main points that we have covered so far:

1 define the following terms in your own words:

   a. environment

   b. ecosystem

2 describe how living things interact with non-living things in our environment

3 explain what would happen if there were no sunshine, water or air in our environment.

Compare your answers with those provided at the end of the unit.

Activity 1.4

(20–30 minutes)

In this activity, you are asked to reflect on what you have learned, and to consider how you can use this knowledge.

1 Look back over what we have covered in this unit so far. In your opinion, what are the key points that have been made?

   Write a list of the main points in your learning journal.

2 Imagine you were to initiate a discussion on these issues with a group of young people who have expressed an interest in environmental issues. Of the information we have covered so far, which do you think would be the most relevant and interesting topics for them to learn about?

3 Imagine you were going to introduce these topics to them in a group setting. What activities could you use to pass on the information and begin discussions? How would you organise them?

   Write your ideas in your learning journal.

Global environmental problems: an overview

With the Industrial Revolution, humans became capable of dramatically changing the face of the Earth and the quality of its air, land and water. Today, because of rapidly increasing human populations and advancing technology, ever-growing demands on the planet are causing a rapid and continuing depletion of natural resources (forests, animals, water, land and minerals that people make use of), as well as an unprecedented decline in the quality of our environment and its ability to sustain life.

We are faced with many threats to our environment. All of these problems are of particular concern to young people as a degraded environment is a threat to their future survival.

Here, we are going to look at some of the major factors that are creating environmental problems around the world today:

- the greenhouse effect
- global warming
- acid rain
- ozone destruction
- synthetic pesticides
- radiation
- loss of forests and wild lands
- soil erosion
- demands on water and air.

The greenhouse effect

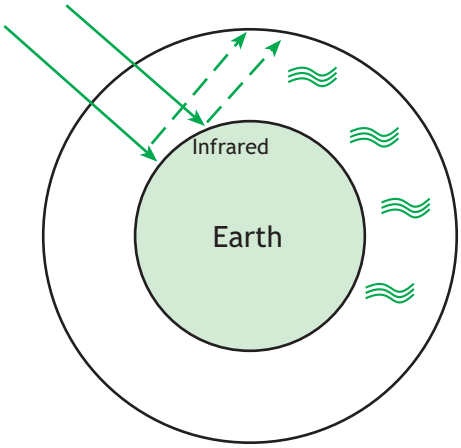
Despite much of it being reflected back into space by the atmosphere, short-wave solar radiation passes through the atmosphere, mainly as light, and is absorbed by the dark areas of the Earth's surface or reflected back by the light areas.

The term 'albedo' (Latin for white) is commonly used to mean the fraction of radiation (as light) that is reflected by a surface or body. Light areas – such as polar ice caps, snow or clouds – can reflect up to 80 per cent of incoming sunlight, while dark areas – such as forests and oceans – absorb the sun's energy and radiate it back at long, infrared wavelengths.

This infrared energy would return to space if it were not mainly reflected back to Earth by a thick layer of gases such as high-level water vapour, carbon dioxide, methane, nitrous oxide, fluorocarbons and ozone in the atmosphere. These are often referred to as 'greenhouse gases' because this process acts in a similar way to a greenhouse: the layer of gases is like the glass walls of the

greenhouse. In balanced quantities, these gases function to maintain the Earth's relatively warm temperature – a hospitable 60°F (15.5°C) (Lovelock, 1991). Low clouds of water vapour reflect sunlight back to space – a cooling effect. This is why the Earth is warm enough, but not too hot, to support life on its surface.

Solar radiation



Human activities, however, have altered the albedo (via forest clearance and farming, for example) of various areas around the globe. This may be contributing to global warming.

Global warming

Global warming is one of the major environmental concerns in the world today. It refers to an increase in the Earth's temperature.

This increase in the industrial era is believed to be mainly due to the use of fossil fuels (wood, coal, oil, petrol) that are based on ancient plant material and therefore contain a lot of carbon. This carbon is released when the fuel is broken down and combines with oxygen in the air to form carbon dioxide. This then combines with the gases released from other industrial processes, leading to the build-up of greenhouse gases (carbon dioxide, methane or natural gas, nitrous oxide and chlorofluorocarbons) in the atmosphere.

Since the late 1800s, we have known that carbon dioxide helps to stop the sun's infrared radiation from escaping back into space. However, the question today is whether the increasing levels of carbon dioxide in the atmosphere over the last two centuries will lead to the sort of higher global temperatures that will unbalance the whole ecosystem of the Earth.

An average temperature rise of a few degrees would cause a significant global warming of the atmosphere, and this would have profound environmental effects. It would speed the melting of polar ice caps, raise sea levels, change the climate regionally and globally, alter natural vegetation and affect crop production. These changes in turn would have an enormous impact on human civilisation.

Since 1850 there has been an average increase in global temperature of about 1°C (1.8°F). Recently, the Intergovernmental Panel on Climate Change (IPCC) has predicted an average global rise in temperature of between 1.4°C (2.5°F) and 5.8°C (10.4°F) between 1990 and 2100. However, this estimate only takes account of global warming driven by known greenhouse gas emissions. The latest reports in the press suggest that the rate of increase is actually faster than that, and possibly much faster, because the Earth may be at a 'tipping point'.

The concept of a tipping point *"refers to a fine threshold where a slight rise in the Earth's temperature can cause a dramatic change in the environment, and that may trigger a far greater increase in global temperatures"* (Sample, 2005), at which point it may be too late to act.

We may have hit such a tipping point in western Siberia. Here a million square kilometre area of permafrost, formed 11,000 years ago at the end of the last ice age, is melting. As it melts it will release billions of tons of methane into the atmosphere. One of the scientists examining the latest evidence, Dr Sergei Kirpotin, called it *"an ecological landslide that is probably irreversible and is undoubtedly connected to climatic warming"*. Climate scientist Dr Stephen Sitch said that he and his colleagues at the UK Met Office's Hadley Centre believe that this will double the atmospheric levels of methane, leading to a 10–25 per cent increase in global warming.

Tony Juniper, director of Friends of the Earth, takes an even gloomier view: "*We knew at some point we'd get these feedbacks happening that exacerbate global warming, but this could lead to a massive injection of greenhouse gases. …If we don't take action very soon, we could unleash runaway global warming that will be beyond our control, and it will lead to social, economic and environmental devastation worldwide."*

Some alternative viewpoints

One of the criticisms raised against the view that human activity is mainly responsible for global warming has been that the fluctuating energy output of the sun, caused by the ejection of huge amounts of solar material from its surface, could well be the cause of the over-heating and over-cooling episodes in global evolution.

Throughout its history, the Earth appears to have undergone major environmental changes, moving between one glacial period and another. However, while the alternate relative heating and cooling of the sun may be significant, these changes have probably been largely due to internal processes in the nature of the Earth that have caused huge volcanic eruptions, with rapid cooling created by volcanic detritus cutting out solar radiation for long periods, then eras of heat and sometimes dryness.

At present we are in one of the inter-glacial periods, but geological evidence appears to show that in at least one of the glacial periods, the Earth was encased in snow and ice for a long period ('Snowball

Earth'), until volcanic eruptions probably started off the re-heating processes and reinvigorated the biosphere.

The present scientific view is that the ejection of material from the surface of the Sun has played a very small part in global warming. The US National Centre for Atmospheric Research claims that *"The solar contribution to warming… is negligible"* (Ahuja, 2006).

The scientific group reaching these conclusions has looked at likely statistical models of the sun's activities, based on examining evidence from the Greenland and Antarctic ice sheets from over the last 1,000 years, and found no support for the idea that the eleven year sunspot cycle is linked to global warming. One of the authors of this study, Tom Wrigley, says, "*Our results imply that over the past century climate change due to human influences must far outweigh the effects of changes in the sun's brightness*."

There is little we could do to cope with anything major like a glacial period of any severity, though this might save us from the worst effects of global warming. But what is now critical is the evidence that our own industrial and technological activities might have a small but crucial effect on tipping the current interglacial period into an intensified over-heating phase. And that we might still be able to do something about.

Tackling global warming

From 1–11 December 1997, about 160 nations met in Kyoto, Japan, to negotiate a binding international agreement on the limitation of the production of greenhouse gases. The outcome of that meeting was the Kyoto Protocol. This is an agreement made under the United Nations Framework Convention on Climate Change (UNFCCC). Countries that ratify this protocol commit to reduce their emissions of carbon dioxide and five other greenhouse gases, or engage in emissions trading if they maintain or increase emissions of these gases. The objective is the "*stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system*".

The Protocol entered into force on 16 February 2005. As of April 2006, a total of 163 countries have ratified the agreement, representing over 61.6 per cent of emissions from the countries concerned. Those who support the Protocol argue that at least it begins the process of cleaning up the environment, and may well lead to fully effective measures in the long term. There will be fines for countries failing to meet their obligations, starting at €40/ton of carbon dioxide in 2005, rising to €100/ton in 2008. This rewards countries that meet their targets, and provides a money incentive to those that don't to clean up their emissions.

However, on current estimates, even if the Protocol is implemented fully, the predicted rise in temperature will only be reduced by a small amount by the year 2050. There are also loopholes in the agreement.

Because many countries, like Russia, have limits set above their current production of greenhouse gases, they can trade these extra amounts on the open market to countries that find it hard to meet their targets.

Of those that have signed the Protocol, only the United States (by far the most serious emitter of all) and Australia have so far refused to ratify it. In both these countries, business interests and right wing politicians claim that it will cause serious damage to industry and employment. They also have certain public policy theorists who do not necessarily believe that the industrial world is causing global warming. In fact some theorists interpret the Kyoto Protocol as an initiative by global socialists to slow the growth of the industrial democracies and transfer wealth to the less developed countries of the world.

However, other countries, such as the South Pacific group, argue that the Protocol does not go far enough. There is as yet little agreement on the relative costs and benefits of Kyoto, though in a capitalist world economy these are likely to be a major influence on implementation in the long term.

Because of the tensions within the Kyoto discussions, Australia, China, India, Japan, South Korea and the United States have created a joint agreement called the Asia Pacific Partnership on Clean Development and Climate, which they presented to the regional forum at the Association of Southeast Asian Nations on 28 July 2005. This allows the partners to the agreement to set their own individual goals for reducing greenhouse emissions, crucially and unfortunately with no enforcement mechanism.

Activity 1.5

(about 5 minutes)

In your learning journal, write a quick summary of the main points that have been made on environmental problems so far.

Don't read back over the last few pages until after you have written your own key points. How well have you remembered things?

A recent review

Within the context of the British Government's policy and approaches to global warming, there has recently been a major rethink. Published on 30 October 2006, the Stern Review on the Economics of Climate Change was commissioned by the British government and headed by Sir Nicholas Stern, who was formerly a chief economist at the World Bank.

Because the review is written by such a hard-nosed economist, it is much more likely to be acceptable to the governments and industrial leaders who have to be persuaded to act against global warming than the urgings of environmental groups or even scientific committees.

Crucially, the review, which is a summary of all the available scientific and economic evidence, expresses clearly the understanding that global warming is caused primarily by human activity: "*The scientific evidence points to increasing risks of serious, irreversible impacts from climate change associated with business as usual (BAU) paths for emissions.*"

Activity 1.6

(about 30 minutes)

Read through the case study below, which is a journalistic summary of the Stern Review. As you do so, look carefully at the main points that this document highlights. What are the most significant implications of the points that are being made?

Keep a note of your ideas in your learning journal, and compare them with the comments noted below.

Case study 1.2

The Stern Review on the Economics of Climate Change

Times Online – 31 October 2006

Climate Change

Stern's report: 'If we act now, we can avoid the very worst'

By Lewis Smith, Environment Reporter

"*World economies do not have to suffer while we deal with climate change,*" said Sir Nicholas Stern.

The economic wellbeing of Britain and the rest of the world depends on changing to a low-carbon global economy, the Government's chief economist said in a report published yesterday. Sir Nicholas Stern described climate change as the "*greatest and widest-ranging market failure ever seen*", but said that action could and should be taken to avert the worst effects.

In *The Economics of Climate Change*, commissioned by the Treasury, Sir Nicholas said that the problem could be tackled without stunting economic growth. He concluded that spending 1 per cent of gross domestic product each year on tackling climate change would save 5 to 20 per cent of GDP by the end of the century, but that Britain could not act alone – it required internationally agreed measures.

"*The conclusion of the review is essentially optimistic*," said Sir Nicholas. "*There is still time to avoid the worst impacts of climate change if we act now and act internationally. We can grow and be green.*"

The report identified carbon pricing, including carbon-emissions trading worldwide and green taxes, improved low-carbon technology, energy efficiency and halting deforestation as the main methods of cutting greenhouse gas emissions. In his assessment of global warming Sir Nicholas, head of the Government Economic Service and the former chief economist at the World Bank, said that the scientific evidence was now "*overwhelming*" that climate change was under way and presented "*very serious risks*". He accepted that the world had warmed up half a degree since the Industrial Revolution and that a minimum of another half degree could be expected over the next few decades. He blamed greenhouse gases created by human activity, such as carbon dioxide and methane.

The current level of greenhouse gases in the atmosphere is about 430 parts per million, compared with 280 ppm before the Industrial Revolution. The report said that the level would reach 550 ppm by 2050 at the current rate of increase, but that the levels were rising so fast that 550 ppm "*could be reached as early as 2035*". As levels increase, temperatures are expected to rise. A 550 ppm level gives a 77–99 per cent chance of an increase above 2C (3.6F), and doing nothing about emissions gives a 50 per cent risk of a 5C rise by the end of the century.

"*Such changes would transform the physical geography of the world*," the report states, with many millions, of people facing starvation, water shortages or homelessness. The melting of glaciers would initially cause floods but would then leave a sixth of the world population facing water shortages. Sea rises would threaten cities such as London and New York, and a rise of 2C would put 15–40 per cent of wildlife at risk of extinction. Falling crop yields could leave hundreds of millions of people, especially in Africa, at risk of starvation, and, once temperatures have risen by 4C, "*global food production is likely to be seriously affected*".

Sir Nicholas said that scientists were clear that the higher the temperature rise, the worse the impact on people and economies. Developing countries are likely to be hit hardest, but developed nations will also suffer. The cost of flooding in Britain, if temperatures rise 3C or more, is estimated at up to 0.4 per cent of GDP, and in the US stronger hurricanes are expected to double the costs of wind damage.

Sir Nicholas argued that the stabilisation of greenhouse gas levels in the atmosphere is possible and will not halt economic growth. He said: "*The world does not need to choose between averting climate change and promoting growth and development. With strong, deliberate policy choices it is possible to 'decarbonise' both developed and developing economies on the scale required for climate stabilisation, while maintaining economic growth in both*."

The Stern Scenarios (summarised in *The Times* online – 31 October 2006)

The following table shows illustrative impacts at different degrees of warming. Temperatures represent increases relative to pre-industrial levels. The impacts are expressed for a one degree band around the central temperature: e.g. 1C represents the range 0.5C – 1.5C.

	Water	Food	Health	Land	Environment	Impact
1C	Glaciers in Andes disappear, threatening water supplies for 50 million people	Cereal yields rise in temperate region	At least 300,000 a year die from climate-related disease, such as malaria and diarrhoea. Winter mortality drops in Europe/ US.	Thaws in Canada and Russia damage buildings and roads.	Estimated 10% of land species face extinction. Coral reefs suffer 80% bleaching	Atlantic thermohaline circulation (density drive circulation) starts to lose impact
2C	20–30% less water available in Southern Africa and Mediterranean	Crop yields drop in tropical regions (up to 10% in Africa)	Up to 60 million more Africans exposed to malaria	Coastal flooding affects up to 10 million more people each year.	An estimated 15–40% of species face extinction. Most at risk include polar bears and caribou	Greenland ice sheet at risk of melting irreversibly: sea levels rise seven metres
3C	Serious droughts in southern Europe. Up to 4 billion more people suffer shortages.	Up to 550 million more people likely to go hungry	Up to 3 million more people would die of malnutrition (if carbon fertilisation weak)	Coastal flooding affects up to 170 million more people each year.	An estimated 20–50% of species face extinction. The Amazon rain forest begins to die.	Severe atmospheric changes.
4C	Up to 50% less water available in Mediterranean and Southern Africa	Agriculture stops in parts of Australia and up to 35% less crops in Africa.	Up to 80 million more Africans would be exposed to malaria.	Coastal flooding affects up to 300 million more people each year.	Half of the Arctic Tundra disappears and half of the world's nature reserves cannot fulfil objectives.	West Antarctic ice sheet threatened with collapse.

	Water	Food	Health	Land	Environment	Impact
5C	Possible disappearance of large glaciers in Himalayas, affecting hundreds of millions of people in China and India.	Ocean acidity disrupts ecosystems and possibly fish stocks.		Main cities, such as London, New York and Tokyo, and low-lying coastal areas, such as Florida, threatened by rising sea levels.		Circulation of water in the Atlantic stops.

A rise of more than 5C would be a disaster on an unimaginable scale. Such a change in temperature would be equivalent to the rise that occurred between the last Ice Age and today. The exact effects are hard to gauge with current models because the temperatures are so far outside human experience.

One of the startling features of the review is the way in which a former World Bank economist finally acknowledges that unplanned capitalism is a cause of the problem rather than a solution to it: "*This is the greatest market failure the world has ever seen.*" His answer to this is planned capitalism at an intergovernmental level: "*Sir Nicholas' chief proposal is that governments work to create a global, liquid market for carbon. In its infancy the carbon market is prone to volatility, susceptible to price manipulation and threatened by political disruption. As it grows, it will become a bankable prospect.*"

Jonathan Porritt (2005) believes that the world capitalist system, as currently constituted, cannot possibly make the adjustments necessary for environmental survival. But he also believes that those groups that argue that letting capitalism collapse along with an environmental collapse, in order that a more just and sustainable system can arise, are wishing for the impossible, and that this would lead to a new totalitarianism. Instead, he argues strongly for a government-led radical reform agenda for capitalism, where market signals work within an internationally agreed and controlled framework.

Activity 1.7

(about 30 minutes)

Where you have access, also turn to the online report itself (www.hm-treasury.gov.uk). In particular, read the Executive Summary, where the detailed consequences for the developing world if these measures are not taken are spelled out very clearly and frighteningly: "*The impacts of climate change are not evenly distributed - the poorest countries and people will suffer earliest and most. And if and when the damages appear it will be too late to reverse the process.*"

Make notes about likely consequences in your country/ region.

Developments (DFID, 2006) describes the problems presented for the poor by climate change in the following way:

1 In Africa some fertile land is already turning into desert.

2 The area of the world stricken by drought has doubled since 1970.

3 A rise of 2–3.5C in India would reduce farm incomes by between 9 and 25 per cent.

4 Wet season rainfall in Pakistan could increase by 5–50 per cent by 2070.

5 Storm surges in places like Egypt and Thailand could devastate many businesses that are less than a metre above sea level.

6 97 per cent of all the deaths from natural disasters are in poor countries.

7 Over 3 billion people in the Middle East and India/Pakistan could be facing acute shortages of water.

8 Climate change brings the risk of increases in serious diseases such as malaria, dengue, yellow fever and polio; longer rainy seasons have already led to increased malaria in Rwanda and Tanzania.

9 Loss of roads and power cables in extreme weather damages countries' economies: Hurricane Mitch in Honduras hit more than a quarter of households and led to a 7 per cent drop in agricultural output, leading to increasing poverty.

Acid Rain

Acid rain is also associated with the burning of fossil fuels. Acid deposition is caused by the emission of sulphur dioxide from coal-burning power stations and nitrous oxides from motor vehicles. These discharge large quantities into the air; they then travel with the wind and slowly oxidise on interaction with sunlight, moisture and

oxidants to produce sulphuric and nitric acids. These chemicals come to Earth in rainfall and snowfall. This process is commonly referred to as acid rain. It also takes the form of dry particles and atmospheric gases.

The vast majority of the acid rain in Europe is produced by the industrial emissions of nations bordering the North Sea. About 0.4 per cent of sulphur acids are actually caused by algae in the ocean. The principal algal emission is dimethyl sulphide (DMS). In Europe algal sulphur emission is stronger near to the coasts of the Baltic and North Sea, where rivers carry deposits of farm chemicals washed off the soil.

Acid rain is a major global problem. The acidity of some precipitation in northern North America and Europe is equivalent to that of vinegar. Acid rain corrodes metals, weathers stone buildings and monuments, injures and kills vegetation, and acidifies lakes, streams and soils. Lake acidification has killed some fish populations and can slow forest growth (ENVIRONMENT, 2007).

The European Union has now introduced legislation reducing the sulphur content of fuels, as well as ensuring that sulphur emissions from power stations have been filtered out.

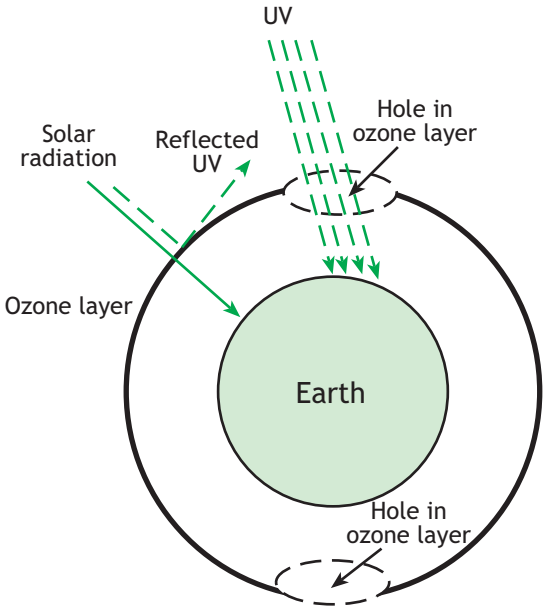
Unfortunately, the haze of acid rain that spreads across Europe into Asia is also the source of global dimming, keeping us cooler by a few degrees than we would naturally be. So the new anti acid rain legislation will contribute towards global warming.

Ozone destruction

In the 1970s and 1980s, scientists began to find that human activity was having a detrimental effect on the global ozone layer, a region of the atmosphere that protects the Earth from the sun's harmful ultraviolet (UV) rays. Without this gaseous layer, which is 40 km (about 25 miles) thick, it has been argued that no life could survive on the planet.

Studies showed that the ozone layer was being damaged by the increasing use of industrial chemicals called chlorofluorocarbons (CFCs) – used in refrigeration, air conditioning, cleaning solvents, packing materials and aerosol sprays. When CFCs are released into the atmosphere, they rise and are broken down by sunlight. The chlorine that is released reacts with and destroys ozone molecules. For this reason, the use of CFCs in aerosols has been banned in many countries.

It was initially thought that the ozone layer was being reduced gradually all over the globe. In 1985, however, further research revealed a growing ozone hole concentrated above Antarctica; 50 per cent or more of the ozone above this area of the Earth was being depleted seasonally (beginning each October). Later, a hole was also discovered above the Arctic.



A thinning of the ozone layer exposes life on Earth to excessive UV radiation, which can increase skin cancer and cataracts, reduce immune system responses, interfere with the photosynthetic processes of plants and affect the growth of oceanic phytoplankton.

Because of the growing threat of these dangerous environmental effects, many nations have been working towards eliminating the manufacture and use of CFCs, with the initial target having been the year 2000. A study organised by the American Geophysical Union in 2003 announced that the depletion of the ozone layer might be slowing down because of this international ban. Three satellites and three ground stations confirmed that the upper atmosphere ozone depletion rate has slowed down significantly during the past decade. However, CFCs can remain in the atmosphere for more than 100 years, so ozone destruction may continue to pose a threat for decades to come.

What may be more significant is the contribution of CFCs to global warming: they are a powerful source of greenhouse gases. So the attempt to eliminate them will help in the struggle against warming.

Synthetic pesticides

According to The History Channel website:

> "Extensive use of synthetic pesticides derived from chlorinated hydrocarbons to combat insect pests has had disastrous environmental side effects. These organo-chlorine pesticides are highly persistent and resist biological degradation. Relatively insoluble in water, they cling to plant tissues and accumulate in soils, the bottom mud of streams and ponds, and the atmosphere. Once volatilised, the pesticides are distributed worldwide, contaminating wilderness areas far removed from agricultural regions, and even the Antarctic and Arctic zones."

"Although these synthetic chemicals are not found in nature, they nevertheless enter the food chain. The pesticides are either taken in by plant eaters or absorbed directly through the skin by such aquatic organisms as fish and various invertebrates. The pesticide is further concentrated as it passes from herbivores to carnivores. It becomes highly concentrated in the tissues of animals at the end of the food chain, such as the peregrine falcon, bald eagle, and osprey. Chlorinated hydrocarbons interfere in the calcium metabolism of birds, causing thinning of eggshells and subsequent reproductive failure. As a result, some large predatory and fish-eating birds have been brought close to extinction. Because of the dangers of pesticides to wildlife and to humans, and because insects have acquired resistance to them, the use of halogenated hydrocarbons such as DDT is declining rapidly in the Western world, although large quantities are still shipped to developing countries."

Activity 1.8

(about 15 minutes)

Think about the last three topics we have covered – acid rain, the depletion of the ozone layer and pesticides.

What are the immediate implications of each of these three? How could they affect you and your family in your everyday life?

Write your responses in your learning journal.

Turn now to Reading 1: 'Health and the environment', from the United Nations Population Fund (UNFPA).

This reading helps to highlight the links between environmental problems and the direct impact they can have on the health of those who live nearby.

Activity 1.9

(about 15 minutes)

Relate each of the problems described in Reading 1 to one of the issues we have covered so far.

Radiation

Although atmospheric testing of nuclear weapons has been banned by most countries, eliminating a large source of radioactive fallout, nuclear radiation still remains an environmental problem.

Power plants release some radioactive waste into the air and water, but one of the main dangers to humans beings is the possibility of nuclear accidents in which massive amounts of radiation are released into the environment, as happened at Chernobyl, Ukraine, in 1986. In fact, since the break up of the Soviet Union, the world has learned that contamination of that region from nuclear accidents and nuclear wastes is far more extensive than had been realised (ENVIRONMENT, 2007). The consequences have been serious, with a high incidence of various types of cancer.

A greater problem facing the nuclear industry is the storage of nuclear wastes, which remain toxic for between 700 to 1 million years, depending on the type (ibid). Safe storage for geological periods of time seems, therefore, to be problematical; meanwhile nuclear wastes continue to accumulate, possibly threatening the integrity of the environment.

One of the temptations open to less developed countries is to store the nuclear waste from developed nuclear economies wanting to clean up their own environments, in order to boost their incomes. This may be a dangerous course to follow.

However, Lovelock, in The Revenge of Gaia (2006), argues that nuclear waste is not a problem (this is not a popular view with environmental groups):

> "An outstanding advantage of nuclear over fossil fuel energy is how easy it is to deal with the waste it produces. Burning fossil fuels produces 27,000 million tons of carbon dioxide yearly, enough… to make, if solidified, a mountain nearly one mile high and with a base twelve miles in circumference. The same quantity of energy from nuclear fission reactions would generate two million times less waste, and it would occupy a sixteen metre cube. The carbon dioxide waste is invisible but so deadly that if its emissions go unchecked it will kill nearly everyone. The nuclear waste buried in pits at the production sites is no threat to Gaia and dangerous only to those foolish enough to expose themselves to its radiation."

Gaia theory – from 'Gaia' the Earth, or Mother Earth, in mythology –describes the Earth as a self-regulating system made up from the totality of organisms, the surface rocks, the ocean and the atmosphere, tightly bound together as an evolving system. The theory argues that the goal of the Gaia system is the regulation of surface conditions so as to be as favourable as possible for whatever life forms exist at the time.

It was realised in late 2005 that, because of the dangers presented by global warming, nuclear energy might be the only reliable and 'carbon clean' source of energy for the next 100 years. In fact, in May 2006, there has been a semi-official announcement by the prime minister of the UK that the country is likely to soon start the process of building a new generation of nuclear power stations. Lovelock has argued very cogently in his book for such a course as the only one capable of giving humanity the time we need to readjust our way of living before environmental disaster befalls us.

Loss of forests and wild lands

Loss of forests and remaining wild lands, even in those areas once considered relatively safe from exploitation, is increasing at an alarming rate.

Insatiable demands for energy are forcing the development of Arctic regions for oil and gas and threatening the delicate ecological balance of tundra ecosystems and their wildlife. Tropical forests, especially in Southeast Asia and the Amazon River Basin, are being destroyed for timber and conversion to crop and grazing lands, pine plantations and settlements.

It was estimated at one point in the 1980s that such forest lands were being cleared at the rate of 20 hectares (nearly 50 acres) a minute; another estimate put the rate at more than 200,000 sq km (more than 78,000 sq mi) a year.

In 1993, satellite data provided a rate of about 15,000 sq km (about 5,800 sq ml) a year in the Amazon Basin area alone. This is rather like emptying the world's lungs of oxygen and filling them with carbon dioxide, given the importance of trees in the conversion of carbon dioxide to oxygen.

This tropical deforestation could result in the extinction of as many as 750,000 plant species, which would mean the loss of a multiplicity of products: food, fibres, medical drugs, dyes, gums and resins. It would also mean the loss of services: shelter for animals and forest peoples, recreation, nature-based tourism and research.

In addition, the expansion of croplands and grazing areas for domestic livestock in Africa, and illegal trade in wildlife and wildlife products, could mean the end of Africa's large mammals.

Soil erosion

Soil erosion is a natural phenomenon caused by water and wind, but this process has been accelerating on every continent due to deforestation and inappropriate agricultural practices.

Soil erosion is reported as degrading one fifth to one third of the cropland of the world, posing a significant threat to the food supply. For example, erosion is undermining the productivity of approximately 34 per cent of all cropland in the United States.

In the developing countries, increasing needs for food and firewood have resulted in the deforestation and cultivation of steep slopes, causing severe erosion. Adding to the problem is the loss of prime cropland to industry, dams, urban sprawl and highways: the United States alone has lost 1.1 million hectares (2.7 million acres) of farmland to non-farm uses. Moreover, in some developing countries, especially in the tropics – for example, in Zambia's Lusitu area in the Gwembe Valley-Southern Province – just a few hours of torrential downpours can wash away tons of topsoil from each acre of land. It has been reported that more than 53,000 Tonga-speaking people in the Lusitu area are facing a bleak future. For the past 40 years, the valley's forests have been disappearing 30 times faster than they are being planted, while hillsides are continually being stripped of their protective covering of vegetation. In Pakistani Kashmir in 1992, Himalayan floodwaters from steep deforested slopes devastated communities in the Mirpur area.

As Lovelock explains (1991), trees have an extremely important cooling effect. Moreover, they help lock into the soil the many precious nutrients needed for farming ecosystems and prevent them from being washed away by rainfall.

Swelling populations, poor land management, vulnerable soils and hostile climates all exacerbate soil erosion, which in turn causes crop yields to decrease. Floods deposit huge amounts of silt into downstream reservoirs and river valleys, thereby affecting aquatic life and requiring regular excavation and dredging, which both require capital.

Demands on water and air

The History Channel website notes that *The erosion problems described above are aggravating a growing world water problem* (ENVIRONMENT, 2007). While most water problems are in the semi arid and coastal regions of the world, expanding human populations in other areas also need irrigation systems and water for industry.

This is so badly depleting underground aquifers that salt water is intruding into them along coastal areas of the Arabian Gulf states, Israel, Syria and the United States. In inland areas, porous rocks and sediments are compacting when drained of water, causing surface subsidence problems (ibid).

The world is also experiencing a steady decline in water quality and availability. About 75 per cent of the world's rural population and 20 per cent of its urban population have no ready access to uncontaminated water. In many regions, water supplies are contaminated with toxic chemicals and nitrates (ibid). In Bangladesh, tube well construction has led to water extraction at deep levels from arsenic bearing rock formations, with devastating results on human health. Waterborne disease debilitates one third of humanity and kills 10 million people a year.

During the 1980s and early 1990s, the United States improved air quality by reducing particulate matter and toxic chemicals, such as lead, but emissions of sulphur dioxide and nitrous oxides, which cause acid deposition, still remain (ibid).

Turn now to Reading 2: 'State of the environment and policy responses 1972–2002'.

This document provides a brief summary of the environmental issues facing the different regions of the world over the last 20 or so years. It also provides an introduction to the policy decisions taken by local governments to try and address these issues.

Activity 1.10

(about 20 minutes)

Identify the differences and also the similarities of the problems faced by the different regions as described in Reading 2. Which are the problems faced by your own region? How do they compare with those problems faced by other regions?

Write down your ideas in your learning journal.

Activity 1.11

(about 10 minutes, not counting the supplementary activity)

Consider the specific examples identified in relation to the global environmental problems described above. Which of these are the most critical that your country faces? What factors are the greatest direct threats to your natural and physical environment?

Some examples of local problems could be:

- loss of wildlife
- beach erosion
- poor garbage disposal
- careless felling of trees/ deforestation
- coastal zone degradation
- industrial pollution
- chemical or nuclear waste dumps.

Write a summary list in your learning journal.

Supplementary to this, find out what wider problems exist in your local area, country or region. In order to obtain this information, you may need to write a letter to an environment protection agency or government ministry or department. You can also try writing to, calling or visiting your local council, library or educational institution for local information.

Note: The information you gather in this activity will help you with your final assignment.

We are now going to move on and look at another key approach to the environment and sustainable development – education and awareness-raising.

Learning about the environment and sustainable development

In order to use our natural resources wisely and ensure the safe quality of our environment, we all need a process of learning that provides awareness, knowledge and the motivation needed to translate concerns about the environment and about sustainable development into positive actions.

This first unit is intended to give you the background knowledge that you need to understand the environment and the environmental problems that young people are facing today. It also aims to provide you with material that you can use to start an education programme for young men and women to raise their awareness of the environment and issues of sustainable development.

A basic programme in such awareness provides a sound foundation for young people to participate in projects that address these problems. Environmental education and education about sustainable development is a life-long process. Covering this module and undertaking the activities with a group of young people is just a beginning.

Here, we will introduce you to some of the key concepts that relate to the complexities of the total environment, and that you may wish to pass on to the young people you are working with:

- inter-connectivity
- sacredness
- renewable and non-renewable resources
- sources of energy.

An understanding of each of these forms a key part of any education on environmental and sustainable development issues.

Inter-connectivity

There is a familiar saying: 'No man is an island'. In fact, our Earth can be viewed as a whole, where everything is connected to everything else. There are various models for this, including Gaia theory.

According to Meadows et al (1992), in Beyond the Limits, with every breath we inhale, a part of the environment becomes a part of us. When we exhale, a part of us becomes a part of the environment. There is an intimate connection between the air we breathe and our lungs, and therefore our human health. As humans, we are connected to all the cycles – water, carbon, nitrogen, oxygen etc.

Our link to the environment can be seen as systemic. Two important characteristics of a system are that:

- each part has a function to play in relation to the functioning of the whole system
- each part is connected to others in a continuous relationship.

Thinking of our connection to the environment in systemic terms is important. It reinforces the point that each component has a special function but that the whole is held together in a continuous fabric. You cannot really deal with it adequately by analysing an individual part and extrapolating from that to try and explain the whole system.

Interfering with, or disrupting, any part of the environment will seriously affect the functioning of the whole system. For example, consider the effects of polluting the water on which all living things depend for life, or the effects of polluting the air.

The following activity demonstrates the inter-connectedness of every element in an ecosystem.

Activity 1.12

(You will need to allow plenty of time for this activity, including preparations and time organising the people who will take part)

First try this activity with your family, a group of friends or your tutorial group if you have one. It is a useful activity to use in your programme for young people also. It's called the Web of Life Game and simulates what can happen in a pond or small lake ecosystem.

Preparation

You will need to prepare a card for each person (about 10). Write one the following on each card: edge weed, mosquitoes, plant-eating fish, fish-eating fish, fish-eating birds, frogs, water snakes, water, air, water grasses and plants, micro-organisms (decomposers). You might like to substitute or add other things that are found in your local area. Next, cut about 30 two-metre pieces of string.

Instructions

1 Hand each person a card and ask them to connect (using the string) with other parts of the ecosystem with which they have a relationship (food, protection, oxygen, etc.). For example the frogs are connected to the water and edge weed as protection for their eggs, the micro-organisms are connected to all living things as they decompose waste and dead material, the birds are connected to the fish as a food source, and so on.

2 Discuss all the connections that can be made within this ecosystem. You will find that the web created by the strings is quite complex. Try to elicit all possible connections.

3 Next, explain that someone has decided that the edge weed is a pest. They spray it with a herbicide ... this works best if you actually act out spraying the person with the edge weed card.

4 Ask the person with the edge weed card to tug on her or his strings to show what parts of the ecosystem will be affected first. Then those parts of the ecosystem tug on their strings to show what is affected next, and so on.

5 Discuss what happens to the ecosystem and how each element is affected. It is quite dramatic. Some things may die, while other elements may increase if their predators are eliminated ... but only if they have enough food.

Because an ecosystem is a complex, interconnected system, human activities that improve or degrade one element of the human ecosystem can have a significant effect on other elements of the system.

Sacredness

This concept refers to the fact that, as part of our spiritual relationship with the biosphere, there are instances when we must value nature for its own sake, or when we should not attempt to attach a commercial or material value to it.

Many indigenous people, such as the Indian tribes in the Amazon and the Australian aborigines, have viewed their relationship with nature as harmonious and themselves as caretakers. This belief meant that they were able to live as part of a relatively balanced ecosystem, without dominating or over-exploiting it.

For our own well being, we could learn from them to value, or consider sacred, a beautiful, healthy and safe environment. While our survival depends on exploiting other species, we need not use them wastefully. We could learn from observing how predators behave with their prey. They do not destroy their supplies. They use only what they need. As a result, the population of animals on which they prey can replenish itself.

At the individual level, we must ask ourselves some important questions about the way we behave toward nature. Among these are:

- Is my action morally right?
- Will what I do jeopardise the biosphere and the lives of future generations?

Renewable and non-renewable resources

When we talk about sustainable development, we need to be aware of the concept of renewable and non-renewable resources. Remember that a resource is anything in the natural or physical environment that people can make use of.

A resource is described as renewable if it can be replenished or reproduced (trees and animals). On the other hand, a non-renewable resource has to be replaced. Continued exploitation or destruction of resources that cannot be renewed or replaced is not sustainable. For example, a 200-year-old rainforest tree that is cut down for firewood or building materials may be considered non-renewable because of the time it would take to replace it. However, plantation timbers that are fast growing may be considered renewable, because they are grown for a specific reason such as for building materials, and they are often replaced after any harvesting so that there is an on-going supply. What is important to note here is that the rate of utilisation of renewable resources should never exceed the rate of their replenishment or reproduction.

Activity 1.13

(about 5 minutes)

Consider some different types of renewable and non-renewable resources. Thinking about your own consumption of renewable and non-renewable resources, list ten examples of each that you or your family use on a regular basis.

Write your lists in your learning journal.

Sources of energy

The sun and wind are renewable energy sources whereas oil and coal are non-renewable sources of energy. For this reason, people who are interested in sustainable development tend to look at alternative sources of energy, such as hydro, solar and wind generated electricity for heating, domestic, agricultural and industrial power. Energy sources that are alternatives to the burning of fossil fuels not only save our non-renewable resources, but they are also much kinder to the environment.

One of the biggest consumers of non-renewable energy is fuel for transport. Many of the everyday things we use or consume are transported from far away, very often from other countries.

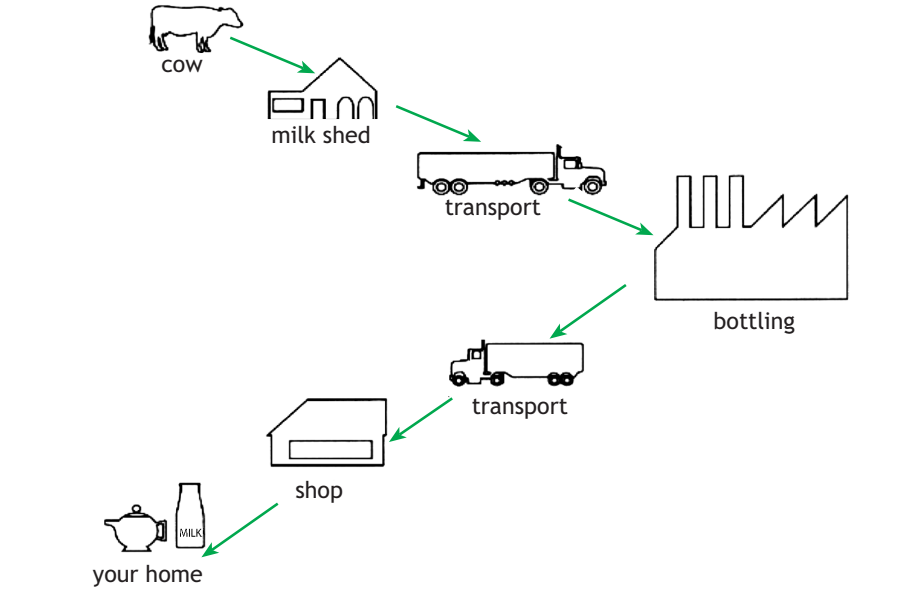
Activity 1.14

(about 15 minutes, not including trying the activity with other people)

This activity is called an energy audit. The aim is to get an idea of the amount of energy required to produce something – for example, a cup of tea. You will be surprised, especially if you live in a city. You will need to think about the ingredients and how they are processed, packaged and transported. For example, if you have milk in your tea, think about where the milk comes from.

Do you milk your own cow or buy milk? If you buy it, the cow is possibly milked with a milking machine that uses energy. Then it is transported, using petrol, to a processing plant where it is treated, packaged or bottled, transported again to a wholesaler, and again to the shop where you bought it. If you drive or go by bus to do your shopping, you use more energy. At each step there is an energy cost to produce and run the machines used for each part of the process, not to speak of the energy required to make the bottles, etc.

The energy trail just for the milk in your tea may look like this:



Add the energy trail for the boiling water, sugar and the tea to this trail for milk.

Once you have done this for yourself, work with others on this activity. Discuss all the materials and energy used at each step on each trail and whether those resources are renewable or non-renewable. Can you think of any ways that energy could be saved along the way? Can you think of any ways that you can reduce the amount of non-renewable resources that you use in your daily work or leisure activities?

You might like to draw up the energy audit for a cup of tea or coffee on a large sheet of paper to promote discussion.

This exploration of key concepts and possible activities to stimulate thinking and encourage learning about the environment and sustainable development bring this first unit to an end.

Unit summary

In this unit, you have covered the following main points:

- the underlying concepts that relate to the physical environment, such as:
  - ecosystems
  - the flow of energy
  - food chains
  - the cycling of matter
  - population regulation.
- some of the environmental problems that the world's population, including young people, face today. These include:
  - global warming
  - the depletion of the ozone layer
  - acid rain and pesticides
  - destruction of natural land, forest and wildlife
  - soil erosion.
- Finally, we introduced concepts important for learning about the environment and sustainable development:
  - inter-connectivity
  - sacredness
  - renewable and non-renewable resources
  - sources of energy.

To check how you have got on, look back at the learning outcomes for this unit and see if you can now do them. When you have done this, look through your learning journal to remind yourself of what you have learned and the ideas you have generated.

Congratulations! This means that you are now ready to advance to Unit 2, in which we will continue to discuss the natural environment and the underlying social and economic issues that affect it. In particular, we will look at environmental issues from a social and political perspective.

Answers to self-help questions

Self-help question 1.1

1 As a human being, you are:

- a primary consumer if you are a vegetarian
- a secondary consumer if you eat meat
- an omnivore if you fall into both categories.

2 Human beings contribute to the cycling of materials by consuming plants and meat. We then expel waste material, which can be broken down by decomposers to provide nutrients for plants. However, with the advent of sophisticated disposal units for human faeces and urine, humans do not generally contribute minerals to the soil except through the disposal of organic matter from their domestic activities and their use of organic and chemical fertilisers.

3 The tree has been made primarily from the carbon that is found in the carbon dioxide in the air, and that has been synthesised into tree material by the chemical systems that are part of the photosynthesis processes in the tree, releasing oxygen back into the air at the same time.

Human beings rely on trees for a range of services and products. Trees protect soil from erosion, serve as wildlife habitats, create shelter belts in agricultural regions and serve as repositories for mineral nutrients that accumulate in tree roots. In addition, trees are major sources of food and provide us with products such as chemicals and wood that are sources of fuel, construction materials and paper.

Because trees provide so many important things, destroying millions of acres of the world's forest and plant life has a serious impact on our continued ability to feed ourselves, acquire certain important chemicals and so on. It will also lead to widespread soil erosion. Moreover, since trees process carbon dioxide and produce oxygen, the destruction of vast forests may have a serious impact on the balance of gases in the air we breathe.

Self-help question 1.2

1 Definitions:

a) Our environment comprises our surroundings. It is made up of the physical world, the living organisms within it and the social structures that humans have established.

b) A functioning ecosystem is a balanced, self-supporting unit of nature. Living and non-living parts interact to exchange energy and materials, and the populations of organisms in

the system are generally in balance. Everything depends on everything else in an ecosystem, because, as we saw when we discussed the cycling of materials and flow of energy, interdependence is the means through which the ecosystem sustains itself.

2 Living things depend on non-living things such as sunshine, air, water and soil, without which life would cease to exist. At the same time, our social structures can cause the preservation or destruction of living and non-living things within the environment. For example, the activities of humans can lead to pollution of the air, water and soil and the extinction of living organisms. In this sense, therefore, the living and non-living things in the environment are inter-dependent, and to a large degree everything depends on the attitudes of society.

3 Sunshine, water and air are essential to life:

a) Sunshine is the primary source of energy. Without sunshine, plants would not be able to survive. This would destroy the food chain and all life would cease. For example, it looks as if the dinosaurs may have been pushed into extinction by a great cloud of dust and other pollution that cut out the energy from the sun and presumably destroyed a high proportion of the producers of oxygen. This was possibly caused by the impact of a giant meteorite on the Earth's surface.

b) Air contains gases such as oxygen (O2) and carbon dioxide (CO2), which are necessary for life. For example, animals need oxygen to breathe while plants need CO2 to photosynthesise nutrients. Without air, therefore, our planet would be unable to support life.

c) All living things seem to be composed of a significant amount of water, which has to be replaced when it is used. Thus, the cycle of water around the planet is crucial to life. Without water, life would cease to exist.

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Unit 2: The social environment and the natural environment

Unit introduction

Welcome to Unit 2 *The social environment and the natural environment*.

In this unit we will examine the relationship between our social environment and the natural environment. We will define our social environment and examine aspects of it that can affect the natural environment: value systems, legislation and global economics.

This leads to the question of the relationship between environment and development, which is key to an understanding of the concept of sustainable development.

We will also consider these issues in relation to the concerns of young people as we examine some of the topics that were raised at a world youth environmental meeting, Juventud (Youth) '92, held in San Jose, Costa Rica. Finally we will analyse the complex nature of what causes environmental problems, in particular deforestation, and further illustrate how all elements in the environment are inter-connected.

We will also begin to look at what action young people can take. Remember, as you work with your groups of young people, that before anyone can take political action about a presenting environmental or sustainable development problem, they need first to understand the underlying nature of the problem. Only then can they develop solutions with which they feel comfortable. At first, the solution might be as simple as using their vote to support politicians who are concerned about the environment rather than politicians who are merely popular or charismatic. Later, when they are more confident and empowered, they may be able to take action such as becoming involved in environmental or sustainable development projects and forming lobby or pressure groups.

Unit learning outcomes

When you have worked through this unit, you should be able to:

- describe some of the value systems that govern modern society
- identify the relationship between these and wider environmental concerns
- summarise the relationship between environment and development
- list the major environmental concerns identified by young people, including poverty, debt and deforestation
- suggest some approaches to introducing these issues to a group of young people.

The social environment

Our social environment consists primarily of systems that groups of people have organised to satisfy their needs. It includes all skills, all artificial structures, all means of agricultural and industrial production, all tools, all means of transport and communication and all social activities. In others words: socio-technical systems. When we speak of the social environment, we generally think of such things as social and cultural institutions (families, religion and values, law, education, economics and politics) together with what is referred to as our built environment.

Our built environment is created by people and includes buildings and other infra-structural works such as towns, cities, roads, seawalls and drainage and irrigation schemes. There is no single social environment; there are many. Each event, such as proposed legislation or construction of a major facility, as long as it is located in an identifiable place or time, has its own social environment.

Whatever happens in our social environment affects the natural environment, but this is not a one-way relationship. As James Lovelock says, our physical existence depends on our natural environment staying within the narrow limits in which it does at the moment (1991). As we have already discussed, people have had a dramatic effect on the natural environment within these narrow limits. Once we get outside the limits suggested by Lovelock, it seems that the conditions for human life as we know it would rapidly disappear. Degraded parts of the natural environment that once supported an extensive human civilisation can sometimes no longer support the economic development that humans need. This is what the evidence of civilisations like that of the Mayans seems to suggest. Indeed, if we do not start to consider our natural environment as we plan our development activities, the survival of future generations will be threatened. Read the case study below for a brief example of this.

Case Study 2.1

The Harrapan Desert

Perhaps the best-known example of the pathology of forest loss is Harrapan in western Pakistan. The region was once abundantly forested and enjoyed an adequate rainfall during the monsoon season. It was a fine example of a self-sustaining forest ecosystem. The forest was gradually cleared by peasant farmers who kept cattle and goats that grazed on the scrub and grass that replaced the forest trees. The rainfall was sustained over the region until rather more than half the forest had been cleared. But after that the region became arid and the remaining forest decayed. The region is now so dry that, as a semi-desert, it can support only a fraction of the people and other organisms that once lived there.

Source: Lovelock, 1991.

What led to the loss of the forest in Harrapan appears to have been the failure of the local farmers and herders to understand that forests keep themselves moist by generating their own rainfall. The Pakistan Government has responded well to this knowledge, and it is now a serious civil offence there to cut down trees. Moreover, there are frequent tree planting programmes in place.

Next, let's consider aspects of the social environment that can affect the natural environment:

- value systems
- legislation
- global economics.

Value systems

Because of their traditional value systems (for example, commitment to the principle of sacredness), some societies do not destroy or deplete the resources in their natural environment. The people in these societies live more or less in harmony with their environment, because they are highly conscious of their place in their ecosystems, though they may not know the scientific principles involved.

Some indigenous societies – for example, the North American and Amazonian Indians – held the belief that they did not own the land, but that they had to protect it. Some groups in India believed that the trees in the forest were gods and, as a result, they protected all trees. Australian aborigines hold a rich, powerful, mythical belief system about the land: that it was created by supernatural forces in the Dreamtime, and is cut across by supernatural lines of force called 'songlines', along which people travel without maps. These songlines were sung into existence during the Dreamtime. Even taking care of where you walk, make fire or defecate is morally directed.

Other societies, like those in the industrialised world, do not hold these sorts of beliefs about the natural environment. While the majority of people in these societies can hardly be said to be genuinely scientific or even technological, they generally have prevailing ideologies that are full of the scepticism associated with science and technology. They are even more ideologically influenced by consumerism. People in these societies tend to see the living and non-living elements in their environment as resources to be used for consumption or as a source of pleasure, even when perhaps conserved for later use. This kind of value system tends to create space for practices that may lead to environmental damage.

Many people living in cities, for example, may simply be too far removed from nature to understand and value it. They may not even be aware that their lifestyle degrades the environment. For example, global warming in parallel with significant population rise in the south east appears to have changed the environment in the UK so much that low rainfall has seriously depleted the aquifers, and very tight water control measures have had to be implemented. A state of possible national emergency has been suggested. Yet if people were careful to use only a litre of water every time they cleaned their teeth, there would be no need for these water control measures.

It is unlikely that materialist societies can ever be persuaded to develop a spiritual value system that will protect the environment, but a fully scientific understanding by a community's leadership might be a very different matter.

In extreme cases, lack of concern for one's environment may be symptomatic of deep social problems. The numbers of beggars and homeless people on the streets of large cities like New York or Lagos indicate very serious divisions in societies and wealth is unevenly spread around. A society that can accept that sort of social divisiveness may itself be very unbalanced. Edwin Small (1994) suggests that a drug addict who has come to the stage where he doesn't care about himself could hardly care less about the proper disposal of garbage or depleting the ozone layer.

Activity 2.1

(about 10 minutes)

Take a few minutes to consider the beliefs and values of your own society. Can you think of any that lead directly or indirectly to protection of, or damage to, your own environment?

Write your ideas down in your learning journal.

Legislation

Our environment is also affected by the existence or non-existence of appropriate laws and the extent to which they are enforced. When the community's leadership has the right kind of knowledge, it is at least in a position for creating good legislation.

If there are no laws created specifically to protect our environment, degradation is likely to occur. For example, the Indian River in Dominica was affected by pollution and erosion caused by tour boat operators and their passengers. This problem was attributed to the absence of regulations governing tourism activities along the river.

If laws exist, but they are weak or not enforced, degradation is also likely to occur. In such a situation, our physical environment is more likely to be affected by large economic projects. Weak legislation and governmental emphasis on economic growth, without regard for the environment, open the doors to developers, which may result in severe damage to our environment. Such damage is even more likely when the enforcement of laws and the management of the economy depend on very rich, powerful and greedy people.

The following case study illustrates how powerful lobby groups can undermine attempts to create or enforce international agreements that could protect our environment.

Case Study 2.2

Global Warming – Europe Turns the Heat on Clinton

Britain and the European Union (EU) are mounting a last-ditch effort to persuade President Clinton to back more ambitious projects to slow global warming. An EU delegation, including Britain's Environmental Protection Minister, Michael Meacher, will go to Washington in a fortnight's time in an effort to persuade State Department officials that US plans, announced last week by Mr Clinton, to cut its CO2 emissions back to 1990 levels within 15 years are inadequate and could spell failure for the conference in Kyoto, Japan, in December, when the world is supposed to agree to an international programme of cuts in CO2.

The conference is seen as the biggest test yet of the international community's willingness to slow climatic change. Only four years ago, Mr Clinton proposed cutting US emissions to 1990 levels by the end of the century. Mr Meacher said yesterday that the President's new target was disappointing, even though US stabilisation of its CO2 emissions would require a major policy shift away from profligate energy use in the United States. The Clinton administration is also insisting that it will only back a treaty at Kyoto on the condition that there are reciprocal energy cuts in developing countries, including China, and agreement on joint implementation. Mr Meacher said that the delegates would not wave a big stick, since he believed Mr Clinton was sincere, but was ... facing a battle against

despicable oil and gas lobbies under the umbrella of the Global Climate Coalition. But he warned: "*It is already unavoidable that, by the second half of the next century, we are going to reach levels of CO2 emissions that have not been reached for 20 million years. These are extraordinarily dangerous levels, and the interaction with ozone depletion means we are going into uncharted territory. All life on this planet is very sensitive to quite small changes to underlying conditions.*"

Source: The Times, October, 1997.

Self-help question 2.1

(about 15 minutes)

Having read the case study, answer the following questions:

1 What was the purpose of the Kyoto conference?

2 According to Mr Meacher, who are the real culprits behind the high levels of carbon dioxide (CO2) being released into the atmosphere?

3 In your view, what is motivating the oil and gas lobbies?

4 In this example, what is the impact of development on our environment?

5 Do you think that it is fair to seek reciprocal energy cuts in developing countries like China? Give reasons for your answer.

Compare your answers with those provided at the end of the unit.

Enforcing environmental laws

Following the Kyoto conference in December 1997, an article appeared in the New Scientist in January 1998 that further illustrates the difficulty in creating or enforcing laws to protect the environment when the economic interests of the rich and powerful are at stake. Even when global agreements are reached, loopholes can undermine their implementation.

Read the case study below for an illustration of this.

Case Study 2.3

Carbon emissions: winners and losers

In the final hours of the Kyoto Climate Conference, sleep-deprived ministers took decisions that could shape the world ... And just as in a treaty to end a war, there were winners and losers ... American companies will soon realise that there is money to be made from trading in carbon pollution permits and introducing cleaner technologies. …Russia and Ukraine also have reason to be pleased with themselves. They persuaded the conference to let them increase their allowable emissions by 40% between now and 2010. Of course their industries will not conceivably be able to grow this fast. Instead they will be selling much of that entitlement to the US and others, with whom they formed a carbon club in Kyoto. Analysts say that Moscow carbon could allow the US to turn the notional 7% cut in emissions that it has promised into a real increase of 10%. In effect, Moscow and Kiev will be laundering carbon credits for the US. And if anyone tries to write rules to prevent the trade, the club members will invoke the precedent of the European Union, which soon will redistribute its overall 8% reduction target among it member states without seeking anyone else's permission.

Source: Pearce, 1998.

Conversely, if laws are effective and enforced, protection of the environment is likely to result. For example, the St. Kitts' Turtle Ordinance, which was established in 1948 to regulate the harvest of sea turtles, was effective only in those communities that revealed the identities of fishermen who were found catching turtles illegally (Caribbean Conservation News, 1995).

Effective legislation, such as an Environmental Impact Assessment Act (or sometimes an Environmental Protection Act), requires the incorporation of environmental considerations into the planning and design of development projects. This has been proven to be a valuable and promising approach in many countries, including Australia, Canada, the Netherlands, the United Kingdom and the United States, and, to a lesser extent, developing countries in Africa and South America.

Activity 2.2

(time depends on how long your investigation takes you)

What laws, if any, has your country introduced since the Earth/ Rio Summit in 1992 to protect the environment?

Take some time to investigate this question and find some examples of these laws. You might need to contact an Environment Protection Agency or government department to find this information. Write your findings in your learning journal.

As you have seen in earlier modules, the modern world is dominated by several sociological theories. These influence approaches to the nature of power, human conflict over resources and global capitalism. These theories also hold implications for the environment. Let's look at this now.

Capitalism

Since the collapse in 1971 of the financially stabilising 1944 Bretton Woods world financial system (see Reading 3 from Unit 2), the world's stock and bond markets have been potentially very unstable. On the one hand, the speed and flexibility with which money can flow around the world has led to rapid worldwide growth. On the other hand, however, capitalism is no longer controlled by individuals or even governments, but by what happens in global stock and bond markets. The main concern of the investors who operate in those markets is to increase profits or at least not to lose money. As a result, they focus only on the economic value of goods and services. Moreover, because of the rapidity with which information is transmitted by the new electronic communications media, markets react to changes in global conditions with amazing speed.

Long term issues like the environment scarcely figure as an issue in the activities of most investors. Much investment on the ground is by huge self-financing companies like the transnationals that compete with each other – whether dealing with energy, food or pharmaceuticals. Even when they diversify, these competitive forces still dictate policy. The only way a company can afford to care for the environment is when international and national laws, backed up by powerful enforcement, make them do so, and that can only happen when the laws apply to everyone in the market.

The current nature of the global market place requires instant reaction by investors to circumstances. Sustainable environmental programmes, in contrast, require a planned programme of sustained investment. Strategies that only consider a narrow, financial focus have led to the environmental degradation we face today. The stress is on the exchange value of goods and services (what they are worth in

money terms) rather than on their use value (how worthwhile and useful they are to human beings, which necessarily includes their environmental effects). Having said this, there's not much evidence that the planned economies of China and Eastern Europe have been any better for the environment than capitalism.

Globalisation

As the discussion above on capitalism indicates, growth and wealth come from the stimulus of trade. Globalisation refers to the acceleration of international trade and financial transactions. This has increasingly included the process of removing national barriers to the various kinds of market forces, such as the barriers of national political and legal systems and the technical barriers for comparing the prices of goods. Electronic communications such as the internet make buying and selling very quick and simple across the world. This has begun to create a genuinely global economy, when the price and quality of what we buy and sell is influenced by all the contributing elements to the market around the world.

There is one overarching body supposed to control all this potential chaos – the World Trade Organisation (WTO). Unfortunately, it is perhaps inevitably undemocratic. The power and wealth of the large countries push the concerns of smaller and poorer nations to one side. CAFOD (in People and the Planet) points out that half the poorest countries in the world cannot afford a single negotiator to defend their interests, while the US has around 250 negotiators. The WTO is its own 'judge and jury' (Friends of the Earth, May 2006). Disputes with the WTO are judged by a closed, internal 'court', and the cost of raising complaints means that developing countries cannot defend themselves. The WTO wants now to increase its powers further. It wants to remove the rights of national governments to demand the recycling of materials, to insist that there are labels on goods such as fridges as to their energy efficiency, and to control the imports of chemicals and viruses (Friends of the Earth, June 2005).

These changes in the world market will have grave consequences for local economies, human welfare and the environment. To take one example – in order that societies can become competitive in the global economy, hundreds of thousands of farmers around the world will end up leaving their farms and going to work in 'export processing zones' in urban areas. Although most countries are perfectly able to grow their own food, globalisation dictates that they grow cash crops or make cheap shoes for export instead. This principle of competitive advantage (Todaro and Smith, 1997) reduces the market price of goods. But it may not reduce the real costs when you consider the consequences if it destabilises local economies and well as households' livelihoods.

Friends of the Earth Scotland issued the following press release on 8 April 2005.

> "Current trade under the WTO is widening gaps between rich and poor, stripping rights from local communities and plundering the earth's natural resources. Rich countries and big business are forcing their agenda of free trade and open markets upon the world, but this model is failing with devastating results…."

- "The WTO's obsession with free trade doesn't support measures to ensure that we don't run out of natural resources;"
- "local communities are forced from land they've inhabited for generations to make way for multinationals to extract and sell raw materials;"
- "farmers are made to use their land for crops like coffee, sugar and cocoa to sell to multinationals, rather than grow food to sell locally or eat themselves;"
- "companies are moving production to countries with cheaper labour and weaker health and safety regulations, threatening employment in their own countries and leaving workers everywhere vulnerable;"
- "companies relocating overseas means products are transported further, which increases pollution."

Having said this, maybe the WTO is undergoing the beginnings of a sea change. So indicates Dipak Patel, Zambian Minister of Commerce, Trade and Industry and Chair of the Least Developed Country (LDC) Group:

> "I was prepared to walk away from the table in Hong Kong, but the way things have turned out since Uruguay and Marrakesh is that the multi-lateral trade organisation is now in our interest because it's a rule-based system. Walking away from it and destroying the WTO would not be in our interests, because then countries would get into bi-lateral agreements and our negotiating capacity and authority and power on a bi-lateral basis is extremely weak, politically and economically. We have to engage at the WTO… but not at any cost." (2006)

Patel says that DFID gave the LDC Group significant help with the technical work necessary for formulating their own part of the rules of origin, so they were able to go to Hong Kong with all their materials and proposals ready. We will have to see, of course, whether this cautious optimism is justified.

Back in 1993, Hilary French pointed out the environmental contradiction in the issue of trade: that the growth of export-oriented economies and long distance trade is founded on cheap, plentiful, carbon-based energy in the form of fuel oil. As we transport more products further around the world, we need more energy, produce more pollution and have more accidents. Pollution from the increased use of fossil fuels to transport goods around the globe now makes up

one sixth of humankind's total greenhouse gas emissions. Already in 1991, 4 billion tonnes of freight were exported by ship worldwide, using the same amount of energy as the entire economies of Brazil and Turkey combined in a year; and 70 million tonnes of freight that year were sent by plane, using energy equal to the total annual energy use of the Philippines (French, 1993).

The global economy compels countries to compete against each other to produce the cheapest goods, on the contested principle of competitive advantage. As countries vie to attract international investors, they are pressured to neglect environmental conservation, where regulations are far from stringent anyway. Ultimately, this may negatively affect both the natural and social environments.

Consumerism

A society's economic relationships tend to influence its value system. In primitive societies, the most strongly held value is usually to consume only what you need to survive. Consumerism, on the other hand, promotes the social value of consuming a large number of commodities of all kinds. It is intrinsic to developed capitalist societies and derives from economic relations where there is a huge capacity to produce things cheaply and a need for these things to be consumed in order to keep the economy running. It requires a large consuming group with the resources to pay for these things.

Two thirds of the people in developed countries and a minority of people in the upper-income levels of developing countries enjoy a high standard of living and consume an enormous proportion of the available energy, food, water, mineral and other resources. It is estimated that 80 per cent of the world's resources are consumed by 20 per cent of the world's population. Transnational companies, caught up in the necessity to compete with other transnational companies in free market situations, are compelled to promote consumerism by the affluent, with little concern for the rest of humanity. They contribute significantly to environmental degradation, thereby jeopardising the future of generations to come.

A dramatic example of this concerns the controversial activities of the Coca-Cola company in Kerala, India. This famous company makes a very popular drink that is consumed all over the world. While there is great poverty in India, it also now has a large affluent population in a country where water is often contaminated and sometimes in short supply. This population enjoys Coca Cola. The Coca Cola company in Kerala has an ultra modern factory that employs a significant number of local workers. However, it draws enormous amounts of water from underground aquifers. These aquifers are believed to be the same ones from which the local peasant farmers and villagers draw the water essential for their needs. The local elected committee, the Panchayat, is now in dispute with the company because their own well water resources are contaminated and disappearing rapidly, with the clear possibility that

the aquifers concerned may soon be emptied by Coca Cola and take many decades to refill, if they ever do.

Through intelligent management of the environment and its resources, human beings can live simple and balanced lives and give back to the ecosystem as much as they take from it. Subsistence farming communities like this Kerala peasant community have done this for centuries, but may soon be unable to do so.

Over-exploitation of environmental resources can come about because, among other things, of overpopulation or the desire to maintain unsustainable life-styles. One of the recommendations for dealing with this problem is for people to lessen their consumption patterns, change their style of living and learn to do more with less. In the UK that lesson is just beginning to be learned by large numbers of people in relation to energy and water resources, which are becoming scarcer and more expensive.

People planning development activities need to be very sensitive to issues related to global economic inequalities.

Activity 2.3

(15–20 minutes)

Reflect back on the three areas we have covered in this section so far – capitalism, globalisation and consumerism. Summarise the main definitions of each in your learning journal and then consider the following questions:

1 What are the similarities and differences between these three topics? How do they contribute to each other?

2 What are the key points that you feel young people need to know about these three areas?

3 In what way/s do young people contribute to over-consumerism? What can they do to help alleviate the problem?

Write your ideas down in your learning journal.

We are now going to move on to look at some of the implications that these aspects of the social environment – value systems, legislation and global economics – have for people and environments around the world.

Third World debt

Another important fact about the global economic system is that, by its structural relations, it causes a serious imbalance in the distribution of wealth, and this has led to massive Third World debt. The initial impetus for this debt was the unjust transfer to newly independent countries of the debts of the colonising States. There

was also the legacy of the loans made to corrupt dictatorships, often to keep them on the side of the lending countries against the threat of communism. And then there was the mishandled lending in the 1960s and 1970s. An obvious example of this was in the way that surpluses of oil revenue in the Organization of the Petroleum Exporting Countries (OPEC) during the 1970s led international banks to lend money to poor countries at low rates of interest. These debts became very expensive, often impossible to service, when the trade cycle shifted upwards and interest rates rose during the 1980s.

In most cases, poor countries have found themselves in a cycle of indebtedness. Because their economies are weak, they have had to continue to borrow money to keep them running. However, they can normally only obtain new loans if they continue to pay money towards their existing debts. According to Professor Kenneth Rogoff of Harvard University, "*by the end of 1990 the world's poor and developing countries owed more than $1.3 trillion to industrialized countries*". In July 2005 the debt was still rising despite ever-increasing payments, and aid was falling. For 60 of the poorest countries, $550 billion had been paid over 30 years on $540 billion loans. Yet there was still a $523 billion dollar debt to be paid (Shah, nd).

When caught in this situation, what do poor countries do? The more they are indebted, the more likely they are to cull the earth's scarce resources in order to create cash for debt repayment. They over-exploit their natural resources and cut back on social services (for example, health and education) and environmental conservation programmes. Researchers like Kahn and McDonald (1994) have argued that there is a direct relationship between Third World debt and tropical deforestation.

Financial debt is definitely a major setback for developing countries with regard to their readiness and capability to contribute globally to environmental conservation. Many social organisations and movements have been established to lobby financial institutions and governments to reduce the debt of poor, developing countries. For example, the Jubilee 2000 campaign – launched in 1996 by Christian Aid agencies in the United Kingdom and by the World Development Movement – called for the cancellation of unpayable and unfair debts. Subsequently, the Jubilee 2000 Coalition combined the efforts of Jubilee 2000 and the Debt Crisis Network to form one coalition representing some 8 million people in affiliated organisations and individual members. Jubilee 2000 has contacts in over 40 countries around the world.

The HIPC initiative of 1996 by the World Bank and the International Monetary Fund (IMF), asking for debt cancellation by donor countries, has had some effect, and the G8 countries have several times promised to write-off huge sums of money. However, the debt-relief measures already taken have looked better in theory than they really are in practice. In particular there is little to prevent poor countries falling back into indebtedness given the unbalanced nature of trade. The 2005 G8 summit looked very promising on both debt

relief and climate change, but the final form of the joint resolution is not strong, and there is no responsibility accorded to rich countries to start on the processes of change.

Imbalance of wealth within countries

Imbalance in the distribution of wealth is also widely evident within the countries of the Commonwealth, where often quite a small proportion of the population may own and control most of a country's wealth. This, too, may contribute to environmental degradation. The problem is that, even if the 'trickle-down effect' of wealth creation really does work, and a new bourgeois elite does manage to kick off higher growth, initially it has to do that by exploiting the labour of the working class and the resources of the peasantry, and eventually causing price inflation.

In that period before growth picks up, old stable structures of survival are sometimes destroyed and the poorest people may well have to plunder their environment for food or materials to sell simply to survive. This is often cited in instances when too many trees are cut down for fuel, which in turn disrupts the ecosystem and can cause desertification. Vegetation might be removed from hillsides to build temporary housing. This loosens the soil, which in some countries can cause landslides. In other cases mangrove trees, which are homes to a wide variety of wild life and nurseries for fish, are destroyed to make charcoal. When the social system does not take the physical environment into account, the results include deforestation, the removal of vegetation and the destruction of the habitats for natural food supplies and, of course, widespread pollution.

Effects on the socio-economic system itself

It is important to note that the negative effects caused by our socio-economic system in turn affect the system itself. For example, deforestation adds to the threat of global warming or climatic changes. These changes can, among other things, reduce agricultural production and contribute to the cycle of poverty. Removal of vegetation from hillsides can lead to mudslides and the loss of human life. In February 1988, mudslides killed 277 residents of Rio de Janeiro, Brazil and left 20,000 homeless. Apart from the human tragedy, this is also a huge burden on an already strained economy. Another example is that the destruction of mangrove trees, which results in the reduction of important fish supplies, also thereby reduces revenue.

In effect, whatever happens in the physical environment rebounds on the social environment. Our social and physical environments are inter-related.

Self-help question 2.2

(10–15 minutes)

Look back over what you have read since the last activity. How do the values of the social environment – for example, as represented by capitalism – have an impact on the physical environment?

Summarise the key points above that help explain the relationship between the physical and social aspects of the environment.

Compare your answers with those provided at the end of the unit.

Now turn to Reading 3: 'Green justice', which has been taken from New Internationalist, No. 23, April 1992.

We would like you to read through this article now. To help guide you, there are a number of questions below to consider.

Note: The article uses 'the North' to refer to rich developed countries and 'the South' for poor developing countries.

Self-help question 2.3

(about 15 minutes)

After you have read the article, answer the following questions:

1 What role does the belief in free market economics play in helping rich, developed countries justify polluting poor, developing countries with toxic and other industrial waste?

2 What effect does structural adjustment have on poorer countries' exploitation of their raw materials for export?

3 What suggestions does the article make about ways in which poor countries can fight back? Do you agree? Why or why not?

Compare your answers with those provided at the end of the unit.

The relationship between the environment and development

We have already discussed the relationship between the natural and social environments. Now let's consider the relationship between the environment and development, which is an integral part of the social environment.

First, we must recognise that the environment and its resources are finite and that economic growth cannot continue at the expense of the natural environment. As populations and their demands increase, the idea of continuous growth must give way to a more rational use of the environment, but this can be accomplished only by a dramatic change in the attitude of the human species.

Principle 4 of the Rio Declaration points out that the environment and development are interrelated. It states that:

> "In order to achieve sustainable development, environmental protection should constitute an integral part of the development process and cannot be considered in isolation from it."

First we need to think about what development is.

Activity 2.4

(about 10 minutes)

Before you read further, complete the following activity. Consider how you would define development. Write your own definition of development in your learning journal.

Some views define development as:

- the acceleration or quickening of economic growth
- the reduction of inequality
- the elimination of absolute poverty.

Let's take a closer look at the first process mentioned in this definition: economic growth.

Economic growth results from activities such as forestry, mining, tourism, agriculture and manufacturing. All economic activities depend, directly or indirectly, on the environment and natural resources. In other words our air, water, land/ soil, minerals, forests and wild animals are all important to economic activities.

Todaro and Smith (1997) explain that a basic function of all economic activity is to provide as many people as possible with the means of overcoming the helplessness and misery that arise from a lack of food, shelter, health and protection. In their view, therefore,

economic growth in the capitalist sense can help in reducing inequality and eliminating poverty.

This is an admirable point of view. If development that is based on free markets and the 'trickle down effect' actually achieved these goals, then this approach would certainly have a lot to offer. Unfortunately, it has not yet proved to do so for some large groups of people. Furthermore, development that has economic growth as its primary focus does not take into account the potential cost of damage to the environment.

As we have already discussed, not only does the development process have a direct impact on the environment but, conversely, the condition of the environment and its resources also affects development and therefore the social environment.

In fact, it is cyclical. The degradation of the environment that results from the development process causes great losses in potential revenue to the government and people of the countries involved. Thus, on a long-term basis, over-exploitation of the environment could lead to loss of the very resources that we require for development and to the continuation of a cycle of poverty. In effect, the environmental effects of our development strategies can hinder future efforts to develop our countries.

Self-help question 2.4

(about 5 minutes)

In no more than three sentences, summarise the relationship between the environment and development.

Compare your answers with those provided at the end of the unit.

The relationship between the environment and development is key to the concept of sustainable development that you will explore further in Unit 3.

Youth concerns and responses

At a world youth environmental meeting, Juventud (Youth) '92, held in Costa Rica, young people from all over the world discussed their concerns about the environment. The issues raised at that meeting included:

- poverty and our environment
- external debt
- population growth
- natural resource degradation.

We are going to look at each of these issues in more depth here. In doing so though, we would like you to think about how you can work with young people in addressing some of these issues. As you explore some of these complex and inter-related issues, consider the following questions:

- how can young people bring about appropriate change?
- what role can I play in encouraging and implementing their involvement?

Poverty and our environment

Poverty eradication remains a global development challenge. This was underlined when it was identified as the first goal of the Millennium Declaration in the World Commission on Environment and Development (1987), General Assembly Resolution 55/2, adopted by 147 Heads of State and 189 member countries. The Commission observed that our world has more hungry people today than ever before in human history.

Inequality is also increasing. In 1976 Switzerland was 52 times richer than Mozambique. By 1997 it was 508 times richer. In 1960 the 20 per cent of the world's people that live in rich countries had 30 times as much income as the poorest 20 per cent. By 1995 it was 82 times. In 2006 the world's 225 richest people had a combined wealth of over $1,000,000,000,000. With 4 per cent of this ($40,000,000,000) we could provide for basic education and health care, adequate food and safe water and sanitation for all the people in the world.

More than a billion people still live in poverty, 10 per cent of them in industrialised countries. Of the four and a half billion people in poor countries, nearly 60 per cent lack basic sanitation; more than 30 per cent have no access to clean water; 25 per cent do not have adequate housing; 20 per cent have no access to modern health services; and 20 per cent of the children in the world do not attend school to grade 5 (New Internationalist, 1999).

In 1980, 340 million people in 87 countries lacked enough calories to prevent stunted growth and serious health risks. Average protein

consumption in France is 115 gms per day. In Mozambique it is 32 gms per day. Moreover, in 1984, differences in annual per capita income at the international level ranged from $190 in low income countries (other than China and India) to $11,430 in industrialised market economies.

In developing countries, the majority of people have very low standards of living or live in absolute poverty (at or below US$1/day, estimated by the World Bank). This is often manifested in the form of inadequate housing, poor nutrition and health, limited or no education, high infant mortality, low life and work expectancy, and a general life of deprivation and sense of hopelessness and despair.

In India about 30 per cent of the population fall below the generally accepted poverty line. The definition of the 'poverty line' is the level of income below which an individual or household cannot regularly afford the necessities of life. This level of poverty is manifested in the state of the nation's health – where malnutrition remains a serious problem. It has been estimated that about 40 per cent of the population below the poverty line are landless, agricultural labourers, urban slum dwellers and remote tribal communities.

Globally, the increase in poverty has come about because of a host of issues. Chief among these are the unequal distribution of land and wealth, inappropriate interventions by international financial institutions, rapid increases in population, environmental degradation and low living standards.

Poverty as an environmental pollutant

It's tempting to think that the results of environmental degradation and collapse will be borne equally by rich and poor alike. After all, we all live in the same overarching environment. In the light of that, we might expect considerable efforts on the part of the wealthy and powerful to protect the environment. However, as Indira Gandhi told the seminal 1972 United Nations Conference on the Human Environment in Stockholm, "*poverty is the worst form of pollution*".

The relevance of that statement to yourself can be understood in the context of the 1991 Harare Declaration of Commonwealth Principles, which recognised that "*many Commonwealth countries are poor and face acute problems, including excessive population growth, crushing poverty, debt burdens and environmental degradation*" (Commonwealth Secretariat, 2002). Of course there are rich and powerful people living even in the poorest Commonwealth countries. But the liberation of world markets and the globalisation process are enabling the coalescence of very rich and powerful people from all over the world into a multiracial international class that can move its education and its residences to wherever it chooses. To remind yourself of the reality of this, read again the appendices in Module 2.

Moreover, Bullard (2002) has observed that, despite significant improvements in environmental protection over the past several

decades, over 1.3 billion individuals worldwide live in unsafe and unhealthy physical environments. And they are almost always the poor. Consider the devastating effects of the tsunami that hit the South-East Asian region of the Pacific on 29 December 2004. Enormous numbers of very poor people throughout the region are still living on the edge of existence. The same has happened with the survivors of the 2005 Kashmir earthquake.

Even in the world's richest country, the violent hurricane in 2005 that destroyed the city of New Orleans affected the poor rather than the rich. Despite the storm being forecast, nothing was done to help them evacuate. But the risk to the poor may go deeper than that, and sometimes results from the wretchedness that is stamped into their attitudes. Van Loon and Charlesworth (2006) describe the condition of the poor in New Orleans in the following way:

> "Indeed, as several contributors have noted, one of the striking features of the tragedy in New Orleans was the immobilisation of the victims of the neo-liberal economic order. They lacked the resources to adequately respond themselves, and they lacked the public value to have resources mobilised for them, but, even more significantly, they were immobilised in their localities by the nature of their own dispositions: many preferred to stay in a locality in imminent danger, not merely because of the distances they would have to travel … but because they felt a security in the impoverishment of their own locality. It is a paradox of the labour market discrimination constitutive of such groups that members feel that the only value or security they have is by remaining within the confines of what they are confined to."

This internalisation of their marginalisation by some poor groups may mean that they lack the political will to insist on protection for the environments where they are compelled to live: in low lying coastal areas, near polluting factories or waste dumps, in hurricane belts – the areas that are most vulnerable to both natural and human induced hazards. Poverty intensifies the pressure on the environment as the poor people who are forced to occupy these ecologically vulnerable areas put natural resources further at risk in order to generate income or to consume what they need to live. The rural poor, for example, gather biofuel (wood, crop residue and animal dung) from the local environment and risk the destruction of the tree and ground cover. They also put themselves at risk of diseases associated with using such fuel for cooking activities, with women and children at the highest risk.

Many of these situations are geographically positioned in very poor countries where governments can ill-afford the establishment of proper infrastructure and effective disaster management plans to deal with hazards – like the hurricane that destroyed most of Grenada, or the widespread floods that severely disrupted livelihoods in Guyana.

It is therefore important that the eradication of poverty should remain high on the international agenda. Given the nature of capitalist

society, this has to be as a consequence of economic growth. However, while economic growth does lead to poverty reduction, there has not been as yet much indication of economic growth creating environmental improvement. In fact, many developing countries in Asia and the Pacific Region whose economic growth has accelerated have had to deal with serious negative environmental consequences.

Most leaders of developed countries agree that developing countries need assistance in an effort to lessen the impact of poverty on the environment. However, the exploitation of poor countries continues. In India, because of poverty and population pressure, only 35 per cent of urban households and 18 per cent of rural households have access to tap water. This means that almost all, particularly rural, residents are forced to overuse the water resources, which include wells, rivers and ponds. This practice has resulted in water contamination. In addition, urban populations have reverted to the growing use of rivers to dispose of untreated sewage and industrial effluent. Consequently, there has been an increase in water-borne diseases as well as overall health risks.

The city of Dhaka in Bangladesh typifies the problems for relatively poor countries of coping with what has just been outlined. This is a city with an enormous over-population of twelve and a half million people, with a continual flow of migrants from degraded parts of the countryside, crammed into a relatively small area on the heavily polluted Buriganga River. There are enormous slums, and many people live in shacks on stilts just above the contaminated water, subjected to malaria and other diseases. Until 2002 it was difficult to breathe freely at the centre of the city because of the pollution from 50,000 polluting taxis and innumerable other polluting vehicles, plus the congestion of 320,000 rickshaws.

Yet, the health levels are surprisingly good, and the city is a go-ahead manufacturing city, with a famous university, an old and important port and a fine airport and modern business area of the city. It is a major trading centre. Although the Bangladeshi state has gradually accepted the ideas of the free global market and moved away from socialism, Islamic and socialist ideals are involved in the state's treating the problems of the city and rural development very seriously. All two-strokes were banned in 2002, and now taxis run on compressed natural gas. This is one very clear piece of evidence that economic development can lead to limited environmental improvement. Even in such unpromisingly difficult circumstances, the fight for the environment can be won by the right kinds of pressure.

The bottom line is that the poor in societies have become both the agents and the victims of environmental degradation, although not the cause. The cause seems to lie with international trade agreements, the over-reliance on a free market approach to development, and of course external debt, all combined with long standing problems like over-population.

Case Study 2.4

Poverty and the environment: what can young people do?

In the spirit of the current General Agreement on Tariffs and Trade (GATT), young people can lobby international and government institutions to encourage environmentally responsible economic growth that will, in turn, provide employment in your country. Growth can be attained if industrialised countries reduce trade barriers against goods from developing countries. The reduction of tariffs on agricultural produce would be especially beneficial.

Your national youth division, with support from your national government, can create special financial initiatives that will provide seed money and training for youth to become self-employed in ecologically sound businesses, so that they can generate their own income safely.

Activity 2.5

(about 20 minutes)

Summarise the main points made in this section. Which of the issues mentioned here have the most direct relevance to the young people that you know and work with? How would you go about introducing them to the key topics?

Consider the kinds of activities that you could realistically undertake to address the issues of poverty and the environment with the young people you know. How long would they take? How would you start to organise these?

Write your ideas in your learning journal.

We are now going to go on to look at the second of the young people's key concerns.

External debt

At Juventud '92, young people expressed their fears and concerns about:

- the causes and impact of external debt
- their dissatisfaction with the approach of developed countries to development, including using financial institutions such as the World Bank and the IMF and giving priority to transnational companies, which has contributed to the depletion of developing countries' resources.

It was observed that the heaviest burden in international economic adjustments has been carried by the world's poorest people in Africa, Asia, Latin America and the Caribbean. Such concerns are still relevant today, even though a certain amount of debt cancellation, debt re-scheduling, debt forgiveness and debt swap programmes and policies have been implemented by international financial institutions. You might like to review the section on Third World debt earlier in the unit before you continue.

Activity 2.6

(about 5 minutes)

Based on what we covered in this previous section, what do you feel are the primary causes of external debt? Before we continue, write your ideas in your learning journal.

Now compare your answers with the responses given below.

The young people at Juventud '92 felt that a combination of factors has contributed to the rapidly growing debt that confronts many developing countries:

- gaining political independence without corresponding economic independence
- local autocrats
- unsustainable consumption patterns leading to increasing importation of goods
- corruption
- the poor management of developing economies
- flawed development strategies
- trade imbalances
- the fact that poor countries are encouraged to imitate the free market development model of industrialised nations.

The main environmental consequences of huge external debts can be summarised as follows:

1 *The rapid exploitation and depletion of natural resources*

This gives rise to chemical pollution, large-scale mineral and forest exploitation, the establishment of hydroelectric dams and, ultimately, environmental deterioration.

2 *A level of exploitation that can cause irreversible environmental damage*

This occurs because there is marginalisation of large sectors of the population. In order to ensure their short-term survival, many of these people must over-exploit their natural surroundings.

3 *Disregard for conservation*

Planners of development projects tend to ignore environmental planning and conservation.

4 *Economic (structural) adjustments*

These result in high unemployment rates among youth, budget cuts in the social sectors of education and health care, and thus an increase in human suffering.

Free market model

The free market model contributes to the debt problem. First, it forces poor countries to focus on short-term, export-oriented production for the global market. This has caused accelerated extraction of raw materials from developing countries. Ultimately, this leads to the depletion of natural resources and, in many cases, a reduction in the long-term income earning capacity of the affected countries.

Second, the focus on the export of raw materials has contributed to the gap between rich and poor nations. Developing countries export their raw materials at relatively cheap prices and import costly manufactured goods from the industrialised nations. Thus, there is a continuing and growing imbalance in income between developed and developing countries.

Multinational corporations

In addition to increasing the debt burden and degrading the environment, current development approaches have caused many poor countries to lose control of their natural resources to multinational corporations.

Quite often, developing countries do not possess the financial and other resources needed to exploit their own natural resources. As a result, multinational corporations, which do possess the necessary finances, purchase the right to do so. They then become the owners (or controllers) of a large percentage of forest and mineral resources in developing countries. They make extraordinary profits on these raw materials and energy production systems. The poor country usually earns low revenues and often the local population is restive, but the local elites control the situation with the army – as was the case in Latin America, for example, until the recent political changes in Bolivia, Brazil and Venezuela.

The countries with the most important raw materials are often among the poorest. Bolivia is the classic example – the poorest country in Latin America that was founded on extracting silver, gas and now oil.

In the pursuit of sustainable development, developing countries have to find alternative development models.

Activity 2.7

(10–20 minutes)

Consider the kinds of activities that you could realistically undertake to address these issues with the young people you know.

For example, young people can lobby for debt cancellation, or research and discuss the possibility of creating alternative models of development that take into consideration the cultural, social, economic and political values of the people. What is needed is a model that respects and nurtures the environment while delivering economic benefits to the people.

What campaigns relating to debt cancellation do you already know about? Where could you find more information?

How would you go about introducing young people to these? What activities could you do to help get them involved? How long would they take? How would you start to organise these?

Write your ideas in your learning journal.

Population growth

One of the factors that adds to the problem of poverty, external debt and their effect on the environment is that poor countries tend to have large, rapidly growing populations who are competing for limited resources. In this section, we will take a brief look at the mechanisms of population growth and the history of human population growth in developed and developing countries and how this affects the environment.

If a population of animals in the wild has plenty of food, shelter and fertile members, its numbers will increase rapidly until overcrowding causes competition for food and space. An overcrowded population is more susceptible to a reduction in fertility and attacks by predators, as well as to disease and parasites. These factors that limit population growth are referred to as environmental resistance.

Human populations are different from wild populations in that they have learnt to protect themselves from predators, diseases, bad weather and other factors that tend to limit the growth of wild populations.

As environmental resistance builds up, growth rate slows down because birth rate decreases and death rate increases. Animals may also migrate to other areas. As the population reaches the maximum number that the environment can support, it is said to have reached its carrying capacity for that species.

Human population trends

Until the late eighteenth century the world's human population grew slowly because the death and birth rates were almost equal. The child mortality rate was high and adult life expectancy was short because of disease and poor nutrition. From the beginning of the nineteenth century the population began to grow faster, mainly due to improved agricultural methods that led to better food supplies. In many places, houses were built with piped, fresh water and efficient sewage disposal. Advances in medicine greatly reduced death from diseases such as diphtheria and cholera. When conditions became crowded, there were still countries like America with ample space to which excess populations could migrate.

From about the 1940s, different trends started to evolve in developed and developing countries.

In developed countries such as the United Kingdom, the United States and most European countries, population growth has long been slowing down. With greater mechanisation in agriculture and industry, fewer people are needed to produce food and other goods, and large families are no longer needed to ensure survival. The cost of raising children, with schooling often into adult life, is also very expensive and very carefully considered by families. The average number of children in families is slightly more than two. In several developed countries, due to the use of birth control, the population is almost stable or may even be declining. People are living longer and having fewer children, with the result that there are fewer young people and more old people.

In developing countries such as those in Africa, Asia and Latin America, the death rate has also dramatically declined. This is due to the introduction of family planning programmes, better health care and access to medicine for diseases such as malaria and yellow fever. However, these countries still have a very high birth rate. This is largely due to the cultural pressure to have many children to guarantee economic support for family members when they grow old.

Approximately 80 per cent of the world's population lives in poorer, developing countries. Their continued rapid population growth rate puts an immense strain on countries that are already finding it difficult to support their people. The only long-term answer is population control, but family planning programmes have been relatively ineffective in areas where literacy levels remain extremely low.

Exponential growth

In theory populations have the capacity to grow exponentially, though they tend not to do so for all sorts of environmental and social reasons. Put differently, the larger a population is, the faster it will grow – for example, in the following proportions: 3:9:27:81 the rise in

numbers of a freely growing population is a function of the quantity already there (3, 3 squared, 3 cubed, 3 to the power of 4).

Self-help question 2.5

(about 5 minutes)

Imagine a glass jar full of a microscopic organism whose population doubles every day.

It takes three months before the jar is half-full. How much longer will it take before the jar is full?

Compare your answer with that provided at the end of the unit.

This is a simple illustration of what the world faces today. The human population growth rate has exponential characteristics, taking less and less time to multiply. At present rates, the population will double every 35 years and is estimated to have reached 6,000 million in the year 2000. This table illustrates the exponential growth of human population.

Year	Global population (millions)	Approximate doubling rate
6000 BC	6–10	Every 1,700 years
1000 BC	70	
Birth of Christ	150	Every 1,000 years
1600 AD	500	
1800 AD	900	Every 100 years
1900 AD	1,600	
1970 AD	3,600	Every 35 years
2000 AD	6,000	

Activity 2.8

(5–10 minutes)

What, in your opinion, are the potential responses to the problems of population growth? What solutions would you recommend?

Which of these do you think are the most realistic and achievable?

Write your ideas in your learning journal.

We are now going on to look at the third area of concern listed at the 1992 conference of youth.

Natural resource degradation

There are many examples of natural resource degradation. In this unit we will look at one of the most significant – deforestation – and its causes and what can be done to protect forests. Then you will look at a case study about upland migration and how it contributes to natural resource degradation.

Combined with air and water pollution caused by industrial waste, deforestation compounds the problem of ozone depletion and global warming. It results in erosion and the loss of topsoil so necessary to agriculture, and has many other environmentally harmful effects.

Lovelock's controversial view is that much the worst damage we can do to the earth, and the greatest threat to human survival, comes from agriculture. This is because we shall soon have destroyed two thirds of the world's natural terrestrial ecosystems – which he thinks are the essential self-regulatory systems of what he calls Gaia (as we saw in Unit 1) – in order to replace them with agricultural systems that are much less efficient at maintaining the delicate balances that allow human life to persist at its present levels.

> "Through their capacity to evaporate vast volumes of water vapour the forests serve to keep their regions cool and moist, by wearing a white sunshade of reflecting clouds and bringing the rain that sustains them. More even than this, the great forests of the tropics are part of the cooling and air-conditioning system of the whole earth."

If 70 per cent or more of the forests are destroyed, then this will destroy the rest anyway in the manner suggested by the case of the Harrapan Forest in Pakistan. This sort of destruction on such a scale would create a situation where a billion people would be left living in regions that were once forested but are now semi-desert.

It is an issue that young people can become involved with directly, and it can be rewarding because every tree that is planted is a positive

action. In Pakistan, for example, many of the tree-planting initiatives mentioned earlier involve young people.

Originally, 15 per cent of the earth's land surface was covered in tropical rainforest, but at present less than half of it is left. The best estimates, based on a survey by the Food and Agricultural Organisation (FAO) of the United Nations, suggest that some 11.4 million hectares of tropical forests are being felled each year. Youth from various regions of the world have expressed their growing concerns about the devastating effects of deforestation. These effects include:

1 loss of natural homes/ habitats

2 loss of forest species and biodiversity

3 loss of soil

4 loss of species important in themselves and that could be researched for their contribution to science and medicine

5 a direct loss of forest livelihoods: this situation mainly affects the vulnerable (women, youth and children) in developing countries.

Because the poor in developing countries are often forced to supplement their income with consumption of locally available natural resources, tropical forest resources are depleted, which may ultimately threaten the continued survival of those same poor families – as has happened in the Kigezi region of Uganda, in Kenya and in the Southern Tanzania highlands.

The main causes of deforestation are:

- commercial logging
- farming to survive
- cattle ranching.

Commercial logging

It is thought that the timber industry is directly responsible for approximately 40 per cent of the tropical rainforest destruction. The worst affected areas are in West Africa and South-East Asia. However, the industry is now making rapid inroads into the forests of Central Africa and the Amazon. Logging companies build access roads into pristine rainforests to extract timber. Forests of the Pacific are also affected. In fact it has been reported that, because of commercial logging operations, most countries of the Pacific region are experiencing great losses in their indigenous culture, which depends on people's relationship with the forests.

Farming to survive

Millions of poor people have no alternative but to destroy tropical rainforests in order to survive. Once the land is cleared, poor families will settle in and begin to farm according to the traditional practice of

slash and burn agriculture: the forests are cut and burnt, then crops are planted. However, the burning process causes the soil to become infertile within two to three years. Thus, at the end of that period, the farmers abandon the lands and clear another patch of forest in an effort to keep producing food for their families. Lovelock sees this as less damaging than other forms of deforestation because the natural forests have a chance to return. Sometimes farmers are forced away from their homes by wealthy landowners, large development projects, population pressures or poverty.

Cattle ranching

Beef cattle farming is one of the main causes of deforestation, especially in the rainforests in Central America and the Amazon. For example, it has been estimated that approximately US$8 billion worth of timber has been destroyed in the Amazon to create pastures for beef cattle. The vast herds that are grazed are not used to feed the local populations. Instead, they are reared to provide cheap meat exports that are mainly consumed in affluent countries. Thus, this aspect of deforestation is largely linked to consumerism.

Activity 2.9

(about 5 minutes)

Of the three causes listed above, which is the major cause of deforestation in your own country? What activities are being undertaken to avert this?

Write your ideas in your learning journal.

Protecting the world's forests

Lovelock's particular view of the crucial importance of forests is contested, but all the major environmental groups believe that protecting the world's tropical forests is critical. This is because, as indicated by the United Nations Environment Programme (UNEP), forests fulfil several vital functions. Here are a few of these:

- Forests provide rural populations with many of their subsistence needs, including fuel wood, charcoal, building materials, fodder, fruit, nuts, honey, medicines and dyes.
- Forests are critically important for topsoil and water conservation. Specifically, they prevent the soil from being washed away by the agents of erosion, protect the watersheds, provide shade and shelter from winds, prevent floods and landslides and retain water. Forests also increase the fertility of the soil.
- Forests harbour vast, but so far little known and documented, genetic storehouses. For example, according to the World

Wildlife Fund Winter Issue of 1994/1995, in a 2,500 acre patch of tropical forest, you could find 1,500 species of flowering plants, including 750 kinds of trees. These include genetic materials for crops, medicines and industrial chemicals.

- Forests fix carbon dioxide. In other words, the trees in forests use and store carbon dioxide (CO2), one of the greenhouse gases, thereby stabilising the global climate by reducing greenhouse gas formation. They also produce oxygen.
- Forests are an important source of industrial products including poles, plywood, veneers, paper and boards, gums, resins and oils.

However, protecting the forests is not always a straightforward choice. Here, we are going to look at one example and case study that helps illustrate the complexities of this topic

Upland migration

The following case study is about upland migration in the Philippines. The analysis that follows illustrates the complexity of the issues we have discussed so far.

Case Study 2.5

Upland migration in the Philippines

In 1990, the Philippines had an estimated population of 62.4 million occupying a land area of 300,000 square kilometres. The population density was over 200 people per square kilometre, thereby making the Philippines one of the most densely populated countries in the world. Further, the population was expanding rapidly. Between 1985 and 1990, the average annual population growth rate was 2.8 per cent.

One of the main challenges that continue to face the country is the extreme pressure exerted on the economy by the need to generate employment. It has been estimated that during the 1990s about 4.4 million new jobs had to be created every year just to keep pace with young people entering the job market. In the upland areas, where 32 per cent of the population (17.5 million people) reside, population pressure is extreme. Most of the upland population are migrants from lowland areas and about 11 million of them live in forested areas of the uplands. By 1985, the upland areas accounted for about 30 per cent of the cultivated land in the Philippines.

Source: World Resources Institute, 1994.

Let's now analyse the causes of upland migration. They can be summarised as follows:

- a downturn in the economic environment
- limited access to land

- widespread poverty
- government resettlement programmes
- timber policies.

We will now go on to look at these further within the context of the case study above.

A downturn in the economic environment

In the 1980s, the Philippines experienced a downturn in the economic environment, as did many countries. During the 1970s, the predominant flow of immigrants was towards the cities. Manila was the most popular destination because of the city's employment opportunities and the government's aggressive programme against illegal forest occupants in 1976.

However, during the 1980s, the migration pattern changed. Employment opportunities in Manila reduced sharply and, as a result, migration to the uplands increased. What caused the shift in the pattern of migration?

The Philippine government experienced an economic crisis, which was triggered off by:

- its domestic economic policy
- excessive bank lending
- changes in the international market, which led to the collapse of the sugar industry in the Western Visaya islands.

Like many other developing countries, the Philippines was forced to obtain stabilisation loans from the IMF. They also had to accept the government's imposition of sharp measures to control inflation and government spending. This economic shock hit the poor very hard, driving unemployment up (especially among youth) and real wages down. Ultimately, it led to the decrease in the population of Manila and the increased flow of people to the uplands.

Limited access to land

The arable lowlands were fully cultivated by the mid-1970s and growing numbers of people had their access to agricultural land limited. One of the reasons for this problem was the inequitable distribution of land. In 1980, only 3.4 per cent of the farms occupied 26 per cent of agricultural land, often the country's most productive soil. The rapid population growth and the land distribution combined to bring about a large increase in the number of landless agricultural workers. From 1975 to 1980, the percentage of landless farm workers in the agricultural labour force grew from 40 to 56 per cent. Over 60 per cent of landless workers were employed on sugar and coconut farms at less than subsistence wages.

A close relationship existed between landlessness and migration to the uplands. Between 1980 and 1983, more than 60 per cent of all upland immigrants were landless.

Widespread poverty

In the Philippines, particularly in the rural areas, there exists widespread poverty. In 1985, about 28 per cent of the population had incomes below the subsistence level; about two thirds of those people lived in rural areas. Besides low incomes, as in New Orleans many of these people felt powerless, were excluded from mainstream society and lacked access to basic social infrastructure such as potable water, health care and education. As you may yourself have observed, poverty has a spatial bias – degrees of accessible social and geographical space are closely related to people's degree of wealth. Thus the poor have access to less land than the rich.

Poverty is also associated with high population growth rates. At times these can offset the effects of poverty (in many rural communities of Asia and Africa, larger families are needed for farm labour and for security in old age). Ultimately, however, they lead to greater poverty. Population growth is higher among the rural poor, partly because family planning services tend to favour urban residents, and it is associated with low per capita income.

Government resettlement programmes

To deal with the population growth and migration problems, the Philippines Government established resettlement schemes. These efforts brought about 200,000 families into upland areas in the 1960s and 1970s. However, road building and other support programmes attracted many more migrants to the upland areas. Thus, eventually 1.3 million migrants occupied forest land that had become accessible through the resettlement programmes.

Timber policies

The government's timber policies contributed to the upland migration. Timber licenses were awarded for a period of 25 years. This was well short of the time needed for forests to regenerate. Thus, timber operators logged forests and then left to find new areas for their logging operations. The result was the establishment of a network of roads and logged land. Timber activities contributed to upland migration because migrants provided a source of cheap labour for logging activities. Moreover, the logged land was much easier to clear for cultivation and was farmed by migrants. Because of these factors, by 1985, 62 per cent of the upland population resided in timber concession areas.

Activity 2.10

(10–15 minutes)

Consider the following questions and, based on what you have read so far, write your response in your learning journal.

1 What effect is migration from lowland areas likely to have on the forest resources in upland areas?

2 What links between economic development and the environment are illustrated in this example?

3 Do you see a direct relationship between events at the global level and changes at the national/ local level? If so, what are they?

The environmental impact of the upland migration

As a result of the upland migration:

1 forest cover declined from 50 per cent of the national territory in 1970 to less than 21 per cent in 1987

2 cultivated uplands increased significantly

3 soil erosion was estimated at about 122 to 210 tons per hectare annually for newly established pasture, compared with two tons per hectare for land under forest cover

4 many upland sites had a population density of 300 per square kilometre in the 1980s. These sites also suffered a high rate of deforestation and soil loss, due in part to a greater demand for fuel wood.

Case Study 2.6

Protecting forests: What can young people do?

1 Support local organisations concerned with protecting forests and planting trees.

2 Arrange and encourage community tree planting activities throughout the year, rather than just on special days like World Environment Day (June 5).

3 Lobby government and local authorities to protect the forests in your country through legislation and education.

4 Become involved in the various awareness campaigns and spread the word about the need to protect the earth's forests.

A good understanding of the underlying causes of environmental problems will help to motivate young people, so that they can become enthusiastic participants in environmental projects.

Of course, it is also important to generate discussion about what concerns the group at a local level, and for these young people to begin to see that they can do something about local environmental problems.

Activity 2.11

(20–30 minutes to write your ideas in your learning journal)

Design two sessions for your group of young people to raise their environmental awareness, with a view to involving them in a project in the future.

Concentrate on introducing them to some of the issues that have been raised in this unit:

- the relationship between the social and physical environment
- poverty and our environment
- external debt
- population growth
- natural resource degradation.

Think carefully about (a) the information that they need to know, and (b) the activities that you will do with them in order to help them express their ideas and offer their own solutions.

You can structure the sessions however you like, but the following suggestions may help you to get started.

You may find it helpful to discuss this activity with colleagues or others in your tutorial group.

Two (1 to 2 hour) sessions

Session 1: Our physical environment

You will be able to use much of the information from this unit for the first session, but remember that your local environment will be of most interest. Try to draw on local examples to illustrate what you are talking about.

Design activities to encourage the group to explore local environmental problems and how they might have been contributing to them, for discussion in the second session. Ask them to think about possible solutions to the problems they identify.

Session 2: Environmental problems

In this session, introduce the global environmental problems. Use the information in this unit as a start, but you might like to do your own research for greater understanding. Discuss the local environmental problems that your group identified and possible actions that could be taken individually, at the household level, at the level of the community and at the level of the country in an effort to avoid, mitigate or minimise these problems. Draw up lists of these things on a board or paper.

Note: This activity will help you with your final assignment.

Unit summary

In this unit, you have covered the following main points:

- our social environment and those aspects of it that can affect the physical environment, including:
  - value systems
  - legislation
  - global economics.
- some of the major environmental concerns that young people identified at Juventud '92, including:
  - poverty and the environment
  - external debt
  - population growth
  - natural resource degradation, taking deforestation as an example.
- some of the actions young people can take in addressing these concerns.

To check how you have got on, look back at the learning outcomes for this unit and see if you can now do them. When you have done this, look through your learning journal to remind yourself of what you have learned and the ideas you have generated.

In the next unit we will go on to look at how these issues have contributed to the development of an awareness of the need for environmental protection. We will also see how this helped to develop the principles of sustainable development.

Answers to self-help questions

Self-help question 2.1

1 The Kyoto Conference aimed at reaching an agreement on an inter-national programme of cuts in CO2 emissions.

2 Mr Meacher views the oil and gas lobbies as the real culprits behind the high levels of carbon dioxide being released into the atmosphere, and thinks that this behaviour is despicable.

He knows that Mr Clinton's presidency has depended significantly on his record for creating jobs, and that, to create jobs, the president requires support from big business investment. The oil and gas lobbies represent some of those big business interests and use their influence on the economy and job market to prevent legislation for environmental protection. Mr Meacher calls them despicable because they must know the possible dangerous effects that global warming could have on the environment.

To some extent, Mr Meacher's view is accurate. However, we should recognise that perhaps the real villain behind the carbon emissions is the global market itself. Once you have an open market system on the present scale, no market operator is big enough to influence the laws of supply and demand. That can really only be done by a worldwide international agreement between governments and all the big companies.

3 The oil and gas lobbies are motivated by concern for profits and general economic growth.

4 In this example, development efforts aimed at promoting economic growth have led to a potentially serious form of environmental degradation. In the interest of development, human beings have caused dangerous levels of carbon dioxide to build up in the atmosphere. This has led to global warming and has implications for flooding and other natural disasters.

5 Before we determine whether this request is fair, we need to establish whether there is a benchmark of what might be considered acceptable levels of CO2 emissions and whether developing countries have exceeded this benchmark. Such a benchmark is particularly necessary since CO2 emissions result from such processes as burning oil, coal and gas. These processes are all essential to development.

Self-help question 2.2

Our social and physical environments are interdependent. Our social environment relies on the physical environment for food, air, water, soil and natural resources. In turn, balance within our physical

environment depends on wise environmental practices within the social system.

When, in the interests of development, the social system over-exploits the resources of the natural system or uses inappropriate methods to exploit and/or process resources, damage to our environment results, and that damage then in turn has repercussions on development.

Self-help question 2.3

1 The main idea behind free market economics is that, wherever possible, the market should be allowed to decide about such things as resource use and allocation. People or organisations that hold this view would see no problem with exploiting the raw materials of developing countries or causing pollution there. Their assumption would be that such exploitation would in turn create a self-correcting market response. Thus, free market economics play a significant role in helping rich, developed countries justify:

- polluting poorer developing countries with toxic and other wastes
- using political and economic muscle to impose economic policies
- showing little interest in the development of poorer countries.

The writer views the relationship between developed and developing countries as inequitable, and considers that this inequity is made worse by a free market economy.

2 Structural adjustment programmes require borrowers to compete in free market terms at the same time as trying to repay crippling debts. The only solution within that system is for them to increase the production of raw materials, and to grow cash crops to satisfy the needs of markets in developed countries. In effect, free market economics and structural adjustment programmes have led to poverty and over-exploitation of natural resources in developing countries.

3 The writer clearly thinks that governments of rich countries will not do the right thing because of their economic policies and their power within the global market. Therefore, he argues for a programme of concerted political action by developing countries and mass support for activist groups. He suggests that such action may include the implementation of sustainable development strategies that result in, among other things, legislation to ban the import of hazardous wastes. While the writer feels that conferences such as the 1992 UN Conference on Environment and Development may not be action oriented, he thinks that they are important tools because they can lead to consideration of, and efforts to influence, public opinion.

Self-help question 2.4

Our environment can be divided into two interdependent parts: the physical environment and the social environment. Part of the structure of the social environment consists of people's development strategies, which rely on the exploitation of the resources in the physical environment. When, in the interest of development, the social system over-exploits the resources of the natural system or uses inappropriate methods to exploit and/or process resources, damage to the environment results. That damage then has repercussions on development.

Self-help question 2.5

The population doubles every day, therefore it will only take one day for the jar to go from being half-full to full. This is the result of exponential growth.

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Unit 3: What is sustainable development?

Unit introduction

Welcome to Unit 3 *What is sustainable development?* In Unit 1, we observed that there is widespread destruction and degradation of the environment. As a result, there has been a global call for the integration of environmental protection and development. To many people who are concerned about the environment, some of the answers lie with a new development path: sustainable development. Young people and women have a major role to play in this.

In this unit, we will examine:

- the major events that have caused the world to focus on the need for environmental protection, in particular the 1992 Earth Summit
- what sustainable development means
- why action by young people and women is essential to the success of sustainable development projects
- opportunities for young people to participate in sustainable development projects.

It is important to note that this unit has a particularly heavy reading schedule. Because of this, you should expect to spend a greater amount of time covering this unit than others.

Unit learning outcomes

When you have worked through this unit, you should be able to:

- identify the milestones that have contributed to environmental protection and sustainable development in recent years, including Agenda 21
- give a definition of sustainable development
- describe the specific roles that youth and women can play in working for environmental protection and sustainable development at local, national and global levels
- design and implement environmental protection and sustainable development activities that involve young people.

Environmental protection

As early as 1864, George Perkins Marsh, in Man and Nature, called attention to a growing worldwide need for environmental protection. Marsh emphasised that humans were making global and often permanent and disastrous changes in the environment. He urged that disturbed environments be allowed to heal naturally or be restored by certain alterations or by skilled management.

However, the world only started to open its eyes with the occurrence of very visible environmental disasters, such as the vast land degradation caused in the United States by over-farming and drought during the 'dustbowl' era of the 1930s, and the Minimata Bay tragedy in Japan in 1953, where mercury was discharged into a river with disastrous consequences.

In the 1960s and early 1970s, the world became more acutely aware of the need to protect the environment. The 'silent spring', in the title of the book by the American biologist and writer Rachel Carson (1962), refers to the fact that the chemical pesticides used by farmers to control insect and plant populations accumulated in the livers of birds, many hundreds of thousands of which died as a result. Carson showed that setting aside wilderness areas and wildlife refuges did not protect birds from the effects of pollution. She also wrote about the already clear links between living resources, chemical pollution and human health.

Now turn to Reading 4: 'Major events in environmental protection'.

This reading describes a number of major events that have caused the world to focus on environmental problems and the need for environmental protection.

Now that you've read an account of major events, let's try to group these according to periods and the main issues or themes.

Period	Themes
1900–1962	Awareness of incidents of pollution grows.
1970s	Political awareness and action, at the highest level, to solve environmental problems.
1980s	Recognition that environment and development are two faces of the same coin and that the issue of poverty is closely related to environmental degradation and development.
1990s	Merging the concepts of 'environment' and 'development' through the concept of 'sustainable development'.
2000s	International cooperation, partnerships and commitment to achieve sustainable development.

Activity 3.1

(about 15 minutes)

From Reading 4, try and identify the major policy changes that each event contributed towards environmental and sustainable development. Write your ideas in your learning journal.

Then consider the table above in terms of the events described in Reading 4. Do you agree with the thematic developments mentioned, or is there evidence of other themes in each period? Make note of your responses in your learning journal.

We are now going to look in some detail at a few of these events and themes. As we examine the themes and activities throughout the past century, it is evident that the 1992 Earth Summit in Rio de Janeiro was an important milestone. It helped awaken the world to the need for a development process that does not endanger future generations. Let's look at it now.

The Earth Summit

The Earth Summit conference was the largest gathering of world leaders in history, attended by representatives of 178 nations, including over 100 Heads of State. It was convened to address urgent problems of environmental protection and socio-economic development.

By means of treaties and other documents signed at the conference, most of the world's nations committed themselves to the pursuit of economic development in ways that would protect the Earth's environment and non-renewable resources.

The Earth Summit conference resulted in:

- a set of agreements that represent a significant advance in international cooperation around sustainable development issues
- political commitment to achieving the goals of the agreements
- the placing of the issue of sustainable development at the heart of international agendas
- new paths of communication and co-operation between official and non-official organisations that work towards development and environmental goals
- an enormous increase in public awareness, which ought to facilitate the adoption of appropriate policies and the allocation of additional resources to fulfil the necessary tasks.

The main documents agreed on at the Earth Summit were:

- The Convention on Biological Diversity – a binding treaty that requires nations to take inventories of their plants and wild animals and protect their endangered species.
- The Framework Convention on Climate Change, or Global Warming Convention – a binding treaty that requires nations to reduce their emission of carbon dioxide, methane and other greenhouse gases thought to be responsible for global warming. It did not set binding targets, however.
- The Declaration on Environment and Development, or The Rio Declaration – 27 broad, non-binding principles for environmentally sound development.
- The Statement of Principles on Forests – a non-binding statement recommending that nations monitor and assess the impact of development on their forest resources and take steps to limit the damage done to them.
- Agenda 21 – a 300-page document that outlines global strategies for cleaning up the environment and encouraging environmentally sound development.

We will now look at the two most important of these documents in a little more detail.

The Declaration on Environment and Development

The Declaration on Environment and Development outlines the 27 broad, non-binding principles for environmentally sound development that were established at the Earth Summit in 1992. These are the basic principles of sustainable development, and we will return to them later in this unit when we examine the concept of sustainable development in more depth.

Now turn to Reading 5: 'The Declaration on Environment and Development'. This document is also referred to as The Rio Declaration.

Familiarise yourself with the major principles that underpin this document and consider the direct implications that these have for young people's involvement in environmental protection.

Agenda 21

Agenda 21 is a blueprint on how to make development socially, economically and environmentally sustainable. It contains strategies for preventing environmental degradation and for establishing a basis for a sustainable way of life on the planet into the twenty-first century.

Agenda 21 identifies nine major groups as partners with governments in the global implementation of the Rio agreements:

- women
- farmers
- young people
- trade unions
- business and industry
- local authorities
- scientists
- indigenous peoples
- NGOs working in environment and development.

In response to Agenda 21, several countries, including Guyana, Jamaica, Nigeria, Pakistan and St. Lucia, with the assistance of the World Bank and other financial institutions, have prepared national documents, called variously a National Environmental Action Plan, National Conservation Strategy or Sustainable Development Strategy.

Activity 3.2

(time taken will depend on how long you need to spend on your investigations)

For this activity, we would like you to carry out some investigations regarding local involvement in Agenda 21. This will involve spending some time contacting people and gathering information.

Your country should have prepared national reports on the status of implementation of Agenda 21, for presentation to the United Nations Earth Summit +5 (1997) and the World Summit on Sustainable Development (2002).

Find out about any national, regional or local action plans that were developed in response to Agenda 21. Do they address any of the principles outlined in the Declaration on Environment and Development? What are the major challenges your country faces with regard to the implementation of Agenda 21?

For example, you can seek to find out what steps your government has taken to:

- combat poverty
- conserve your country's natural resources
- strengthen the role of youth and women in environmental management

- integrate environment into the decision-making process
- strengthen the role of local government
- establish laws, regulations and agencies in an effort to protect natural resources.

In gathering this information, you might consider approaching local and national government departments, schools and colleges, and local and national NGOs involved in environmental issues. Each of these might have leaflets or documents that describe their involvement with Agenda 21 or other environmental activities.

Outcomes of the Earth Summit

Although the Earth Summit did achieve a massive leap forward in global awareness of the need for environmental protection and some consensus about future action, there were disputes between the wealthy, industrialised nations in Europe and North America and poorer developing countries in Africa, Latin America, the Middle East and parts of Asia.

In general, poorer countries were reluctant to jeopardise their economic growth through the environmental restrictions urged on them by richer, developed countries unless they received increased financial aid, which they claimed would help make environmentally sound growth possible.

The Commission on Sustainable Development (CSD) was created to monitor and report on implementation of the Earth Summit agreements. It was agreed that a five-year review of Earth Summit progress would be made in 1997 by the UN General Assembly, meeting in special session. We will look briefly at this five-year review now.

Earth Summit +5

Earth Summit +5 was a special session of the UN General Assembly that took place five years after the 1992 Earth Summit in Rio de Janeiro. It aimed to evaluate how well countries, international organisations and sectors of civil society had responded to the challenge of the Earth Summit. Its objectives were to:

- revitalise and energise commitments to sustainable development
- frankly recognise failures and identify reasons for these
- recognise achievements and identify actions that would boost them
- define priorities for the post-1997 period
- raise the profile of issues addressed insufficiently by Rio.

It found that, while interest in and concern about the environment remained high and some advances had been made, there were still major environmental problems facing future generations. For example, we were still faced with a polluted and damaged atmosphere, poisoned and diminished water supplies, erosion and soil degradation, loss of bio-diversity, food shortages and depletion of natural resources.

Progress at the international and governmental levels had been slow in developing strategies for sustainable development because of political and economic conflicts. However, at the regional and local levels the meeting found that successful grassroots action was taking place through many exciting projects.

Activity 3.3

(about 40 minutes)

Take 10 minutes to summarise the main points made in the section on the Earth Summit and its outcomes. Then consider the following questions:

- How would you define the major contributions to environmental protection and sustainable development made by the Earth Summit?
- How would you begin to introduce these points to a group of young people?
- Which of the issues mentioned here have the most direct relevance to the young people that you know and work with?
- How would you begin to generate young people's interest and involvement in these issues at a local level?

Write your responses to these questions in your learning journal. You might spend up to 30 minutes on this part of the activity.

Another key event in the legislation for environmental protection was the 2002 World Summit on Sustainable Development. We look in more detail at this event later in this unit. Now, however, we would like you to explore the Earth Summit in more detail with the reading below and the activity based on it.

Now turn to Reading 6, which looks at Earth Summit +5 success stories and Earth Summit +10 success stories.

This document from the UN Department of Economic and Social Affairs provides a summary guide to a series of local and national projects that came about as a result of the Earth Summit and its follow-up conferences.

Finally, if you have access to the internet, you can read more about the Earth Summit, Earth Summit +5 and the World Summit on Sustainable Development, including key documents such as Agenda 21, on: http://www.un.org/esa/earthsummit/

Activity 3.4

(about 40 minutes)

Review the case studies in Reading 6 in the light of your own context and interests.

Identify which of the cases outlined here are of most relevance to you and the young people you might be working with.

Explain which of these case studies you feel are the most practical and feasible for the situation in which you live and work, and why.

You might review these case studies based on their similarities to your geographical location, language or culture. You might also review them according to the value or relevance of the activities they undertake.

You may find it helpful to discuss your ideas with your colleagues.

As you read through, make note of your responses in your learning journal.

We have been looking in some detail at the Earth Summit, one of the key formal events related to environmental protection and sustainable development. However, the informal activities of local groups and individuals can have as much impact as the large-scale global conferences. We are going to look more at this in the next section.

Social movements

Social movements can be a sudden response to grievances and/or a product of planning and organisations. They can be defined as any broad social alliances of people who are connected through their shared interest in blocking or affecting social change. Since the 1960s, social movements have been a key agent of positive environmental and social change.

You may find it interesting and worthwhile to learn about the work of social environment movements, such as the Conservation Movement, which sought to protect biodiversity on aesthetic, traditional and spiritual grounds; the Ecology Movement, which focuses on the inter-relationships between human sciences and human responsibilities; and the Environmental Justice Movement, which links social,

ecological and environmental concerns with the ultimate aim of ending environmental racism.

For more information go to the following website: http://en.wikipedia.org/wiki/Environmental_movement.

Note also that social movements can be established at any level – international, regional, national or local. At the national level, for example, the Green Belt Movement in Kenya – headed by Dr. Wangari Maathai, world-renowned environmentalist, advocate for women's rights and Nobel Peace Prize winner – provides income and sustenance to millions of people in the country through the planting of trees.

The following activity should enhance your understanding of the role of social movements.

Activity 3.5

(about 30 minutes)

Based on your awareness of informal social environmental activism in your own surroundings, identify those movements or activities that you are familiar with. Once you have done this, consider the following questions. Write your responses to them in your learning journal.

1 Can you give the name of and describe the role of one or two social environmental movements in your community or country?

2 For each of these, write a paragraph (7–10 lines) on the influence that these social environmental movements have had in terms of changing local practices, raising awareness, involving local people and influencing government activities.

3 Based on this, what do you think these movements could do to improve their activities and to have a greater influence at the local level?

Sustainable development

The concept of sustainable development has come up a number of times in this module as we have explored the impact of the social environment on the natural environment and the relationship between the environment and development. Now we examine more closely the meaning of sustainable development and its main features.

You are probably aware that sustainable development has become a compelling concept to many of those interested in the environment.

While there is debate over the way that it is interpreted and implemented, the concept remains central to any approaches to saving our environment.

The term 'sustainable development' was first used by economists who were concerned about the problems caused when efforts to promote growth ignored the environmental dimensions of that growth. Such efforts focused on activities in which projected benefits exceeded projected costs by the highest margin possible. Of course, this was a very limited and dangerous way of calculating economic growth, because it did not look at the environmental effects of growth, which are normally long-term costs.

In the 1980s, the term came to be used to convey a different idea. It was used to describe development that takes account of environmental consequences. How was this change brought about? During the 1980s a number of reports from agencies concerned with the environment and development (some of them already mentioned in this unit) called for a radical approach to natural resource exploitation and economic development.

They suggested that existing forms of economic development were not sustainable because they undermined the natural resources and services on which all economic activity is based. In fact, those forms of development failed to meet the needs of a growing number of the world's people, many of whom lived in a state of absolute poverty. As a result, the reports recommended that human societies should implement sustainable development programmes.

This new approach would bring together two aspects of development that the previous approach separated:

The socio-economic aspect. This involved economic production and the satisfaction of human needs. (See the discussion on environment and development in Unit 1.)

The environmental aspect. This involved the capacity of the environment to cope with the effects of economic activity.

So the rise in the use of the sustainable development concept has been caused by growing recognition that:

- the impact of development on the environment is so great that development cannot be contemplated without reference to its effects on the environment
- environmental and development concerns must be integrated.

An ecological approach

In 1980, the International Union for Conservation of Nature and Natural Resources (IUCN), the United Nations Environment Programme (UNEP) and the World Wildlife Fund (WWF) published the World Conservation Strategy in which they defined sustainable

development in terms of ecology. According to their definition, sustainable development had three priorities:

1 to maintain essential ecological processes and life support systems

2 to preserve genetic diversity

3 to sustain utilisation of species and ecosystems.

You will notice that this view of development ignores the issue of economic growth. Since environment and development cannot realistically be separated like this, this view of development is as flawed as the earlier one that ignored environmental effects.

In our drive to protect the environment, we cannot ignore variables such as economic and social factors. The physical environment cannot be sustained if development policies do not consider the need for changes in access to resources, and the distribution of costs and benefits. Otherwise we create or maintain a group of the very poor who are forced to subsist by damaging the environment in order to find the wherewithal to live.

Those of us who live in developing countries will agree that a world in which poverty and inequity are present will always be prone to environmental crisis. Thus, if sustainable development is to be achieved, basic needs must be met and opportunities must be provided for everyone to have a better quality of life. Do your own experiences support this view or not?

An integrated approach

The World Commission on Environment and Development (also known as the Brundtland Commission after its Chairman, Gro Harlem Brundtland of Norway), which was formed in 1983, redefined sustainable development. Its final report, Our Common Future, which was published in 1987, defined sustainable development as: "*Development that meets the needs of the present without compromising the ability of future generations to meet their needs*".

The report points out that:

> "Environment and development are not separate challenges: they are linked. Development cannot subsist on a deteriorating resource base; the environment cannot be protected when growth leaves out of account the costs of environmental destruction."
>
> (World Commission on Environment and Development, 1987)

In fact, within the notion of sustainable development are two other key concepts:

1 The concept of needs – more particularly, the basic needs of the world's poor to which overriding priority should be given.

2 The concept of limitations – limits that are imposed on the capacity of the environment to meet present and future needs. These limits are brought about by the state of technology and social structures.

Next we look at the characteristic concerns that distinguish sustainable development from other forms of development – quality of life and social equity.

Quality of life

The supporters of sustainable development view the quality of human life as the main concern of development. In fact, sustainable development is a process of gradual improvement in the quality of human life brought about by economic growth.

The change must be gradual because sudden and rapid change requires over-exploitation of environmental resources and defeats the purpose of sustainable development.

Social equity

Sustainable development also implies social equity. Entailed in the idea of social equity or equality are:

- respect for regional, national, local, ethnic and cultural diversity
- the strengthening and full exercise of citizens' participation in development
- peaceful coexistence and harmony with nature.

As we seek to achieve social equity, our goal is to ensure the quality of life for future generations while meeting the needs of the present citizens.

Robin Pellew, Director of WWF-UK, argues that conservation laws that take away the livelihood of rural populations and do not offer alternative benefits are inappropriate. He suggests that the solution to the conservation problem is to involve local communities in conservation. For example, elephants will survive only if rural people want them to – therefore, a live elephant must be worth more to the people than a dead one. Communities must benefit directly from sustainable exploitation while having the confidence to invest in its future conservation. People thus become part of the solution and not part of the problem (Pellew, 1995).

Sustainable development involves changing production methods and consumption patterns in the interest of ecological balance. For example, industries can modify or replace their equipment in order to conserve natural resources. In one example, a Kenyan factory modified its milling process in order that less water would be needed for purification and less energy would be required to purify and pump the water (Commonwealth Secretariat, 1992: 10).

Activity 3.6

(about 15 minutes)

Summarise the main points on sustainable development we have covered so far. Use this summary to write your own brief definition of sustainable development in your learning journal.

Once you have done this, provide two examples of your own to illustrate what in your opinion is and is not sustainable development.

The challenge

Sustainable development offers long-term benefits. We must note, however, that it presents a major challenge for developing countries. This is because sustainable development may require that they choose between short- and long-term benefits. This is a difficult choice as these societies may have an urgent need for short-term financial benefits. They may have stagnant economies, with low or uneven growth, and as a result may make choices that damage the environment. The publication Environmental Pollution illustrates this challenge to poor countries when it states that:

> "Caribbean governments, under pressure to generate foreign exchange, have often been tempted to allow the establishment of foreign-owned industries with inferior or no pollution systems to treat their waste. Several of these industries often cut costs to increase profitability by using highly polluting technology. Many of these industries provide short-term financial gains, but in the long term, result in the destruction of the environment." (1993: 7)

Principles and strategies of sustainable development

The success of any project or activity depends on sound principles and strategies. We have already seen that sound principles for sustainable development are laid out in The Rio Declaration (Reading 5). From these principles, we can start to address how they can be achieved or, in other words, what strategies we can use.

Activity 3.7

(15–20 minutes)

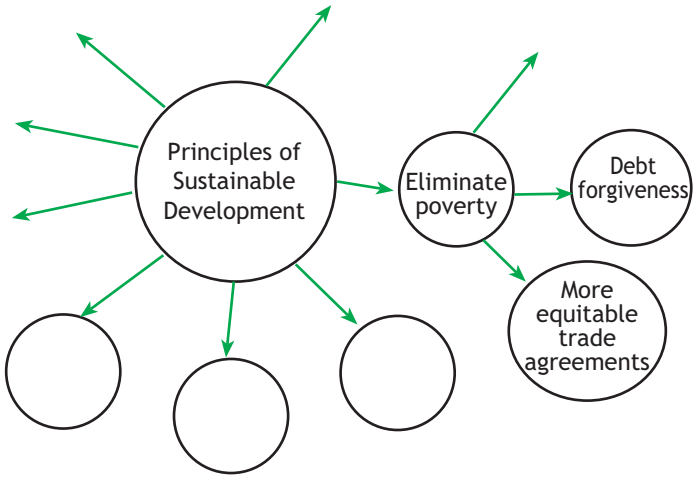
Based on what you have already studied in Units 1, 2 and 3, try to draw a mind map in your learning journal of the principles of sustainable development.

A mind map is a graphic way of organising information. You start with the main concept in a circle in the middle, e.g. sustainable development, then attach to it all the related ideas you can think of. The first ideas might make you think of other secondary but related ideas that you attach to the first ones, and so on. Unlike a list, you can make connections between any of the different ideas and see the inter-connections.

Below is an illustration of how a mind map might look with just a few principles.

See how much you can remember and add. When you have generated as many principles as you can, try to match them against the 27 principles listed in Reading 5: 'The Declaration on Environment and Development'. Add any that you forgot.

Use your own words to express the basic ideas presented by the 27 principles. You might find that you can group more than one principle together into a central idea. Write your thoughts in your learning journal.



Sustainable development centres on improving the quality of life of human beings. It is designed to enhance the ability of humans to meet their socio-economic needs without damaging the environment.

A minimum condition for sustainable development is that the development process must not endanger the ecological systems that support life on earth. As a result, the following strategies for sustainable development have been outlined in Our Common Future (World Commission on Environment and Development, 1987):

- reviving economic growth in developing countries as a means of meeting basic needs, since economic growth is a prerequisite for environmental protection in developing countries
- changing the quality of growth to achieve improved distribution of income, social equity, reduced vulnerability to economic crisis and, more or less, to make growth less dependent on energy and materials
- meeting the essential needs (jobs, food, energy supply, water, health care, education, sanitation) of most of the world's population
- enabling a sustainable level of population (refer back to the information on population growth in Unit 2)
- conserving and enhancing the natural resource base through waste management, cleaner technology, use of substitutes such as alternative sources of energy, etc.
- reorienting technology and managing environmental risks
- merging environmental issues and economics in decision-making
- viewing environment and development not as opposites but as inter-related and complementary.

For some illustrations of practical approaches to sustainable development, turn now to Reading 7: 'A first list of good practice in sustainable development'.

As you read through these examples, look at the list of bulleted points above. Try and match each of the examples with one of the categories provided.

Activity 3.8

(10–15 minutes)

Based on what you have learnt so far in your investigations of national policy, do you find any contradictions between your country's environmental goals and its development goals?

Bearing this in mind, what actions could your country take to help promote and achieve sustainable development? Write your response in your learning journal.

World Summit on Sustainable Development

The World Summit on Sustainable Development (WSSD), described as a 'summit on actions and results', was held in Johannesburg in 2002. The primary aim was to review Agenda 21 in terms of the world's attainment of sustainable development. At this important gathering, no new treaties were made but new targets were set. These included:

- to halve the proportion of people without access to basic sanitation by 2015
- to use and produce chemicals by 2020 in ways that will avoid significant adverse effects on people's health and the environment, and to maintain or restore depleted fish stocks to levels that produce maximum sustainable yields by 2015
- to achieve by 2010 a significant reduction in the current rate of loss of biological diversity.

Some of the significant outcomes of this Summit were:

- the launching of more than 300 voluntary partnerships, which it is hoped will increase resources to support efforts to implement sustainable development
- the beginning of a new level of dialogue among stakeholders, especially governments, civil society and the private sector
- commitments to improve the quality of our natural environment
- setting of targets and timetables – for example, a ten-year programme on production and consumption.

Sustainable livelihoods

The sustainable livelihoods approach is gaining prominence in poverty-oriented research, as well as among development organizations, particularly the UK Department for International Development (DFID) and the Overseas Development Institute. In its simplest sense, a livelihood is a means of gaining a living. The sustainability of livelihoods raises two fundamental questions:

- Is a livelihood sustainable from a natural environmental standpoint?
- Can it survive stress and shocks such as depleted soils, floods, droughts, fires, famines, epidemics of human illness, among others? (Chambers and Conway, 1991)

The aim is to support people to achieve their own livelihood goals (with the proviso about sustainability). One of the strengths of this approach is that it puts poor people at the centre and also focuses on the impact of development policies on people's priorities and concerns. Policies can either enable or prevent access to the various types of capital (ecological, economic, etc.) required to achieve sustainable livelihoods' outcomes.

Turn now to Readings 8 and 9. Compare DFID's definition of sustainable livelihoods (Reading 8) with the practical examples described by Andrew Simmons (Reading 9). What are the similarities and differences in the arguments and solutions that each document presents? Make a note of your ideas as you read through.

We are now going on to look at issues surrounding the involvement of key stakeholders in sustainable development.

Youth and sustainable development

Chapter 25 of Agenda 21 recognises that youth comprise 30 per cent of the world's population. It also indicates that their involvement in decision-making about the environment and development and the implementation of programmes for sustainable development is critical to the long-term success of Agenda 21.

For this reason, we need to look at how we can begin to involve young people in sustainable development. In this section we will look at some of the means and ways by which this can be done.

Opportunities for young people

Numerous organisations provide opportunities for young people to become involved in environmental and sustainable development activities, either directly or indirectly. The following are just two of many.

International Youth Federation (IYF)

The International Youth Federation for Nature Studies and Conservation was founded in Salzburg, Austria in 1956. It is the advocate for the interests of youth environmental groups. According to its statutes,

> "IYF shall … seek to organise and encourage all that might increase the knowledge, understanding and appreciation of nature and the awareness of environmental problems among young people throughout the world. This is in order to promote the commitment of youths to the principles of environmental conservation and to stimulate young people to voluntary action for the protection and enhancement of the environment and for the natural use of the Earth's resources."

IYF operates in Asia and the Pacific, Africa, Latin America and the Caribbean and Europe. It involves over 15 million young environmentalists in some 150–200 environmental organisations.

The work programme varies from environmental education to strategy and practical action. The focus over the years has been on appropriate technology, technology transfer, energy, tropical forests and the use of pesticides in industrial and developing countries. The organisation has held a number of youth exchange programmes and meetings around the world and has produced a number of publications.

The Caribbean Youth Environment Network (CYEN)

The Caribbean Youth Environment Network (CYEN) is a non-profit youth organisation dedicated to the promotion of appropriate development through education, regional integration and community development. These activities are aimed at changing the attitudes and behaviour of young people in order to popularise the conservation and protection of human and natural resources within the wider Caribbean. The goal of the organisation is to promote meaningful youth involvement in the conservation and protection of resources through education for awareness, integration and community action.

Some of the concerns of the CYEN are solid waste management, the low level of environmental awareness, sewage disposal, coastal zone degradation, management of coastal resources, depletion of biological resources and the agro-chemical pollution of ground and surface water resources. At the community and national levels, CYEN members work with young people to address some of these issues. An established focal point in each country is responsible for co-ordinating activities at the national level and reporting to the executive board.

CYEN members have also been engaged in, among other things, public awareness campaigns on the protection of leatherback turtles, tourism development and its impacts, and solid waste management, using the 3 Rs (Reduce, Reuse, Recycle). The organisation strives to meet bi-annually in order to share ideas, knowledge and experiences on a particular theme. See http://orgs.takingitglobal.org/1015 for more information.

Youth as initiators

It is important to explore the role of youth as initiators on the larger national stage. For youth to function in this role, the government of your country must have a generally sympathetic approach to youth and realise that tapping the idealism, energy and new thinking of the young is one of the few ways in which developing countries can make that qualitative jump essential for sustainable development.

Now turn to Reading 10: 'Building a National Youth Environmental Service (YES) Corps for the Commonwealth of Dominica'.

This document describes an official government policy towards youth involvement, in a region that is sometimes said to have marginalised youth from involvement in decision-making.

It is a proposal for a three-year programme for involving youth centrally in sustainable development, at a time when the staple banana industry is under serious threat from the World Trade Organization's rule that the European Union is not allowed to make favourable trading agreements with any particular country.

Activity 3.9

(about 20 minutes, not including your investigations)

As you read through Reading 10, note which aspects of the context described are similar to your own. Also note which elements of the policy and plans could be applied in your own circumstances. What additional inputs would be needed to make them work? Write your answers in your learning journal.

Following on from Reading 10, we would like you to investigate youth-based activities in your own country. Undertake the activities below. As with earlier activities, this may involve you contacting other organisations and institutions.

1 Find out about youth organisations that are involved in environmental and/or sustainable development activities at the community and national levels.

2 Identify and summarise two approaches that these youth groups have adopted in an effort to promote environmental protection.

3 Identify ways in which you (and/or your group of young people) could become involved in the activities of any of these organisations.

Youth as activists

What can young people do to participate in the process of sustainable development? They can become activists. Here are a few ideas gathered from international reporting on this matter.

Activity 3.10

(20–30 minutes)

As you are reading through the list of suggestions below, for each one make note of the various tasks you would need to undertake in order to help a group of young people achieve this. It might involve finding resources and finances, organising education sessions, assigning roles and responsibilities, and so on.

Write your ideas in your learning journal.

- Make your voices heard by ensuring that you are consulted and integrally involved in those of your country's decision-making processes that relate to environmental protection, natural resource management and development.

- Encourage policy makers at both regional and national levels to adopt the strategies that are recommended by international, regional and local youth conferences that offer perspectives on sustainable development.
- Get involved in educational and training efforts that are designed to increase environmental awareness. The knowledge and skills that you gain will empower you to contribute positively to sustainable development.
- Lobby your government to make sustainable development a cross-disciplinary theme of school curricula and vocational training programmes.
- Get directly involved in project identification, design, implementation and follow-up.
- Organise fund-raising activities such as eco-fairs in order to produce seed funding for some of your own environmental/ sustainable development projects.
- Agitate and collaborate to prevent more environmental degradation in your community and country.
- Enhance your ability to activate, organise and mobilise by seizing opportunities for environmental education and employment. As Agenda 21 states, *Education is critical for promoting sustainable development. It is a prerequisite for participation in decision-making and for improving the capacity of people to address environment and development issues*.
- Lobby your leaders for a continuous flow of information on the environment so that you can keep abreast of environmental issues and problems.
- Network with youth in your community and country to exchange information and to strengthen your environmental activities at the local level. Networking will lessen the degree of duplication and save much-needed resources.
- Form yourselves into groups and discuss each of the 27 principles of sustainable development. Pay special attention to their implications for the youth in your country.
- Share, with other youth, your knowledge of and skills in environmental protection at summer camps, schools, public forums and youth organisations.

Activity 3.11

(30 minutes at least)

For this activity, we would like you to sketch out a plan for a local youth project based on your own context. In your plan, you will need to include:

- a brief description of the problem you want to address
- your objectives (what you want to achieve)
- a timeframe (planned start and duration)
- the strategies you want to use (how you want to achieve your objectives)
- an action plan (the steps you need to take).

It's probably best to test the waters with a small project to begin with; it might grow into something bigger later as you and your group become more experienced.

You might consider including the following activities as part of your initial plans:

1 Discuss with your group of young people which of the strategies described above are most relevant to your situation.

2 Identify an existing organisation and project in which you and/or the group can participate.

3 Describe the project (problem, objectives, timeframe, strategies, action plan).

Can you suggest any other ideas for strategies, not mentioned above, that may be more relevant to your community or country?

Note down your initial ideas in your learning journal. It is likely that your ideas will develop as you progress further. Make sure you keep note of all these as well.

Women and sustainable development

You may recall that Principle 21 of the Rio Declaration on Environment and Development states that: *Women have a vital role in environmental management and development and … their full participation is essential to achieve sustainable development. However, for such a role to be fulfilled, women must overcome many obstacles, which can be broadly categorised as (a) constitutional, legal, administrative, (b) cultural, behavioural, social and (c) economic.*

One of the questions that will be asked from time to time is: Why focus on women specifically? In the following discussion, we will consider some issues that show why that focus is important:

- women form the majority of the world's poor
- women have a crucial role as educators
- women are users, managers and conservers of environmental resources.

Now turn to Reading 11: 'Women and the environment', from the United Nations Population Fund (UNFPA) website.

This document introduces some of the key issues in the relationship between women and the environment. As you read, note or highlight the most important points.

The majority of the world's poor

Women suffer many inequities and as a result are the majority of the world's poor (See Module 5). Any suitable development project that aims to alleviate poverty must have, built into it, the involvement of women in the decision-making, planning, advising and extension work in the field.

Activity 3.12

(time depends on how long you need to spend investigating)

Do you know the rough percentage of women who are living in poverty in your country? If not, try to find out.

Also investigate the government's programmes to address this issue. Are there other actions that you think should be taken? Record your responses in your journal and discuss with your peers or family.

Women's poverty has been linked to inequalities in their:

- situation in the market
- access to credit
- treatment under social welfare systems
- access to health and education services
- status and power in the family.

In each of these areas, more opportunities are available to men. For example, in Latin America and the Caribbean, women comprise only 7 to 15 per cent of the beneficiaries of credit programmes. Similarly, less than 10 per cent of African women are able to access small-scale credit even though they produce more than 75 per cent of household food (Commonwealth Secretariat, 1992: 16).

Access to credit is crucial for any woman who plays a dominant role in agriculture – for example, managing a small farm. Such women have to deal with problems such as poor output and crop loss through disease. However, they rarely receive the benefit of agricultural training or technical assistance from extension services.

The quality of life for women and children can be quantified and used as an index of the effectiveness of sustainable development programmes. This index tells us a great deal about the relative social positions of men and women.

It is mainly through their battle against the deterioration of their living conditions, and those of their families, that women have been playing a major role in sustainable development issues. In their struggle for a better livelihood, comprising access to sanitation and proper housing, health care and education, and the right to live in a healthy and balanced environment and satisfy the demands of life, women have always been active in demanding improvements in their environments. As a result, it is often said that the 'quality of life' issue links 'women' and 'sustainable development'.

Women as educators

There is no doubt that women around the world have knowledge and experience in managing and conserving natural resources. This is extremely important since women are usually children's first teachers; therefore they have an important and far-reaching role to play in instilling in their children, through reasoning and example, concern for the environment. In this role, women may teach best by example.

Users, managers and conservers of environmental resources

In carrying out domestic duties, women are in intimate, daily contact with their immediate environments as users and/or collectors of fuel, food, water, etc.

Women grow much of the world's food: 70 per cent in Africa, 50–60 per cent in Asia and 30 per cent in Latin America. In many parts of the world, they collect fruits, nuts, leaves and so on from forests for food. In other places, like the Caribbean, choice of food in the marketplace is still largely made by women. In a real sense, women determine a crucial part of the nutrition of the country.

Women also manage water supply in the home. They are responsible for safeguarding health by providing water for drinking and hygiene. They are also responsible for conserving supplies. In many parts of the world, women are also carriers of water, which is a tiring and time-consuming task.

Women are consumers. In this role, they can play a vital part in conserving fuel, food and water. They also play an important role in protecting other environmental resources. For example, they can

contribute to halting ozone depletion by choosing environmentally friendly products. In addition, they can contribute to halting the depletion of natural resources, such as corals and wild animals, by choosing clothing and makeup that do not require the destruction of these.

Through family planning, women help in controlling population growth. Therefore, there is need for an increase in efforts to educate women about family planning. To be effective, all such efforts must take into account traditional practices and views about contraception, and the relationship between population growth and resource consumption.

As the foregoing discussion shows, women are in a position to influence attitudes to, and use of, the environment. Their choice in using natural resources affects not only the environment but also their own and their families' health. However, if their influence is to be positive, they need training, land, credit and simple conservation technologies.

Read the example of women's environmental activism described below:

Case Study 3.1

Environment: A Woman's Responsibility

From The Hindustan Times, 8 June 1991.

Examples of the decisive part played by women in saving the environment are spread all over the continent. The Chipko movement, originating initially in Rajasthan, which multiplied in other states of India such as Uttar Pradesh, Kerala, etc., is well known. Parallel with this, and equally vigorous, has been the movement against deforestation in Sarawak in Malaysia in 1987.

The lives of the Penan community that have inhabited and lived on the resource of tropical rainforests for centuries were endangered by the extraction of logs for export to Japan. In defiance, the Penan women rose to form human barricades across the logging roads to frustrate the greed of the timber tycoons wanting to plunder the tree wealth of their land.

They had lived in harmony with the forest, harvesting but not destroying it to meet their needs of food, herbs and materials to construct shelter and make handicraft articles for domestic use. The Penan women averred that "*the forest is our source of survival. Without the forest we are all dead. Until we die we will block this road.*" They looked at the land as their life, something they must bequeath to and for the sustenance of their children.

When women's needs are not met, the results are detrimental not only to the environment but also to their families' health. For example, if appropriate technologies for cooking are not provided, women may have one of two options:

- to rely on trees for firewood and charcoal, thus contributing to deforestation
- to conserve fuel by not boiling water or cooking food long enough to destroy any water-borne diseases, thus contributing to ill health in their families.

Neither of these options is desirable. When women's needs are met, the results are generally beneficial. For example, if alternative fuel sources are available and appropriate training is provided, many women around the world could get involved in replanting trees and managing forests. There are examples of this in Module 8. This is particularly true for women in Africa and Asia.

The international community has highlighted a number of issues that need to be addressed to ensure meaningful and maximum participation of women in the process of sustainable development. Chief among these are: women's human rights and control over their lives, poverty eradication, women's access to resources and services, women's control and management of resources, globalisation, and finance for development and health, including environmental health.

Now turn to Reading 12: 'An aquaculture project in Western Samoa', from *Women and Natural Resource Management*, Commonwealth Secretariat, 1996: 62–65.

This is a case study of a project that focuses on resource and finance management as a means of helping to involve women in environmental activities.

Self-help question 3.1

(about 15 minutes)

After you have read the article, answer the following questions:

1 What advantages did this project bring to the lives of the villagers?

2 Why was the project successful??

Compare your answers with those suggested at the end of the unit.

We can see, then, that the involvement of women and young people in sustainable development activities can be crucial for establishing a culture of care and involvement.

Unit summary

In this unit, you have covered the following ideas:

- the major events that caused the world to focus on the need for environmental protection, and led to the concept of sustainable development, in particular the 1992 Earth Summit
- the meaning of sustainable development and its main characteristics
- why action by young people and women is essential to the success of sustainable development projects
- approaches to involving young people in such projects.

To check how you have got on, look back at the learning outcomes for this unit and see if you can now do them. When you have done this, look through your learning journal to remind yourself of what you have learned and the ideas you have generated.

In the next unit, you will build on your understanding of sustainable development by looking at it in terms of its application to planning and evaluating projects.

Answers to self-help questions

Self-help question 3.1

1 The project brought the following advantages to the lives of the villagers:

- prawns were an added delicacy in the families' diet
- the WCOM members acquired many new and complex skills
- health would probably improve through new understanding of the water supply
- the villagers learnt more about the need to take communal responsibility for collective assets
- they realised that modern technology in the form of piped water was not necessarily always superior to traditional ways.

2 The project was successful because:

- the WCOM worked collectively from beginning to end
- there was a constructive sharing of skills and responsibility among WCOM, the Fisheries Extension officers and the Aid officials
- the women learnt the effects of environmental neglect through a practical problem, so there is likely to be transfer of understanding to other environmental problems.

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Unit 4: Action for sustainable development

Unit introduction

Welcome to Unit 4 *Action for Sustainable Development*. In this unit, you will continue to refine your understanding of sustainable development in terms of its application to planning and evaluating projects.

We will start by examining the elements of a sustainable development project. We will then look at how far these reflect the general objectives laid out in the documents on sustainable development as provided by the World Resources Institute and the World Bank.

By using these models to evaluate project case studies, you will be better able to design projects that give clear expression to the principles of sustainability. As you study the projects, remember that youth in your community can play a vital role in education, training, action and advocacy designed to protect the environment.

Indeed, all over the world young people are forming organisations and, through their collective efforts, attempting to alleviate environmental problems through sustainable development projects. As you may recall from Unit 3, one of the significant outcomes of the World Summit on Sustainable Development, held in 2002, was the launching of over 300 voluntary partnerships to support the implementation of sustainable development.

Unit learning outcomes

By the end of this unit, you should be able to:

- give a further definition of sustainable development
- identify the various criteria used by international institutions in measuring sustainable development
- review and analyse projects from the perspective of sustainable development
- evaluate case studies of youth-based sustainable development programmes.

Sustainable development projects

When concepts such as sustainable development are translated into action in order to plan projects, the original definitions – which are usually at a general or even philosophical level – may need to be refined so that they are useful at a practical level. Earlier in this module, we introduced the Brundtland Commission's definition of sustainable development as: "… *development that meets the needs of the present without compromising the ability of future generations to meet their needs*" (World Commission on Environment and Development, 1987).

Because this definition poses difficulties in its application, institutions such as the World Resources Institute and the World Bank have started to develop new ways of defining or evaluating sustainable development. As discussed in the last unit, a sustainable development project should address issues related to economic growth, the quality of human life and the impact on the biosphere.

Let's continue by considering the elements of a sustainable development project. A project is a set of activities designed to achieve an objective or a set of objectives within a given time frame. It requires the precise use of resources to achieve those objectives.

Elements

Basically, the elements of a sustainable development project fall under four headings:

1 environmental (in the natural or ecological sense)

2 economic

3 socio-cultural (including community participation, empowerment and the cultural dimension)

4 technological.

Environmental

A sustainable development project ensures environmental sensitivity because this makes good business sense in the short and long terms, and also demonstrates good stewardship of our natural resources.

However, we must emphasise again here that environmental protection alone will not ensure sustainability. Environmentally sensitive projects must take into account not only the maintenance but also the growth of natural resources (what can be conceptualised as the expansion of ecological capital). Thus, during the decision-making process, sustainable development projects in fields such as forestry or energy will:

1 only exploit natural resources at a rate that is in balance with their rate of renewal

2 always consider the use of resource substitutes instead of using natural resources, by applying the principles of opportunity cost.

These two things must be done in order to conserve natural resources and protect the environment and also ensure that extra value is added to any development undertaken. Therefore such projects normally seek to ensure conservation and if possible create an increase in natural resources, while avoiding premature depletion of those resources that are non-renewable.

Ensuring the intelligent use of resources depends on the availability of baseline data. This allows the resource experts to estimate what will constitute a sustainable rate of exploitation. In the case of fish stocks, for example, this means having accurate baseline estimates of the available stocks from which you are going to take fish, their breeding (self-renewal) characteristics and the environmental information that will tell you about the probable ecological effects of your estimated catches of fish. However, having the necessary baseline data depends on on-going scientific research, which has proven to be extremely costly and in most cases not affordable for poor countries.

Economic

While not a sufficient condition to improve the quality of human life among the poor in developing countries, economic development is a necessary condition. The economic aspect of any sustainable development project focuses on:

- its commercial/ financial viability
- employment creation
- income generation
- the efficient use of resources.

As we have already discovered, we cannot view economic development and environmental conservation as separate objectives. Sustainable development aims to provide economic independence for countries, communities and individuals without depleting their ecological capital.

Successful economic development will require informed project selection, planning, design and implementation, and will ultimately depend on:

- the rational use of environmental resources
- minimising, as far as possible, the adverse impacts of development projects. (Dixon et al,1988)

Socio-cultural

In order to promote sustainable development, a project must also have a social-cultural dimension. One of the essential requirements of

sustainable development is meeting the basic needs of the poor. These needs include employment, income, shelter, food, potable water, safety, health services, education, freedom from violence, guaranteed rights and democracy. They are the basics of human life.

Poverty is both a cause and an effect of environmental degradation. Therefore any project that aims at protecting the environment has to address the issue of poverty. As stated in the first principle of the Rio Declaration on Environment and Development: "*Human beings are at the centre of concerns of sustainable development. They are entitled to a healthy and productive life in harmony with nature.*"

Community participation

It is recognised widely that one of the main causes of the failure of a number of environmental projects has been the lack of involvement and participation by the community, especially women, youths and children. In Modules 4 and 6, we looked at different aspects of participation – if you have these notes to hand, it would be worth looking at them again.

Community participation is crucial to the process of environmental protection and sustainable development. It ensures that planners avoid poorly considered decisions and provides a vital means of educating the public on the importance of environmental protection and conservation.

Local communities must:

- be adequately informed about the project
- have an input in decision-making and planning
- share in the benefits of the project through employment, commerce or income
- be motivated to participate through good information dissemination
- be educated in environmental awareness and be given access to a range of communication strategies.

Through participation, community members can become enthusiastic supporters and, in time, initiators of development projects.

Planners must ensure that participation is:

- horizontal – across sectors and geographical areas within countries
- vertical – across various levels in the society, particularly reaching grassroots groups.

Empowerment

The involvement of youth as part of the larger community hinges on the concept of empowerment – that is, a process that gives people opportunities to analyse their own problems and suggest appropriate

solutions. Through empowerment, young people can deal with issues by providing alternatives and helping to find necessary resources.

The involvement of young people in conservation and environmental management will help to build their confidence and improve their understanding of environmental management objectives. This is particularly relevant to rural development programmes and on-going projects in developing countries. Involvement will provide an opportunity for them to participate at the problem identification and design stages of projects. Providing education and training is an important step that will empower young people. This will help them to understand and appreciate environmental problems. It will also help them to become concerned enough to take positive action to address some of the environmental problems that they face daily at the community level.

As Agenda 21 states in chapter 25: "*It is imperative that youth ... participate actively at ALL levels of decision-making processes because it affects their lives today and has implications for their future*".

The following case study is an example of how community participation is essential to sustainable development. The community's needs were satisfied while protecting the environment. This reinforces the point that sustainable development is more than simply protecting the natural environment. People's economic needs and wellbeing must also be considered and adequately met. One without the other will lead to unsustainable practices.

Case Study 4.1

The Luangwa Integrated Resource Development Programme

In Zambia, the Government has introduced the concept of community-based development and, in particular, community-based wildlife utilisation. The purpose of this step is to improve the co-operation of local communities in natural resource preservation.

The Luangwa Integrated Resource Development Programme was established to promote community participation in the conservation of wildlife resources. The conservationists discovered that:

- local people were most familiar with the areas and wildlife within their community
- failure to ensure their co-operation made them indifferent to illegal hunting, among other things – in fact, it made them somewhat hostile to conservation efforts.

Through the project, local communities were allowed control over decisions made to manage the wildlife resource. They were also allowed control over decisions related to income. This generated the following activities:

- tourism and safari hunting
- rural development activities in the protected area or surrounding buffer zones, which generated employment
- local job creation – jobs were available in the areas of tourism, wildlife and park services and in commercially run cropping or hunting schemes
- creation of markets for local handicraft and produce.

Additionally, communities were allowed direct use of wildlife resources through:

- the issue of hunting quotas and licenses for local communities
- the establishment of user rights and buffer zones for limited resource exploitation.

As a result, wildlife was seen by the communities as an economic asset worth maintaining and conserving.

The cultural dimension

In some projects, the cultural dimension must be considered a central element, particularly when it relates to sacred sites and places, and traditional ways of life. This is especially so if the project is to impact directly on communities. For example, eco-tourism has a very close relationship with indigenous communities. Thus, governments have established protected areas for eco-tourism, for example in the Royal Chitram National Park in Nepal and the Amboseli National Park in Kenya. Protected areas are, more often than not, beneficial to local communities since they ensure a regular supply of water and reserves for wildlife.

Assuring cultural sustainability requires that communities be consulted and be allowed to participate fully in decision-making concerning the project design and implementation. More importantly, economic activities such as ecotourism should be monitored to ensure that local cultures are protected from foreign intrusion.

As Chapter 26 of Agenda 21 states:

> "… the lands of the indigenous people and their communities should be protected from activities that are environmentally unsound or that indigenous people concerned consider socially and culturally inappropriate."

Technological

Another critical element of sustainable development projects is encouraging the use of appropriate technology. We use technology as the key to adding value to our economic situations. Our technologies include tools, methods and systems for producing energy, transforming natural resources, manufacturing, communication,

transportation and so on. Wherever technology remains underdeveloped, poverty will exist and environmental degradation may continue. Appropriate technology helps us to save labour and time. It improves production, as well as health and safety.

Nevertheless, technology can have negative effects on the environment. For example, the mechanical plough used in agriculture leads to increased agricultural production but, at the same time, it tends to increase soil erosion. In pursuit of sustainable development, therefore, the use of environmentally friendly technologies is encouraged as a means of reducing any possible negative effects on the bio-physical environment. Technologies should be pollution-free and based on the use of renewable energy.

The challenge for those of us who live in developing countries is to enhance our countries' capacity for technological innovation and help ensure that technological development pays close attention to environmental factors. Urgent technological research is necessary in areas such as:

- energy conservation
- information technology
- biotechnology.

Research in these areas can lead to projects that will help promote sustainable development.

Activity 4.1

(15–20 minutes)

Look back at Reading 11 on the aquaculture project in Samoa in Unit 3.

Bearing in mind the four elements of a sustainable development project outlined in this section (environmental, economic, socio-cultural and technological), evaluate this project.

Make notes as you go through, and identify the areas where this project succeeds or fails in meeting the criteria. What actions would you recommend to help improve the project?

Write your notes in your learning journal.

In the next section, we are going to look at some other definitions of sustainable development. We will see some of the elements described above reflected in the objectives that are laid out in the World Resources Institute model.

The World Resources Institute model

The World Resources Institute (WRI) has designed a model containing the general objectives of a sustainable development plan for the Earth. These objectives have been grouped into four categories – economic, human (social), environmental and technological. When you are designing, implementing or evaluating a sustainable development project, try to compare its specific objectives against these general objectives.

Turn now to Reading 13, which provides a summary of the main objectives the WRI has for sustainable development. Browse through these now, but keep this document to hand as we move on through this section. You will be expected to refer to it as we look at the following case studies.

We will now identify the various elements in two well-known sustainable development projects:

- The Iwokrama International Rainforest Project – Guyana
- Project CAMPFIRE – Zimbabwe.

While the Iwokrama International Rainforest Project and Project CAMPFIRE were not initiated by youth groups, young people have had a great deal of involvement in them.

Case Study 4.2

The Iwokrama International Rainforest Project

At a meeting held from 18–24 October 1989 in Kuala Lumpur, Malaysia, the Commonwealth Heads of Government adopted a 16-point Programme of Action as part of the Langkawi Declaration on the Environment. The Programme of Action was designed to promote development without environmental destruction and resulted from concern with issues of sustainable development.

In response to that call for action, the President of Guyana offered to set aside 360,000 hectares (900,000 acres) of the country's virgin tropical forest for a pilot project under the auspices of the Commonwealth. As a result, the Iwokrama International Rainforest Project was established, with a funding base of US$15.7 million (provided by donor agencies).

The project aims to study:

- the use of the forest on a sustainable basis
- the conservation of species.

The ultimate goal of the project is to demonstrate to Guyana and the world how to manage tropical forest sustainably and maximise socio-economic benefits.

The specific objectives are:

1 to demonstrate methods for:

   (a) sustainably utilising the forest

   (b) learning from the experience

2 to research new ways of saving, and yet benefiting from, biodiversity

3 to ensure that the socio-economic dimensions of forest utilisation are fully accounted for

4 to make sure that the world hears and learns about what works and what does not in managing forests sustainably for human benefit.

Activity 4.2

(about 15 minutes)

Using what you have learnt so far, identify and list any of the elements of sustainability that you think there will be in the Iwokrama Project. Once you have done this, compare your own analysis with one based on the principles listed in the WRI document.

Write your ideas in your learning journal before you continue to read the analysis that follows.

We will now go on to analyse the case study above in some detail. Compare your own findings with those mentioned below.

Environmental and technological objectives

The Iwokrama Rainforest Project has established a wilderness reserve that allows for the wise use of biodiversity and the protection of pristine ecosystems. It also contains a storehouse of diverse genetic resources that will be used for research and biotechnology.

Since its establishment, the Iwokrama project has made significant strides in a number of areas related to environmental/ technological sustainability, including:

- introducing sustainable livelihood practices (e.g. conservation contracts and community-driven ecotourism) in the adjacent Amerindian communities

- funding and providing technical expertise for research and documentation of the diversity and the natural history of the forest's biological resources, and establishing a natural screening laboratory
- wildlife and forest management and low-impact logging
- demonstration of waste minimisation practices
- protecting biodiversity by use of a zoning plan that comprises a Sustainable Utilisation Area and a Reserve
- operation of other sustainable businesses using non-timber forest products.

Economic and socio-cultural objectives

The Iwokrama Rainforest Project also seeks to demonstrate that tropical rainforests can provide economic benefits to the neighbouring communities, the nation and the world, without compromising the ecological safety of the forest. In fact, the project maintains and manages a Sustainable Utilisation Area for yielding economic benefits to the people.

This element of the project is integral to the concept of sustainable utilisation of the forest and involves:

- timber and non-timber forest products, such as pharmaceuticals, food products, waxes, gums, resins, aromatic fibre products (curare, balata, cassava, tomatoes and peanuts)
- sustainable tourism and others activities, which have created employment and generate income for members of adjacent communities.

Additionally, the project has done extremely well in terms of capacity building in local communities through:

- providing and facilitating short-term and long-term training
- holding technical workshops and seminars on environmental awareness
- facilitating a sub-regional decision-making body that can represent the indigenous communities adjacent to the project area (the North Rupununi District Development Board).

Because it is intrinsically linked to research, the project has experimented with different strategies and management practices to increase income and ensure proper stewardship of the forest. These include

- aquarium fish
- the Arapaima project
- production of crabwood oil and honey

- enabling university students and professors from around the world to conduct academic research on a range of related subjects.

With regard to information dissemination, the project has already implemented development support communication (the planned use of communication resources and systems to foster the participation of local communities in their own development). This has facilitated dialogue as well as the exchange of ideas, information and knowledge in order to get the local communities of indigenous peoples to participate fully in the development of the project. Collaborative arrangements have been developed with local agencies for natural resources management.

Sadly, however, the project has been strapped for funds: apart from the initial stages, donor funding has not been very forthcoming. This has resulted in radical restructuring and limiting of the objectives on the basis of cost. However, essential core staff have been retained. The Iwokrama project must now demonstrate that it has the capacity to generate enough money to cover its own operating costs through environmentally sound and socio-culturally acceptable practices.

This shows that economic viability requires that projects must be sustained locally, though initial funding will be from donor agencies.

Let's now go on to look at the second of our case studies.

Case Study 4.3

Project CAMPFIRE

At one time, Zimbabwe approached wildlife management through centralised co-ordination and control of preserved areas, designated as national parks. This approach proved ineffective because it worked against the direct economic interests of local communities, which no longer had any access to resources that they had traditionally exploited for centuries. In addition, the establishment of these preserved areas led to the displacement or forced relocation of rural communities, with very little or no real compensation for the loss in traditional livelihoods or resources. As it was illegal to hunt or use the land or wildlife resources from these areas, the local communities became gradually alienated from or lost interest in wildlife conservation. This translated itself into a lack of concern for the depletion of wildlife resources by others, poaching and so on.

In 1984, a change in the approach to wildlife management commenced because of the government's awareness of two factors:

- communities were suffering extensive losses due to the effects of wildlife poaching
- ecological and economic conditions appeared more suitable for the maintenance and exploitation of wildlife resources by the local community.

Thus Project CAMPFIRE (Communal Areas Management Programme for Indigenous Resources) was launched to address the problems of communal resource ownership by means of:

- a more equitable allocation of natural resources
- placing a value on natural resources.

Project CAMPFIRE sought to involve communal area residents directly in wildlife management and to enable them to receive identifiable benefits from these resources. The two-fold hope was that:

- the economic needs of communal residents would be met
- the communities would (a) be given money from safari hunting and eco-tourism to protect the wildlife from illegal hunting, and (b) regard wildlife management as a financially attractive land use option.

The objectives of Project CAMPFIRE were:

- to obtain the voluntary participation of communities in a flexible programme that offered long-term solutions to problems of using natural resources
- to introduce a system of group ownership, with defined rights of access to natural resources for communities residing in target areas
- to provide the institutions needed by resident communities to manage and exploit resources legitimately for their own direct benefit
- to provide technical and financial assistance to communities that joined the programme.

Activity 4.3

(about 15 minutes)

Using the same process as in the last activity, identify and list the various elements of sustainability demonstrated by Project CAMPFIRE before you continue on to read the analysis that follows.

Do you think that this project is likely to experience similar financial constraints as recorded in the Iwokrama Rainforest case study? Why? Record your answers in your learning journal.

Socio-economic and cultural objectives

The CAMPFIRE approach is based on a system of group or communal ownership. The emphasis is on participation by local people through their elected institutions run on democratic lines.

Consultation and decision-making occur at village, ward and district levels, spreading the knowledge of wildlife issues widely and deeply. The programme makes it possible for residents of a district to carry out censuses of their wildlife resources, set quotas, interview potential safari hunters and decide on the utilisation of CAMPFIRE funds.

Moreover, in contrast with past practices, CAMPFIRE gives local people an opportunity to make informed decisions on projects to be implemented. So, local needs that are pinpointed in the wards and villages taking part in the programme are seriously considered by District Councils.

The training of cadres at village, ward and district levels is an important feature of the project. There are training inputs from local people, with outsiders as facilitators. Most training includes basic accountancy methods, project planning and implementation, monitoring and evaluation methods, and meeting procedures.

Cadres consist of community workers, monitors, 'problem animal' reporters, guards and professional hunters. They are elected, and their responsibilities are determined by those who elect them.

The CAMPFIRE structure involves the:

- creation of locally based natural resource co-operatives concerned with the management of wildlife, but also of grazing, forestry and water resources
- inhabitants of the community as co-operative shareholders – therefore, at the direction of the community, profits that accrue from the fees from safari hunting and the sale of meat and skins are allocated either for communal benefit or for individual shareholders
- establishment of a reserve fund for capital expenditure, which is spent on small projects including footbridges, a nursery, a clinic, housing for nurses and teachers, a butchery and a beer hall – all of these projects are considered as needs of the local communities
- sale of wildlife meat at a subsidised price to the local inhabitants, which provides them with nutritional benefits from wildlife resources
- increase the local inhabitants' share of the benefits from wildlife (a primary economic objective) – thus, they learn to consider wildlife as an economic asset
- increase in local participation in terms of community control and management over wildlife resources in the locality.

Ecological objectives

In Project CAMPFIRE, the issue of conserving and managing natural resources – and more particularly, the wildlife resources – is addressed by granting:

- wildlife quotas that determine (a) the amount of wildlife to be removed from the protected areas and (b) anti-poaching activities
- licences to two safari operators based on a growing knowledge of the way the carrying capacity of local ecosystems works – these licenses determine the rate and amount of wildlife exploitation.

Once the local communities realised that they could benefit economically from wildlife conservation, the programme was no longer met with hostility. This is a crucial lesson for developing countries to note. At all times, the needs of local communities must be met, so that their poverty will not be a cause of environmental degradation.

When communities have responsibility for their own natural resources and the freedom to use and benefit from those resources, there is a need for both civic and cultural leadership. In cultural terms, CAMPFIRE encourages respect for knowledge passed on from one generation to another. The programme has links with the traditional leadership to ensure that local wisdom is not lost but utilised in the sustainable management of wildlife resources. For example, the programme has capitalised on the principle that in Zimbabwe plants that have traditionally been recognised as having medicinal value are not cut at random: they are community assets in the same way as figs and other wild fruits that have value as food. Similarly, the project has made use of the knowledge that people of different totems – such as elephant or zebra – do not use the meat of these animals.

Finally, a number of challenges were encountered by Project CAMPFIRE. These included:

- making the project financially viable so that it could be self-sustaining in the long run – sustainable economic viability is crucial for an economic development project in the long term
- changing the perception of policy makers and external donors in order that they would promote community-based wildlife management as a good alternative to conventional agriculture, which is argued by Lovelock (see Unit 2) to be so damaging
- implementing genuine local authority for wildlife management wards and villages, particularly in the area of distribution and application of revenues.

Note: The detail of how these projects are run and what their effects are can be found by looking under the project names on the internet.

We are now going to go on to look at the approach taken to sustainable development by the World Bank.

The World Bank approach

One of the foremost financial organisations in the world today is the World Bank. It operates like any other bank and is therefore susceptible to the decisions of large depositors such as the governments of the developed countries. However, the World Bank has attempted to respond to the complexity of the concept of sustainable development by creating *"... more environmentally responsive procedures for assessing the impacts of development programmes, and on developing lending portfolios for client countries."* (Dumanski, 1997).

The World Bank assesses the impact of programmes and applications for loans using two methods:

- the sustainability matrix
- sustainability as opportunity.

The sustainability matrix

First, the Bank compares a lending request against a set of criteria and indicators known as the sustainability matrix (World Bank, 1995). The sustainability matrix contains:

- a set of criteria for measuring the economic and financial viability of a project (the developmental/ growth dimension)
- a set of criteria for measuring the ecological and social sustainability of a project (the environmental/ social dimension).

While this is a positive step, it still presents a number of challenges. Dumanski (1997) explains that the actual indicators for the ecological dimension – such as ecosystem integrity, carrying capacity and natural resource conservation – are as yet poorly defined. He also points out that the indicators of social sustainability – such as equity, social mobility, social cohesion, participation, empowerment, cultural identity and institutional development – are even more poorly defined.

Sustainability as opportunity

Second, the Bank has begun to develop a new model of sustainability, called 'sustainability as opportunity'. This is defined as leaving future generations as many, if not more, opportunities as we have had ourselves.

In keeping with this view, instead of national income being used as the criterion for assessing economic and environmental achievement, national wealth (national capital stocks) forms the criterion. This national wealth is made up of man-made capital, natural capital, human capital and social capital.

Thus, the measure of the viability of a project will be:

1 the normal growth criteria or indicators

2 criteria such as environmental assets, the growth of human skill and knowledge and improvement in the quality of social and cultural life.

At the end of a project, all of these indicators should be either at the same level at which they were at the beginning, or at a higher level.

Activity 4.4

(about 20 minutes)

Dumanski has pointed out that the criteria used by the World Bank to evaluate sustainability are poorly defined. Consider the following questions and write your answers in your learning journal.

1 In your own words, restate the criteria used in the sustainability matrix and sustainability as opportunity models.

2 Based on your own context, try to define what the following terms might mean to you in your situation. If possible, provide examples to help illustrate your ideas:

(i) economic viability

(ii) ecological sustainability (such things as ecosystem integrity, carrying capacity and natural resource conservation)

(iii) social sustainability (such things as equity, social mobility, social cohesion, participation, empowerment, cultural identity and institutional development)

(iv) national wealth (man-made capital, natural capital, social capital and human capital).

The following examples might help you:

For social capital, your definition may relate to areas such as:

- the nature of the communication process
- the nature of social relationships
- willingness to work together co-operatively.

For human capital you may consider areas such as:

- increased levels of manual skills
- opportunities for education and training
- ability to identify and analyse problems
- ability to find and evaluate solutions to problems.

Self-help question 4.1

(10 minutes)

1 Can you suggest how the World Bank approach to sustainable development could affect participation by young people in solving development problems?

2 How well do you think Project CAMPFIRE fits into the World Resources Institute's model?

3 How well do you think it fits into the World Bank's model?

Compare your answers with those suggested at the end of the unit.

Practical case studies

The following case studies are examples of the practical approaches to sustainable development adopted by some youth organisations in the Commonwealth:

- Young Conservationists Club (YCC), Thailand
- Fiji National Youth Council (FNYC)
- Association of Friends of Nature Clubs (ACAN), Cameroon
- JEMS, St. Vincent and the Grenadines.

We will examine them to evaluate their activities from the point of view of the World Bank model.

Case Study 4.4

In April 1975, immediately after a seminar was held on natural resources conservation, the Young Conservationists Club (YCC) was started in Thailand. It comprised 64 students from 17 high schools.

YCC members became involved in activities such as wildlife exhibitions and tree planting at the Srakaew plantation run by the Forest Industry Organisation. The YCC also organised a mobile exhibition unit with movies, slides, posters and lectures that visited about 50 schools in Bangkok and nearby cities. In addition, the club launched a programme for improving parks and various recreation areas with the help of youth volunteers.

The ultimate goal of these activities was to enhance youths' awareness and knowledge of the need for conservation.

Self-help question 4.2

(10 minutes)

How would you assess this sort of activity in the light of the definition of sustainability now being used by the World Bank?

Compare your answers with those suggested at the end of the unit.

Case Study 4.5

In the Pacific island of Fiji, a youth group known as the Fiji National Youth Council (FNYC) aims to promote the human, economic and spiritual development of young people.

The group places a lot of emphasis on spiritual development. It argues that this is essential for conservation since it is felt that:

1 Advanced technology and greed for wealth, among other things, have subdued our appreciation of, and love for, nature.

2 The harmonious relationship between human beings and nature has been lost because human beings have come to regard themselves as the conquerors of nature.

Therefore, the philosophy of FNYC is based on the view that the pursuit of material wealth is a root cause of over-consumption of resources, ultimate environmental deterioration and rapid depletion of resources. The group also believes that, as human beings, we must strive to do more with less while nevertheless helping people overcome poverty.

The work of FNYC is centred on grassroots participation because the organisation tries to promote an alternative to a consumer society. That alternative places greater value on friendship and a sharing community.

The group has established an information centre that produces publications, manages a loan scheme for agricultural purposes and provides training for youths through seminars and workshops.

Moreover, it has been involved in conservation activities such as saving energy by switching off lights, avoiding electric fires and using public transport instead of personal cars, among others.

All of the FNYC activities are designed to demonstrate simple, accessible ways to avoid the over-consumption of natural resources.

Self-help question 4.3

(10 minutes)

To what extent do you think that the FNYC is approaching the problem of sustainable development in the spirit of the new definition adopted by the World Bank?

Compare your answers with those suggested at the end of the unit.

Activity 4.5

(about 15 minutes)

Keeping in mind the FNYC strategy, consider:

- two ways in which your lifestyle contributes directly or indirectly to environmental degradation
- to what extent you feel that the way of remedying this is by cutting consumption, conserving resources and cultivating a richer social life
- the losses and gains that will result from changing your lifestyle.

Write your responses to each of these questions in your learning journal.

As pointed out earlier in this module, one of the environmental concerns of youth is deforestation. The case study cited below illustrates one approach to this problem.

Case Study 4.6

Forest once covered an estimated 230,000 square km of Cameroon, or 45 per cent of its total land area. However, as a result of industrial and agricultural development and expansion and a rapid increase in population, Cameroon is now grappling with deforestation and its accompanying environmental ills.

Over a decade ago, the Association of Friends of Nature Clubs (ACAN) was established in the country. ACAN commenced an environmental education programme in secondary schools and at the University of Yaoundé. The group held regular excursions to facilitate the study of natural resources and dialogue with experts and decision makers. It also organised programmes for students. These included films on nature conservation, pesticides and air and water pollution.

In addition, because of its concern about the destruction of the tropical forests, ACAN launched a number of campaigns and appealed to the Cameroon Government to stop all contracts with foreign timber companies. ACAN also alerted the local people to the environmental dangers of deforestation.

Self-help question 4.4

(10 minutes)

How do you think the World Bank would view this strategy by ACAN? Bear in mind their approaches and emphasis.

Compare your answers with those suggested at the end of the unit.

Case Study 4.7

In the Caribbean, there is a well-known community-based organisation called JEMS, which was established in 1978. JEMS is an acronym for four villages in St. Vincent and the Grenadines and is based in Enhams, a rural village.

JEMS is comprised mostly of underprivileged youth who work as a team to achieve a number of social and economic goals that they have set themselves, based on the development and environmental problems in the region. Through the activities of the organisation, the young people are empowered to make significant changes in their neighbourhoods and also in their own lives.

JEMS views development as a people-centred process that involves people in decision-making and engaging in activities to re-shape their own lives. The objectives of the organisation are to:

- prepare and implement environment and community development projects
- use environmental issues as a medium to upgrade the literacy level of residents within the community
- involve children in school and community clean-up campaigns
- provide training for teachers in popular methods for educating people about environmental issues.

One of the key projects in which JEMS has been involved is the protection of Kingshill Forest Reserve, which is approximately 200 years old. JEMS has used a problem-solving approach, based in local cultural traditions, to protect the reserve. The events that led to the use of this strategy are described below.

During the 1970s, an agricultural estate – which provided employment for 90 per cent of the residents of Kingshill – ceased

production. Residents of Kingshill therefore needed an alternative source of income. As a result, they began to exploit the Reserve's resources that, as a local community, they had once protected. Land owners decided to clear forested lands in order to extend their property while squatters cleared lands for housing settlements, charcoal burning, firewood and small-scale timber production. These activities led to the start of a gradual destruction of the Reserve. JEMS therefore decided to implement a cultural development programme to re-sensitise residents to the importance of the Kingshill Reserve.

JEMS' strategy mobilised the neighbouring communities to take action to solve their economic and social problems. This was done through cultural activities including drama, folk songs, drumming and talks that were based on the socio-cultural and economic conditions of the communities. Additionally, in primary and secondary schools, JEMS implemented an educational programme on the importance of the Kingshill Forest Reserve to the community.

As a result of the awareness and re-sensitisation programme, some villages formed watchdog committees to monitor activities in the Reserve. Others organised protest marches and launched an adult education programme to train villagers in literacy skills, employment creation skills, personal and community development and local resource management. Through self-help, a number of development projects were implemented. These included road improvement, the construction of recreational facilities and a community centre, the installation of a water system and the creation of a solid waste management programme.

The work of JEMS has been such a success story that, in 1993, the organisation was awarded the Caribbean Conservation Award by the Caribbean Conservation Association for its work in community development and conservation in St. Vincent and the Grenadines.

Self-help question 4.5

(15 minutes)

How do you think World Bank experts would view JEMS activities?

Compare your answers with those suggested at the end of the unit.

Activity 4.6

(about 30 minutes)

Refer back to Reading 6 and the Earth Summit case studies. Choose one of the success stories most relevant to you and evaluate it using both of the following two models:

1 the World Resources Institute's model

2 the World Bank's model.

Self-help question 4.6

(20 minutes)

1 List the two methods that the World Bank uses to assess lending programmes to borrowing countries.

2 Describe the indicators that each of the two methods uses.

3 In your own words, briefly describe the approaches used by a youth group to solve sustainable development problems in one of the following countries:

   (a) Cameroon

   (b) Fiji

   (c) St Vincent and the Grenadines

   (d) Thailand.

4 (a) Name one international or regional organisation that offers youth an opportunity for involvement in environmental work.

   (b) State the objectives of the organisation.

Compare your answers with those suggested at the end of the unit.

The final self-help question will help you review and summarise your learning in Units 3 and 4. The final activity is designed to help you think how best to apply your learning to your work as a youth development worker.

Self-help question 4.7

(20 minutes)

1 Using your own words, define sustainable development.

2 Explain why the integrated approach to sustainable development is superior to the ecological approach.

3 In your own words, explain the two characteristic concerns of sustainable development.

4 In your own words, explain two or three sustainable development strategies that are relevant to your situation.

5 List some of the factors that would affect your government's attempts to introduce such strategies in your country.

6 Explain why it is important for youth to participate in the process of sustainable development.

7 Explain the importance of involving women in sustainable development activities in your community.

Compare your answers with those suggested at the end of the unit.

Activity 4.7

(about 30 minutes)

Imagine you are working with a youth group to apply for funding from the World Bank for a sustainable development project (think of a likely example of the kind of project you might be involved with).

List five recommendations you would give the group to help them make sure the project meets World Bank criteria.

Note your ideas in your learning journal.

Unit summary

This is the end of the final unit in the module. In this unit you have covered the following main points:

- further definitions of sustainable development in terms of its application to planning and evaluating projects
- the elements of sustainable development projects and how these are reflected in the general objectives laid out in the World Resources Institute's model
- the criteria the World Bank uses to evaluate sustainable development projects
- practical case studies of approaches to sustainable development adopted by youth organisations in the Commonwealth.

Based on this, you should now be able to approach the design and evaluation of projects that give clear expression to the principles of sustainability.

To check how you have got on, look back at the learning outcomes for this unit and see if you can now do them. When you have done this, look through your learning journal to remind yourself of what you have learned and the ideas you have generated.

Answers to self-help questions

Self-help question 4.1

1 The World Bank approach is far more realistic and future orientated than earlier approaches to sustainable development. Moreover, because it includes questions on human capital formation and social and cultural formation, it is generally more suited to evaluation by young people. This is so because their own experiences of living in society forms an excellent starting point for the analysis of the issues it raises. Nevertheless, these issues are complex, and if young people are to engage in the required level of analysis, they need the kind of training that you have begun to receive in this Diploma.

2 Project CAMPFIRE is designed to realise several of the objectives of sustainable development that have been outlined by the World Resources Institute under the economic, human and environmental categories. Although there are no stated objectives or strategies that fit the technological dimension, some technological objectives must have been considered since the project is not likely to tolerate hunting practices that lead to wanton destruction of wildlife supplies or their habitat. Therefore, hunting methods must use appropriate technology.

3 Project CAMPFIRE seems to satisfy several of the overall criteria of the World Bank model of sustainability. It incorporates a number of strategies designed to bring about financial and economic viability, as well as ecological and social sustainability. It has also resulted in added value because resources that previously had no value to nearby communities, and that were being destroyed, are being sustainably exploited to generate income for communities.

However, in the area of financial viability, the Bank would probably expect to see projected earnings, over time, that could lead to the recovery of the initial capital investment and ensure further growth. This information is not provided in the case study. It is possible that it has been considered, though, since the analysis of obstacles indicates that making the project financially viable was one of the challenges that the project faced.

Self-help question 4.2

Young people need to know the basic issues involved in conservation. Therefore, the YCC's activity of mounting exhibitions and lecturing is a valuable first step toward conservation. However, this is only the first stage. The real action begins when activists start to move out into the field. Of course, this has happened in the YCC's programme for improving parks and recreational areas.

Nevertheless, the YCC strategy could easily turn into a short-term measure that makes everyone feel they have done something worthwhile and the problem has been solved, whereas what is needed is a permanent change of mind and practice on the part of the whole population. Cleaning up recreational areas is only tackling one problem within a much larger issue, which is the need to safeguard and improve the whole natural environment while at the same time keeping up the rapid pace of development achieved by Thailand. This must all be done at a time of great threat to the country's hardwood forests through logging concessions in the region.

Self-help question 4.3

By making the spiritual question the prime focus of its strategy, the FNYC seems to have concentrated more on conservation than on development. That may be a particularly appropriate strategy for the Fijian society in which there is ethnic rivalry and a particularly delicate balance of human and natural resources because of the island status of the country. These circumstances make the question of quality of life, which is the basis of the FNYC strategy, particularly relevant. Contemporary development theory emphasises the quality of life, and this is one of the areas on which the World Bank focuses.

However, in placing the stress solely on the quality of life, the FNYC approach is in line with only one part of the World Bank approach. The Bank is an agency of world capitalism, and capitalism works through the medium of profit and 'added value'. That entails more consumption, whereas the FNYC's major practical strategy is to cut consumption. Therefore, in development theory and policy, there is a clear division between even the modern World Bank view and the grassroots approach now preferred by the group.

Self-help question 4.4

This approach shows that ACAN recognised that education is critical to environmental conservation. As we are aware, knowledge can lead to concern and concern can translate itself into positive action. Knowledge can also enable youth to identify conservation needs and spread awareness. Thus, the educational aspect of ACAN's strategy is important.

However, it is unlikely that the part of the strategy that asks the government to end timber contracts with foreign companies would find favour with the World Bank. After all, the Bank represents the general position of progressive capitalism and its policy position generally is that economies have to make themselves financially sound by managing their environmental assets properly. As a result, it would have expected Cameroon to fulfil its contractual agreements with the logging companies; meet its debts in the most effective way while conserving as much of its forests as it can; and improve its ability to borrow through introducing a structural adjustment programme.

Self-help question 4.5

This strategy seems to fulfil all the essential World Bank general criteria, because it is not an approach in which people have, from the outset, to borrow money unsoundly. Its development plan is based on creating more opportunities for people in the present and the future than existed at the start of the strategy; maintaining and extending the physical capital in the form of forest reserve; adding to the infrastructure, in the form of roads and waste management; and enhancing the cultural and human capital through providing community facilities, basic education and skill training.

In other words, it is a programme with high added value, which is the measure used by progressive capitalist systems to evaluate an initiative. One would imagine that it also satisfies the straight economic criteria since it has led to added value in a situation that might have led to expensive social breakdown.

Self-help question 4.6

1 The two methods used by the World Bank are (a) a set of indicators known as the sustainability matrix to measure the sustainability of projects; and (b) the 'sustainability as opportunity' model, the idea behind which is that we must leave future generations with as many, if not more, opportunities than we have had.

2 The indicators used in the sustainability matrix are:

- economic viability
- ecological sustainability (such things as ecosystem integrity, carrying capacity and natural resource conservation)
- social sustainability (such things as equity, social mobility, social cohesion, participation, empowerment, cultural identity and institutional development).

Sustainability as opportunity uses the concept of national wealth, meaning such things as man-made capital, natural capital, human capital and social capital.

3 (a) The Association of Friends of Nature Club (ACAN) in Cameroon promotes the study of natural resources; has dialogues with experts and decision makers; and organises programmes for students. It has also campaigned for the government to stop all contracts with timber companies and has made the local population aware of the environmental dangers of deforestation.

(b) The Fiji National Youth Council (FNYC) focuses on grassroots participation and seeks to promote the human, economic and social development of young people. It disseminates information, manages a loan scheme for agricultural purposes and provides training for youth. FNYC

views the pursuit of material wealth as the main cause of over-consumption and depletion of resources. Thus, it advocates striving to do more with less, while at the same time overcoming poverty. The group engages in conservation activities aimed at demonstrating simple, accessible ways to avoid over-consuming natural resources.

(c) JEMS, a group of mostly underprivileged young people, has set itself social and economic goals related to the development and environmental problems in the region. They have made important changes in their neighbourhoods and their own lives. The group takes a people-centred approach to development and therefore involves people in decision-making and activities aimed at re-shaping their lives. An important example of its work is its mobilisation of local communities to protect the Kingshill Forest Reserve, which was threatened with destruction at a time of social and economic difficulties. The group used drama, folk songs, drumming and talks based on the socio-cultural and economic conditions of the country.

(d) The Young Conservationists Club in Thailand engaged in information dissemination in the form of wild life exhibitions, movies, slides, posters and lectures to educate children in schools about the need for conservation. They also mounted a programme for improving parks and various recreation areas with the assistance of young volunteers.

4 (a) The International Youth Federation (IYF) for Nature Studies and Conservation (international) or the Caribbean Youth Environment Network (CYEN) (regional).

(b) The IYF aims to organise and encourage activities designed to increase the knowledge and appreciation of environmental problems by youths throughout the world. Its purpose is to help youth become committed to the principles of environmental conservation and encourage youth to act voluntarily to protect and improve the environment and employ the Earth's resources naturally. CYEN aims to promote, through education, regional integration and community development, the conservation and protection of human and natural resources within the Caribbean.

Self-help question 4.7

1 Sustainable development is development that aims to improve our present socio-economic condition while, at the same time, protecting or adding to environmental resources in the interest of safeguarding the socio-economic condition of future generations.

2 The ecological approach to sustainable development focuses on the protection of the ecosystem and excludes consideration of socio-economic factors. Conversely, the integrated approach

focuses on the environment as well as socio-economic issues. In so doing, this latter approach shows awareness of the fact that the environment and development are inter-related. Thus, the integrated approach reflects the reality of sustainable development and is therefore superior to the ecological approach.

3 The two characteristic concerns of sustainable development are:

- The quality of human life. Inherent in sustainable development is the belief that development should ensure, over time, gradual improvement in the quality of life of individuals and communities.
- Social equity. It is believed that citizens from all strata of society should be able to participate in decision-making about the use of resources in their environment and share in the benefits of sustainable development. Development activities must also reflect respect for regional, national, local and ethnic diversity.

4 Some sustainable development strategies that you might have stated are:

- reviving economic growth in an attempt to satisfy the basic needs of the population
- changing the quality of growth in terms of factors such as income distribution
- ensuring a sustainable level of population growth
- conserving and enhancing the natural resource base
- researching and acquiring appropriate technology
- managing environmental risks
- merging environment and development issues in decision-making.

5 The government's ability to introduce these strategies will be affected by such factors as the:

- availability of natural resources
- skilled manpower
- investment capital and technology
- social structures, perceptions and attitudes
- level of information dissemination
- political will
- design and implementation of relevant programmes.

6 Youth possess energy, creativity and insights that should be tapped in efforts to promote sustainable development. Moreover, involving youth in sustainable development activities will raise their level of awareness of important environmental issues, ensure their active participation in the conservation and the protection of the environment, and lay the foundation for more widespread interest in sustainable development over time.

7 We should involve women in sustainable development because:

- the daily activities of many women bring them into close contact with the physical environment
- environmental problems impact on women's ability to fulfil their responsibilities, thus women have a vested interest in sustainable development
- women are among the first to be affected by economic changes
- since they are the main decision-makers in areas such as choice of foods, fuels and household cleansing agents, women need to be aware of environmentally sound practices in each of these areas.

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Summary

Module summary

You have now come to the end of Module 13 *Sustainable Development and Environmental Issues*. We hope that your awareness and knowledge of the crucial issues in this area have grown through studying this module, and that you now have a greater concern for our environment and the cause of sustainable development.

You must not stop there, but rather translate that concern into positive action that will promote a safer environment and sustainable future, not just for yourself but for all generations to come.

Remember that as a young person and a youth worker, you have the creativity, the energy and a whole new perspective to bring to the process of environmental protection and sustainable development. Strive to become an environmental ambassador – you(th) can make a change.

Now you have come to the end of this module you should be better able to:

- outline key concepts related to the natural environment and its associated problems
- identify key social, economic and political factors contributing to environmental problems
- explain the concept of sustainable development
- describe various approaches to environmental protection and sustainable development around the world, including Agenda 21
- evaluate the opportunities and practical approaches provided by a range of agencies.

In terms of participating with young people in environmental and sustainable development activism, you should be able to:

- lead activities with groups of young people to develop their knowledge and understanding of environmental and sustainable development issues
- work with a youth group to design and undertake an environmental/ sustainable development-related project
- design a project that gives clear expression to the principles of sustainable development
- evaluate projects in terms of their contribution to sustainable development.

Glossary

biodiversity	The variety of biological life and the variable state of nature. It encompasses three levels of organisation in living things: the genetic level, the species level and the ecosystems level.
biomass	Organic matter used to produce energy. It includes wood, crops and waste products from farm animals.
carbon	A non-metallic chemical element occurring as, among other things, graphite and charcoal. It is found in carbon dioxide, in carbonates and in all living things.
carbon dioxide (CO_2)	A gas formed by breathing and by the combustion of carbon.
carnivores	Organisms, animals or plants, that mainly feed on a diet of other animals.
carrying capacity	The maximum number of members of a species that can be supported in an area. The carrying capacity of an area is usually limited by the resources in the environment.
chlorofluorocarbons	Known familiarly as CFCs, these are hydrocarbons (mixtures of hydrogen and carbon) in which some or all of the hydrogen has been replaced by chlorine and fluorine atoms. CFCs are easily liquefied by the application of pressure and used, for example, as aerosol propellants and as coolants for air conditioning and refrigeration. Since 1974 it has been understood that the CFCs that we have pumped into the atmosphere are responsible for destroying some of the protective ozone layer.
conservation	The policy of managing the environment to ensure that adequate supplies of natural resources are available for present and future generations.
consumers	Organisms that feed on organic matter or other organisms. The term is also used to refer to individuals and households that purchase goods and services in the economy.

eco-development	Ecologically sound development. This is an approach to development that focuses on the wise use of natural resources, appropriate technology and systems of production that consider and provide for the conservation of nature.
ecology	The scientific study of the interrelationships of plants, animals and the environment.
ecological capital	See *natural resources*.
economic growth	An improvement in material welfare or the gross domestic product over time.
endemic	A species that is native or restricted to a particular region or locality.
environmental	Anything that relates to the natural environment
environmental degradation	The lowering and reduction of environmental quality; it may also be an action that makes the environment less fit for human, plant or animal life.
environmental education	A process designed to increase awareness of, and concern about, the environment. It involves individuals and the community in environmental problem solving and decision-making.
environmental impact assessment (EIA)	The critical appraisal of the likely impact of a project or activity impact assessment on the environment.
food chain	A series of linked stages in which the higher organisms at each stage progressively consume the organisms at the stage below them
genetics	The study of the biological mechanisms of inheritance or heredity (the process by which the characteristics of organisms are handed down from parent to offspring).

greenhouse effect	The presence of relatively high concentrations of gases such as carbon dioxide (CO2) and methane (CH4) maintains a relatively warm surface temperature of the earth. These gases trap energy that would otherwise escape into space and keep it near ground level, keeping ground temperatures at a global average of about 15 degrees C. The effect is comparable to the way in which a greenhouse traps the heat of the sun.
greenhouse gases	Components of the atmosphere that cause the Greenhouse Effect. They are carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons and water vapour.
habitat	The place where an organism or a community of living organisms lives. A habitat includes all living and non-living elements in the surrounding environment.
hazardous wastes	Wastes that, by reason of their chemical reactivity, etc. cause or are likely to cause danger to human health or the environment.
herbivores	Consumers of plants.
lobby	An activity seeking to influence legislators in favour of special interest groups. Lobby groups seek to influence decision makers by direct contact and to affect public opinion through the use of the media and mailing campaigns.
natural resources	All parts of the environment that are useful to human beings, including the atmosphere, water, soil, forest, wildlife, land, minerals and environmental assets generally. Also called ecological capital.
non-renewable resources	Those natural resources that, once consumed, cannot be replaced, for example, minerals and oil.
omnivore	Consumer of both plants and animals
ozone	Gas with three oxygen atoms in the molecule.
ozone layer	A layer of the atmosphere, between 20 km and 50 km above the surface of the earth. It is the protective belt that moderates the effect of incoming ultraviolet radiation from the sun.

renewable resources	Those natural resources that can be renewed, replenished or reproduced. They are mostly living resources.
species	A group of organisms with members that can interbreed and that differ only in minor details.
toxic	Poisonous.

Further reading

The following list of books and texts is meant to support your leaning throughout this module. You are encouraged to read as widely as possible during and after the course. There is now excellent recent work on the internet under the headings used throughout this module.

We suggest you discuss further reading with your tutor. What is available to you in libraries? Are there other books of particular interest to you or your region? Can you use alternative resources, such as newspapers and the internet?

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Assignments

Assignment 1

This assignment counts towards your final assessment in this module and is worth 50 per cent of the final mark.

Complete a 1,750 word written assignment that records the initiation, design, delivery and evaluation of an environmental or sustainable development project you have undertaken with a group of young people.

This may be a project that your group initiates or an existing (larger) project in which you and your group participate. Alternatively, this might be a project you have previously worked on and wish to evaluate in the light of your new skills and understanding, having studied this module. Discuss the options with your tutor before proceeding.

You are encouraged to draw on the various ideas and information you have recorded in your learning journal for the activities in this module.

The following is a suggested format for your report:

1 **Initiation**

a) Identify the group of young people that you will work with on the project. Discuss the programme that you have developed to raise their awareness of the environmental and sustainable development issues.

b) Describe the problem that you and your group have identified as affecting your community or country. Discuss the main causes and nature of the problem. In your description of the problem, try to link the natural environment with the social environment and, more importantly, with the concept of sustainable development.

2 **Design**

Describe the design of the project that will help alleviate the problem that you have identified and how it will promote sustainable development. Describe what action has been planned and the desired outcomes to be achieved.

3 **Delivery**

Describe how you will put your plan into action and record what occurs. Identify any potential areas of failure, anticipated problems and obstacles and how you plan to overcome them.

4 **Evaluation**

Evaluate your project design using the various criteria outlined in Unit 4. Include the opinions of others and match the outcomes with those that were planned for.

Assignment 2

You are expected to keep a learning journal throughout your work on this module. You use this to record your thoughts and feelings as you are learning and also to write your responses to the study guide activities. The journal is worth 20 per cent of the final assessment.

Assignment 3

This assignment will consist of a written examination worth 30 per cent of the final mark.

Note: We recommend that you discuss the assessment requirements with your tutor before you begin, including how your learning journal will be assessed.

Readings

The readings in this section will help you develop your understanding of Module 13 *Sustainable Development and Environmental Issues*. The reading numbers, their titles and author(s) and the unit in which they appear are listed below.

Reading 1: Health and the Environment

by James Hole, Developments, March 2006

Environmental conditions help determine whether people are healthy or not, and how long they live. They can affect reproductive health and choices, and they can help determine prospects for social cohesion and economic growth, with further effects on health. Changes in the environment – pollution and degradation, climate change, extremes of weather – also change prospects for health and development.

Martha Cooper, Still Pictures

Women in India carrying pots. Rural poor women often carry heavy loads over long distances, contributing to ill-health.

Environmental conditions contribute significantly to communicable diseases, which account for about 20–25 per cent of deaths annually worldwide. The illnesses most closely related to environmental conditions – infectious and parasitic diseases and respiratory infections and diseases – endanger development prospects, particularly in poor countries and among poor people in any country. Unclean water and associated poor sanitation kill over 12 million people each year. Air pollution kills nearly 3 million more.

Changes in land use can create new breeding grounds. Irrigation or dam construction, for example, can encourage waterborne diseases: schistosomiasis established itself in Egypt and Sudan after the building of the Aswan dam. The clearing of tropical forest creates hardpan on which rainwater can collect and mosquitoes can breed. Malaria results in over 1 million deaths each year and accounts for some 300 million new clinical cases each year. Malaria causes 10 per cent of the total deaths in sub-Saharan Africa.

It has been estimated that roughly 60 per cent of the global burden of disease from acute respiratory infections, 90 per cent from diarrhoeal disease, 50 per cent from chronic respiratory conditions and 90 per cent from malaria could be avoided by simple environmental interventions.

In more-developed countries, these conditions contribute a lower proportion of the total burden of illness but still are responsible for outbreaks, especially in communities poorly served by sanitation and other clean-water services. Outbreaks of diphtheria in Central and Eastern Europe reflect poorer public health services (including low levels of vaccination) and greater migration of infected and susceptible populations in the wake of political change.

Changes in health conditions directly affect development prospects and the chances for eradicating poverty. These are affected by a wide variety of conditions in the human and social environment.

Demographic Change and Health

Environmental change can dramatically improve urban health, as in European cities in the 19th century, when piped water and treated sewage eliminated the ancient threat of cholera. In Sri Lanka and other Asian countries in the 1940s a combination of spraying DDT and removing mosquito breeding places temporarily wiped out malaria. Such public health interventions hold down the burden of disease in many developing countries, especially in great cities, but they often fight a losing battle against growing populations, polluting industry, deteriorating infrastructure and housing stock, and shortage of resources.

Crowded living conditions, particularly in urban areas, spread infection. People living in poverty are the most crowded because of the cost of housing and the larger size of their families. Infants in poorer and more crowded portions of cities are at least four times more likely to die than infants in more affluent neighbourhoods. Environmentally related diseases, notably tuberculosis and typhoid, contribute to these differentials.

Trade links between large cities and the surrounding rural areas and smaller cities are accelerating with the integration of economies into the global system. Better transport to centralized markets has helped spread sexually transmitted diseases, including HIV/AIDS. Infection rates are markedly higher along lorry routes and at border towns where drivers congregate.

Ease of transport also allows diseases to travel between regions or continents within human hosts, other animals or cargo. Cholera has travelled from Bangladesh to Chile in the ballast tanks of a freighter. Cholera outbreaks following disasters in India have been spread by infected people leaving the area.

Migration to newly opened lands, sometimes as part of government-approved and -assisted colonization programmes, often removes settlers from the reach of health systems, including reproductive health services. Incentives for doctors and nurses to move to rural locations are generally insufficient and ineffective. Equipping and re-supply of remote facilities is difficult and their inadequacies deter settlers from using them.

Health services in settlements around cities are similarly poor. Mortality rates for the young can be higher than in more-established rural settlements.

Maternal mortality, though difficult to measure, is clearly much higher in rural areas – where fewer births are attended by trained staff and transport in case of pregnancy complications is difficult – than in cities, and higher still in new rural settlements.

Large families in new settlements also have a greater effect on their immediate environment than smaller ones. Their needs for food, fuel and water are greater and, with additional resource scavengers, so are their impacts.

Pollution and Health Threats

Air pollution kills an estimated 2.7 million to 3.0 million people every year, about 90 per cent of them in the developing world. The most critical components include: sulphur dioxide (from the burning of oil and high-sulphur coal); particulate matter (from domestic fires, power and industrial plants, and diesel engines); carbon monoxide and nitrogen dioxide (from petrol fumes from motor vehicles); ozone (from the effect of sunlight on vehicle emission-generated smog), and atmospheric lead (from burning leaded petrol or coal).

Outdoor air pollution harms more than 1.1 billion people and kills an estimated half million people per year, mostly in cities. Nearly 30 per cent of these deaths are in developed countries. Fine particulate pollution is responsible for up to 10 per cent of respiratory infections in European children (and twice as much in the most-polluted cities). The situation is particularly serious in the former Soviet Union where, despite reduced levels of industrial output, automobile transport has increased markedly.

Densely populated and rapidly growing megacities in developing countries subject their populations to levels of air pollution exposure far in excess of allowances recommended by the World Health Organization.

The one hour per year maximum for specific concentrations (greater than 0.1 parts per million) and 30 days per year limit on generally high ozone exposure are exceeded in Mexico City regularly. The specific limits were exceeded for more than 1,400 hours over only 145 days in 1991. Similar excessive exposures are common in Santiago and São Paulo.

Asian megacities do better in ozone exposure, but worse with respect to WHO standards for suspended particulate matter and sulphur dioxide (for example in Beijing, Delhi, Jakarta, Kolkata and Mumbai). Cairo, Lagos and Tehran also show high exposure concentrations.

Automobile ownership is expanding rapidly in many developing countries. In Beijing, more than three quarters of survey respondents

expect to purchase a car in the near future. India has recognized the growing contribution of automotive exhaust to city pollution. However, efforts in Mumbai to mandate use of liquid propane to power taxis have met strong opposition from drivers and fleet owners. (Similarly, efforts to regulate industrial emissions have generated a counter-response from small businessmen.)

Indoor air pollution – soot from the burning of wood, dung, crop residues and coal for cooking and heating – affects about 2.5 billion people, mostly women and girls, and is estimated to kill more than 2.2 million each year, over 98 per cent of them in developing countries.

Air pollution's impact extends beyond direct health effects. Acid rain results from chemicals dissolved in precipitation. It increases the corrosive effect of rainfall on buildings and structures and makes the lands and waterways that receive it less productive. Alterations in the chemical balance of soils and water have widespread effects on plant and animal life. Air pollution also reduces food production and timber harvests by impairing photosynthesis. An estimate for Germany suggests that $4.7 billion in agricultural production is lost due to high levels of sulphur, nitrogen oxides and ozone.

Heavy Metals

Heavy metals are released into the environment by metal smelters and other industrial activities, unsafe disposal of industrial wastes, and the use of lead in water pipes and petrol. The most dangerous metals, when concentrated above naturally occurring levels, include lead, mercury, cadmium, arsenic, copper, zinc and chromium. These have diverse effects relating to cancers (arsenic and cadmium), genetic damage (mercury) and brain and bone damage (copper, lead and mercury).

Bangladeshi woman giving birth. Women weakened by environment-related health problems are more vulnerable in pregnancy and childbirth.

Shehzad Noorani, Still Pictures

Lead pollution from leaded petrol (phased out in the United States and the European Community over the past three decades), worsened by use in inefficient or poorly maintained engines, causes widespread health problems in some countries. It contributes to lower levels of intelligence among exposed children and later loss of productivity in adulthood.

Nuclear Contamination

The contaminated areas around the Chernobyl nuclear facility in the Ukraine provide one of the starkest examples of the catastrophic dangers of unsafe nuclear power use. Over 2 million people were immediately affected, including 500,000 children. There has been a great increase in thyroid cancers, in some areas over a 100-fold higher incidence than expected. The full impact in thyroid and other cancers will develop over the coming years.

The 600,000 soldiers and civilians who worked to clean up the site over several years will also bear the burden of radiation exposure. The 50,000 who worked on top of the reactor building to put out the fire and build its new concrete containment were most seriously exposed and affected. Research suggests that some 30 per cent suffer from reproductive disorders (including higher levels of infertility and birth defects).

Many area residents are afraid to have children from fear of defects, fears that are complicated by the continuing decline in the capacity of the health system. Observed effects are clearly related to proximity and exposure. Malformations (including cleft palate, Down's syndrome and deformed limbs and organs) increased 83 per cent in severely contaminated areas, 30 per cent in mildly contaminated areas and 24 per cent in "clean" areas. The worst-affected region in neighbouring Belarus has seen increases in childhood cancers (more than 60 per cent), blood diseases (54 per cent) and digestive organ diseases (85 per cent).

Contamination of the land has restricted agricultural production, killed trees and polluted waters. Close attention will be required to monitor and prevent contamination of nearby waterways that supply 35 million people.

With growing awareness of the health and climate impacts of oil-, gas- and coal-fuelled power plants, reliance on nuclear power for electrical generation may increase. Many countries still do not have the capacity to run and regulate these facilities properly, or to prepare and implement emergency plans to handle accidents.

Reproductive Health and the Environment

Environmental factors have a direct effect on individuals' reproductive health and communities' response to reproductive health conditions. They also affect service access and quality. They have

their most serious impacts among the poor, who are more likely to live near sources of pollution and use polluted resources.

Impacts start at or before birth. Exposure to some agricultural and industrial chemicals and organic pollutants are associated with pregnancy failures and with infant and childhood developmental difficulties, illness and mortality. Exposure to nuclear radiation and some heavy metals has genetic impacts. Exposure to new interactions, with reproductive risks stretching down the generations, is increasing.

Anaemia is common among ill-nourished girls and women and can affect the age at menarche. Frequent childbearing intensifies the incidence and severity of anaemia.

Rural poor women frequently carry large loads of water and household fuel (wood, charcoal and other bio-matter), often for long distances. In many communities environmental damage has greatly increased the distance women must go for fuel or water. In addition to their general effect on health and the possibility of injury, these heavy loads contribute to low weight and proportions of body fat among women. Below certain levels low body weight contributes to the cessation of menses and reduced fertility.

Women weakened by general ill-health, and by infectious and respiratory diseases, are much more vulnerable in pregnancy and childbirth, especially if they are very young, near the end of their reproductive years, or have had many children. They may also be more vulnerable to HIV infection.

Reproductive Health Service Challenges

Peri-urban and marginal land use. The unplanned development of land around cities and the opening of new, often marginal, rural lands increases the number of people in areas without health delivery infrastructures. The reduced availability of reproductive health services in these areas increases the risks of maternal mortality and unwanted pregnancy.

Water availability. In poor countries and countries in transition with shrinking health budgets, lack of water or clean water at health facilities is a serious problem. Quality health care, including reproductive health care, is impossible without adequate supplies of clean water.

Seasonality burdens. Cases of many diseases increase when seasonal conditions favour their spread. This is true, for example, of water-borne and insect-borne diseases during and after rainy seasons; and infectious diseases in cooler times when more people are indoors or in overcrowded schools. Pregnancies similarly may follow a pattern related to breaks in the agricultural work schedule or certain holidays, for example. These patterns affect the flow of visitors to clinics and hospitals. Improved flow management and staff training are required to maintain appropriate service quality, including sufficient time for counselling and follow-up, throughout the year.

Exposure to Persistent Organic Pollutants

Pollution from emissions, industrial processes, fertilizers, pesticides and waste is exposing people to higher levels and a broader range of chemicals than ever before. Many chemicals that did not exist 50 to 100 years ago are now widely dispersed throughout our environment.

People are at the top of their food chain (living on agricultural products and on animals, birds and fish which themselves consume affected organisms, water and prey) and are exposed to concentrated levels of pollutants. Most of these chemicals have not been studied, either individually or in combination, for their health effects. Many questions remain about their possible impacts on early foetal and childhood development in particular.

Developed countries, the major producers of the new substances, vary dramatically in their concern and attention to the issue. The European Community, for example, tends to take a more cautious approach to the regulation of new chemicals than does the United States.

Since 1900, industrialization has introduced almost 100,000 previously unknown chemicals into the environment. Many have found their way into the air, water, soil and food – and human beings. One category of these chemicals, endocrine disrupters, is now suspected as an important cause of human reproductive disorders and infertility.

An endocrine disrupter is a synthetic chemical that, when absorbed into the body, interferes with normal hormone function, sometimes altering the amount of hormones inappropriately, sometimes mimicking or blocking their action. This interference can undermine intelligence, decrease disease resistance, or impair reproduction.

Virtually every person on earth has been exposed to endocrine disrupters – through direct contact with pesticides and other chemicals or through ingestion of contaminated water, food or air. Many are persistent, accumulating in fat and other tissues, so human exposure may increase from eating fatty foods or contaminated fish.

Assumed endocrine-disrupting chemicals include some of the most commonly used substances in the developed and developing worlds. For example:

- Phthalates – plasticizers found in polyvinyl chloride, used in plastic bags and intravenous equipment, as well as in soaps, hair sprays, nail polishes and cosmetics.
- PCBs – formerly used in electrical equipment and still found in contaminated watersheds, landfills and other disposal sites.
- Dioxins – produced during waste incineration and by industrial processes such as paper production.
- At least 84 pesticides – some of the most common are DDT, lindane, vinclozolin, dieldrin, atrazine, 2-4 D (agent orange),

2,4,5-t, some pyrethroids and malathion. Many have been banned in the United States and Europe, but are still exported to and used in the developing world. In fact, pesticide use and human exposure are rapidly growing worldwide.

Research about the effects of these ubiquitous chemicals is not conclusive, but mounting evidence links endocrine disrupters to a range of problems, including: infertility among women; miscarriage; declining sperm counts; testicular and prostate cancer; and other reproductive disorders such as hypospadias (malformed penises), cryptochidism (undescended testes) and early puberty in girls; endometriosis; and breast, ovarian and uterine cancers. Children exposed in utero are more likely to suffer development problems and difficulties in learning or cognition.

Some recent research findings:

- A February 2001 University of North Carolina (U.S.) study found that foetal deaths are almost twice as likely among pregnant women in California farming communities who live near areas where certain pesticides were sprayed. Deaths appeared to be a result of exposure during the first trimester of pregnancy. These findings are relevant to developing countries where regulation of chemical application is less stringent and where even more dangerous chemicals banned in the developed world are still used in agriculture and disease control.
- A 1996 study in the Great Lakes region of the United States and Canada found that children born of women who had eaten fish from the lakes, which contain extremely high levels of PCBs, showed delayed motor development and dramatically lower levels of intelligence. PCBs are ubiquitous around the globe, particularly in poorer nations.
- In 1997 the International Association for Research on Cancer found high levels of dioxin in human breast milk in 29 of 32 countries studied, including France, Pakistan, the Russian Federation, the United States and Viet Nam. WHO has called for measures to control and reduce dioxin and other organochlorines in the environment to eliminate or minimize exposure.
- A controversial set of studies of U.S. girls points to a nationwide trend towards earlier and earlier puberty. Other studies show that girls exposed to high levels of PCBs and DDE (a product resulting from the breakdown of DDT) in utero entered puberty 11 months earlier than did those without such exposure.

Existing evidence points to the need for more extensive and rigorous testing of chemicals, as currently proposed by the European Union; effective "right-to-know" laws that inform individuals about the chemicals to which they are exposed; better detection of exposures; and reducing and eliminating exposure in the first place.

In an important step towards achieving the latter, the United Nations Treaty on Persistent Organic Pollutants, signed in May 2000 and set

to go into effect when ratified by 50 countries, is intended to control or eliminate 12 toxic substances, all of which are endocrine disrupters.

HIV/AIDS and the Environment

The causes and consequences of the HIV/AIDS crisis are closely linked to wider development issues, including poverty, malnutrition, exposure to other infections, gender inequality and insecure livelihoods. The epidemic, with its direct and devastating impact on health and the family, complicates the problem of environmental protection, intensifies agricultural labour problems and adds to the burdens of women in rural settings.

The Food and Agriculture Organization of the United Nations has pointed to the impact of the epidemic on agricultural sustainability. Tenuous land rights and low access to resources already limit rural women's choices. These disadvantages are heightened by the death from AIDS of male heads of farm households.

The loss of labour to the epidemic cripples the household. Infection rates are higher among women, who comprise most of the agricultural labour force, produce more than 80 per cent of household food and gather and manage other vital resources for their families.

The impacts are most severe in poorer communities, where farming is labour-intensive with little mechanization and few modern inputs. Land falls out of cultivation; tilling, planting and weeding are delayed; pests become more virulent. A farm may shift to crops needing less labour, and from cash to subsistence production. The loss of experienced farmers and agricultural extension workers deprives the community of their knowledge and management skills.

In severely affected areas, the numbers of surviving children and the elderly overload the community's systems of social support. Families are hard put to keep farms afloat, including their share of communal responsibility for land management, to feed and educate the children, or to care for the elderly. Loss of the male landholder may put even the survivors' tenure in question.

The impact of the pandemic in urban centres limits prospects for development, including programmes for environmental protection. By killing workers in mid-life, including employees of productive industries and the public-sector workers such as doctors, nurses and teachers, the pandemic can negate a generation of investment in economic and social development.

Biodiversity Loss and Health

Most of the world's most effective pharmaceutical products have been discovered from compounds derived from plants or animals. These are frequently found in tropical climates, where biodiversity is greatest, and often in "biodiversity hotspots" subject to increasing human pressure.

Decreased genetic variability in agricultural crops also increases the vulnerability of the food supply to new pathogens. Resistance to pests and climate variation decrease without enough diversity in the strains of common food crops under cultivation. If crops were adversely affected, widespread hunger and disease would surely follow.

Ecologists have also rediscovered what many indigenous cultures and agriculturalists already knew – greater diversity among plants in a field can significantly increase their yields and resistance to pests. Population pressures, increasing consumption and the drive for cheap food have led to the intensification of agriculture. This change has often been achieved at the cost of a greater homogenization of cropping practices. Continuation of this trend could increase the risks to food security.

Great hopes have been placed on the development of genetically engineered crops suited to survive in difficult habitats (whether due to soil conditions, climate or pests). Slower population growth, consistent with the voluntary choices of women and men, could allow more time for the research, distribution and education efforts needed to ensure that such crops are safe and pose no long-term threats to sustainability; relaxing population pressure would also soften the blow of possible failures or reversals of progress.

Effects of Climate Change

There is no certainty about the effects climate change due to global warming might have on health, but what data there are suggest that countries should invest more in public health to meet possible hazards. Environmental change can increase the location, spread and intensity of insect- and water-borne diseases. Epidemics can develop when disease-carrying insects or animals reproduce out of control, or move to new locations where people have not developed immunities.

Higher temperatures may encourage insect hosts to breed and to move further up hillsides and mountains. They could also lead to changes in the geographical range of insect hosts as previously cooler areas become more hospitable. Exposure of new populations without prior immunity could lead to virulent outbreaks.

Temperature variation could also shift the timing of seasons and the seasonal transmission of diseases. Changes in the timing of seasonal activities (e.g., harvest or planting times) could interact in complex ways to shift exposures and risks related to disease.

Higher rainfall could trigger mosquito-borne disease outbreaks, increase flooding (spreading parasitic diseases), increase the contamination of water supplies with human or animal wastes and increase exposures to run-off of pesticides and other chemicals. Studies in a lake region of Kenya show that malaria, acute respiratory infections and diarrhoeal diseases increase dramatically two or three months after heavy rainfalls.

Geothermal plant in Iceland produces power without contributing to global warming. Climate change could increase outbreaks of various diseases.

Arnaud Greth, Still Pictures

Global warming will also increase the risks and danger of exposure to heat stress, especially in urban areas, which act as local heat traps because of their interference with air flow patterns, greater reflective surface area and local heat generation.

Extreme weather events have a variety of effects on reproductive health, including an immediate short-term decline in fertility. This is largely the result of postponement or cancellation of marriages, decreased frequency of sexual relations and an increase in temporary separations. Fertility may subsequently increase as couples take up postponed or interrupted relationships, or respond to improving conditions and hopes.

Disasters also disrupt health services as infrastructure, equipment and drugs are lost, access becomes more difficult, and other immediate priorities supervene. Reproductive health, including safe motherhood, is an immediate victim, since pregnancy is not regarded as an emergency and contraception is not given priority in relief efforts. Extended settlement in temporary shelters or refugee camps exposes women and girls to sexual abuse, sexually transmitted diseases and unwanted pregnancies.

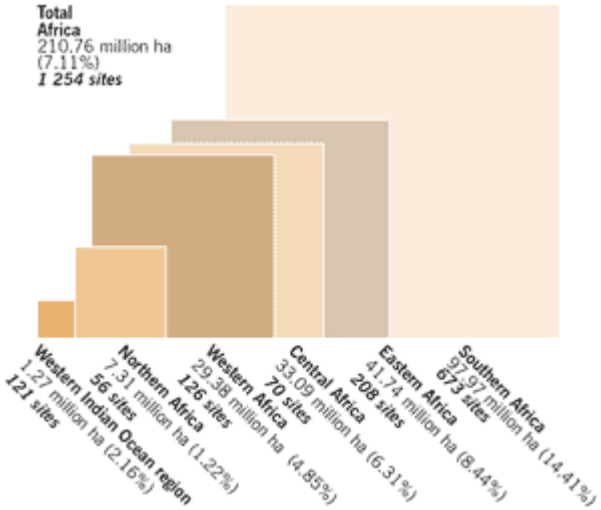
Reading 2: State of the environment and policy responses, 1972–2002

Regional highlights: Africa

The increasing numbers of African countries facing water stress and scarcity, and land degradation, are major environmental issues in the region. The rising costs of water treatment, food imports, medical treatment and soil conservation measures are not only increasing human vulnerability and health insecurity but are also draining African countries of their economic resources. The expansion of agriculture into marginal areas and clearance of natural habitats such as forests and wetlands has been a major driving force behind land degradation. The loss of biological resources translates into loss of economic potential and options for commercial development in the future. These negative changes, however, have been tempered by Africa's impressive wildlife conservation record, including a well-established network of protected areas and the region's commitment to multilateral environmental agreements. African countries also participate in many regional and sub-regional initiatives and programmes. Notable achievements include the 1968 African Convention on the Conservation of Nature and Natural Resources (currently being updated) and the 1991 Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Waste within Africa.

Protected areas: Africa

Note: number of protected areas includes those in IUCN categories I-VI

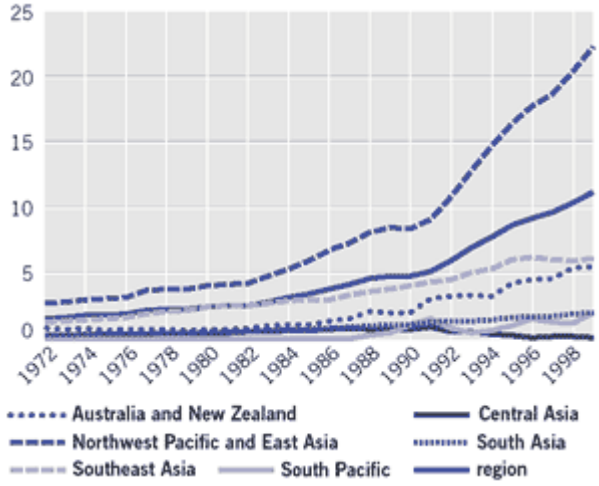


Source: compiled from UNEP-WCMC 2001b

Regional highlights: Asia and the Pacific

Overpopulation, poverty and lack of enforcement of policy measures have compounded environmental problems in many parts of the region. Biological resources have long been of subsistence importance, and have been increasingly exploited for trade. About three-quarters of known or suspected species extinctions have occurred on isolated islands in the region. Protected areas constitute only 5 per cent of the total area, compared to the IUCN benchmark of 10 per cent. Discharge of sewage and other wastes has heavily polluted freshwater. Sedimentation in rivers and reservoirs caused by large-scale deforestation has also resulted in big economic losses. Urbanization, industrialization and tourism, coupled with a growing coastal population, have degraded many coastal areas. More than 60 per cent of Asia's mangroves have been converted to aquaculture farms. Air pollution levels in some cities are among the highest in the world. While most environmental trends have been negative, positive changes have included improvement in governance by public authorities, growing environmental awareness and public participation, and increasing environmental awareness in industry.

Annual aquaculture production per capita (kg)



Source: compiled from Fishstat 2001 and United Nations Population Division 2001

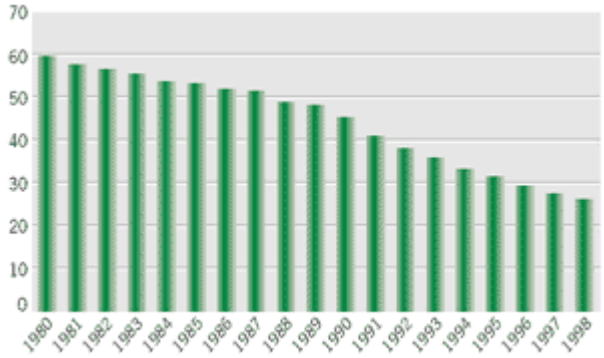
Regional highlights: Europe

The environmental situation is mixed: there have been some noticeable improvements over the past 30 years (for example, emissions to air); the state of biodiversity and forests has not changed greatly; and other situations have undergone marked degradation (freshwater, and some coastal and marine areas). By the 1990s, the European atmosphere had generally improved significantly. Increasing efforts to safeguard natural areas and biodiversity may signal a turnaround in species protection. Freshwater stocks are unevenly distributed, with parts of southern, western and southeastern Europe being noticeably water stressed. The health of coastal and marine areas has noticeably worsened, particularly in

southern and western Europe and the Mediterranean coastline. Geographically, there has been an amelioration of some environmental problems in Western Europe, and a common (but far from universal) deterioration in Central and Eastern Europe, with recent signs of a broad recovery in many countries. The development of strong environmental policies in the European Union promises continuing progress in the area.

SO_2 emissions in EMEP countries (million tonnes/year)

Over the period 1980–98, SO_2 emissions in countries that are members of the Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP) have been reduced by 56 per cent.



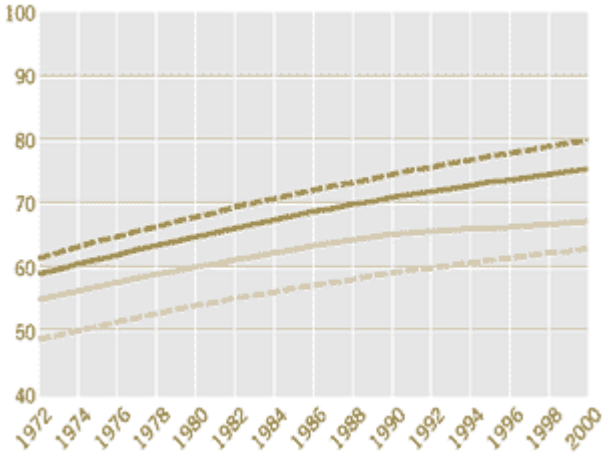
Source: Vestreng and Støren 2000

Regional highlights: Latin America and the Caribbean

Environmental degradation in Latin America and the Caribbean has increased over the past 30 years. The main pressures on the environment and natural resources are the rising population, increasing inequality of incomes, limited planning, especially in urban areas, and the high dependence of many economies on natural resources exploitation. More than 300 million ha of land have been degraded and almost 30 per cent of the reefs in the Caribbean are considered to be at risk. Of the more than 400 million ha of natural forest lost worldwide over the past 30 years, more than 40 per cent was in the region. Urban environmental problems, especially air pollution, water contamination and inadequate waste disposal, are having severe health impacts on people living in cities, currently 75 per cent of the population. The increasing frequency and intensity of natural disasters, possibly linked to climate change, is having a high human and financial cost. The poorest populations, especially urban ones, are the most vulnerable to such disasters.

Urban population (percentage of total): Latin America and the Caribbean

Graph shows the high levels of urbanization in the region



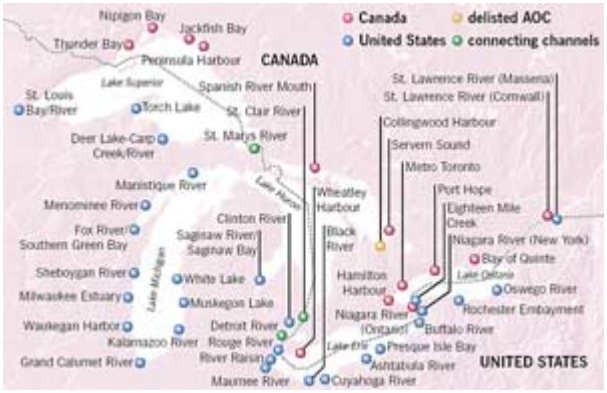
Source: compiled from United Nations Population Division 2001

Regional highlights: North America

North America is a major consumer of the world's natural resources and producer of its wastes, and its per capita impact on the global environment is larger than that of any other region. Resource conservation in North America has been less successful than pollution abatement, and per capita consumption has increased steadily since 1972. There has been significant progress in controlling some forms of air and water pollution and in continuing a trend to set aside protected areas. During the 1990s, North American free trade strengthened the economic ties between Canada and the United States. At the same time, regional environmental degradation led to an increased recognition of the interdependent nature of cross-border ecosystems. The two countries strengthened cooperative measures to address transboundary pollution, agreeing to more aggressive NO_x emission controls, for example. They also undertook to conserve the continent's wetland habitats to protect waterfowl and other migratory species. The impact of introduced exotic species on biological diversity became of increasing environmental concern with the liberalization of trade.

Areas of concern (AOC) in the Great Lakes

In 1987, Remedial Action Plans were developed to clean up 43 areas of concern in the Great Lakes basin in both Canada and the United States.



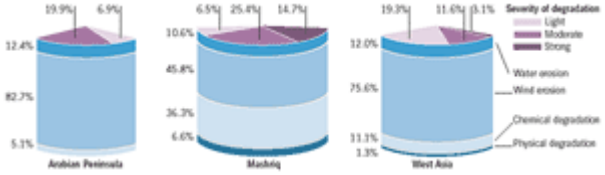
Source: EC 2000

Regional highlights: West Asia

Conservation and protection of freshwater resources is a top priority, particularly on the Arabian Peninsula where water deficits are being met mainly through exploitation of groundwater resources. Countries are developing water policies to manage water scarcity by increasing both water supply and conservation, and introducing more efficient irrigation. Land degradation and food security continue to be key environmental issues. The region's seas include some of the busiest shipping areas of the world, making the marine environment susceptible to pollution events such as oil spills. Per capita hazardous waste production is among the highest in the world due to the types of industry in the region. Air emissions from power stations, desalination plants and industrial installations are also of concern.

Land degradation in West Asia: severity and causes (%)

Charts show the severity (percentage of total land area) and the causes (percentage of total degradation) for the region and the two subregions. Note the prevalence of wind erosion.



Source: compiled from Marcoux 1996

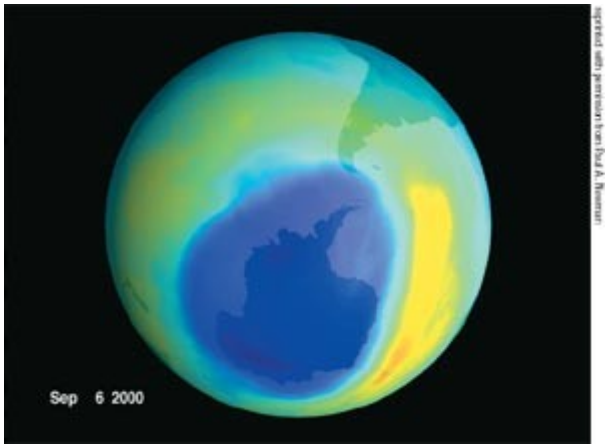
Regional highlights: the Polar Regions

The major environmental issues in the polar regions include the depletion of the stratospheric ozone layer, the long-range transport of air pollutants, warming associated with global climate change, the decline of several bird, mammal and fish species, and pollution of major rivers. In the Arctic, average yearly ozone levels in the 1990s had declined by 10 per cent from the late 1970s, increasing the risk of snow blindness and sunburn. Climate change is expected to be more extreme in the polar regions than anywhere else. Human activities are major threats to biodiversity in the Arctic. The warming trend is

reducing the ice habitat for species such as the polar bear and walrus. In the Antarctic, sealing and whaling have reduced populations in the Southern Ocean. Eutrophication is a recent problem in several lakes in Scandinavia. One of the major developments in the Arctic is public opposition to dam construction, particularly in the Nordic countries. For example, in 2001 Iceland's National Planning Agency rejected plans for a hydroelectric power project that would have dammed two of the three main rivers flowing from Europe's largest glacier and destroyed an extensive wilderness.

The Antarctic ozone hole breaks a new record

The ozone hole reached a record size in September 2000 — 28.3 million km^2, three times the size of the United States. Dark blue areas denote high levels of ozone depletion.



Source: NASA 2001

Reading 3: Green justice

By David Ransom, from *New Internationalist*, April 1992.

Now's the time for the North to cut the eco-babble and listen to the South for a change. David Ransom explains why – then shuts up.

The caged birds and animals were silent in the darkness. The place was deserted. I followed a familiar path, around the dozing exhibits in the Monkey House, past the life-sized memorial to Guy the gorilla and into the Reptile House of the London Zoo. Drinks were on offer at a private environmental function.

An iguana peered out from its brightly lit box as I talked to a woman from one of the largest international nature conservation agencies. As it turned out we shared – with the iguana, no doubt – a degree of gloom about ecology. Private polls had revealed, she said, that her organisation's supporters were not prepared to change their lifestyles to save the planet. Well, if they – the active supporters of nature conservation –weren't, who would be? Anyway, it meant no more campaigning to change lifestyles and consumption patterns in the North; that would put her organisation out of business and her out of a job.

I should not have been surprised. It is, after all, election year in both the US and the UK. The environment is not a priority on the election campaign trails. Imagine this from one of the candidates; 'Read my lips! No more carbon emissions!', 'Cut consumption and save the earth!' Such slogans would be, everyone agrees, among the shortest political suicide notes ever written. No-one – or almost no-one – in the North is prepared to vote for change. We all – or almost all – still require of our political leaders that they at least promise greater material prosperity all round.

This is a problem, and it is our problem in the North. Because, unless the evidence provided by scientists and our own eyes deceives us, the threat to the environment comes from what we consume in the North. It does not matter which measure you take – against emissions of greenhouse gases like carbon dioxide and methane, ozone depleting chlorofluorocarbon (CFC) gases, toxic or radioactive wastes, garbage or chemicals – the degradation of the earth and the threat of global warming comes from the wealthy minority who live largely in the North.

But it is not just a problem for the North. It is also a problem for the poor majority who live largely in the South. The unusual skin cancers that are appearing in southern Chile may be the result of a hole in the ozone layer over Antarctica, but the CFC gases that punched the hole came from the North. The truth that people on a small planet depend upon each other for their survival is self-evident.

What is less clear, however, is what that means in practice. Here the problem for the people of the South is not so much with the planet as

with the people of the North. Because, since we in the North won't pay the real cost of living as we do, we look for an escape route. Almost by tradition, we find it to the South.

So, with a bit of fine-tuning of the evidence, we change the subject. We say that if the South fits itself out with refrigerators, cars or televisions on the same scale as the North, the pollution of the planet will spiral upwards out of control. Anyway there are just too many people in the South – its population is growing too fast. Their governments are incompetent and corrupt. Besides, the people of the South are more vulnerable to environmental disaster from, say, rising sea levels or soil erosion than we are in the North. We shift our attention away from what we can see happening here and now, onto what might happen somewhere else in the indefinite future.

There may be an element of truth in all these points. They are important issues that have to be tackled. But that does not matter. They are being deployed by the North not because we have the slightest intention of tackling them, but to get us off the environmental hook. It's not a question of blame and guilt, but of power and responsibility.

For, precisely because of its wealth, the North actually does have the power to inflict the environmental costs of its lifestyle on the South. It can use the South as its environmental sink. It can impose conditions on the South for the receipt of aid or credit. It can and in practice does insist that the South remains poor and relatively green. The vulnerability of the South has become the world's single biggest environmental problem. A psychologist might say that the South is being required to collude with the North's self-deception about the responsible stance it thinks it is taking.

You can see this process at work in Rio de Janeiro, where in June the United Nations Conference on Environment and Development (UNCED) will convene. It's billed as the biggest-ever gathering of world leaders, a veritable Earth Summit, and it's meant to usher in a new era of global co-operation to save the planet.

Rio is a very tempting venue and no doubt there will be a good turn-out for the conference. But the city has its problems: violence, drugs, destitute children on the streets and the most terrible pollution.

The Avenida Brasil runs from the international airport into town and crosses one of the most run-down areas of the city. When it rains the road floods, the traffic stops, and the more unruly elements have on occasion been known to make piratical raids on stranded vehicles. Not, you might think, a problem that ranks high among Rio's priorities. But somehow it crept to the top of the list. Very little can happen in debt-strapped Brazil these days without the say-so of its Northern creditors. Since they will be turning out in large numbers for the Earth Summit, and doubtless would not take at all kindly to being hijacked on the road to Rio, one can only assume they had at least some influence over the preparations.

So, in a city where just last year I was all but blinded by air pollution, hundreds of millions of dollars are now being spent on an elevated motorway – the 'Red Route' – that will smash up the communities of the turbulent citizens of Rio in the interests of whisking UNCED notables over their heads and into CFC-consuming air-conditioned hotels.

These notables will then focus on an agenda they have fixed for themselves – and particularly on climate change and biodiversity. The general principle is that the South should sign up to an agreement to limit emissions of 'greenhouse gases' like carbon dioxide, and preserve tropical rainforests as 'gene banks' for scientific research and the medical industry in the North. As for 'development', the only specific suggestion so far is that a Green Fund should be set up to support environment-friendly initiatives, administered by the World Bank.

Now, the World Bank may be many things, but an environmental protection agency it certainly is not: Lawrence Summers, the Bank's chief economist, observes flippantly in a leaked internal memo that in some African countries air pollution is 'probably vastly, inefficiently low compared to Los Angeles or Mexico City'. He argues that the only thing preventing the export of more pollution from North to South is the physical difficulty of moving it. The London Economist remarked, on publishing the memo, that 'on the economics, his points are hard to answer'.

But shifting the stuff is getting easier all the time. Carlos Milstein, deputy director of the Office of Technology Imports in Argentina, claims that ' in 20 years of working at customs I have never seen the quantities of industrial waste and trash [that are now] coming into this country from the US and Europe'. Last October it amounted to 200 tons a week of hazardous waste; local entrepreneurs are now planning to import 250,000 tons of plastics a year for incineration and land dumping.

Ironically, the worst dumpers are the nations with the toughest environmental laws, like the Netherlands, Austria, Switzerland, Germany and the US. Tough laws at home mean higher costs and so instead of cleaning up their act, many companies simply ship their filth elsewhere. It may look good locally in the rich world but it makes no difference in global terms. In Brazil, for example, huge lead smelting plants are working flat out recycling the lead from car batteries returned by well meaning motorists in the North. Workers in and around these smelters now have very high levels of lead in their blood.

To the free-market economists of the North it all makes perfect sense. Goods come and go as they please, and disposing of Northern toxic wastes in the South is cheaper and easier than it is in the environmentally conscious North. This is the way North-South trade usually works – and has worked for the past decade. During this time heavily indebted Southern countries have been required by the World

Bank to follow what are called structural adjustment policies. These policies demand exports of any kind in exchange for credit. If you have natural resources like copper or wood, then you must produce more of them and cheaper. Because everyone else is required to do the same thing there is a glut on the world market, your exports get cheaper and cheaper and so you must export more and more.

The net result is that the North gets plentiful raw materials cheaply – and therefore doesn't have to worry about conservation – while the South is left with torn forests, polluted rivers, gigantic holes in the ground and an impoverished people living in an almighty mess. All that's new is that the South now has the option of importing toxic wastes as well as exporting raw materials.

The body that sets the rules for world trade – and so could intervene to stop this happening – is the General Agreement on Tariffs and Trade (GATT). Its latest round of negotiations has been trundling along since 1987, trying to reach agreement on things like Intellectual Property Rights and Trade-related Investment Measures. It is currently stalled on a dispute between the US and the European Community over farm subsidies. It does have a committee on the environment, set up in 1972. But, in all that time, it has never actually met.

The undeniable truth is that, in practice, the North is much less bothered about environment than it pretends to be. We might churn out scientific papers and documentaries, we might listen with rapt attention to environmental Jeremiahs, but given a chance most of us still go shopping in cars – and only use our feet when we vote against self-denial. Hit by the most severe economic recession in 50 years, yet finding that the pollution of the planet continues unabated, we may well discover that the rest of the century will have to be spent revising conventional wisdom on both the environment and the economy of the North. But we have not started yet.

Not, you might think, a very auspicious point from which to launch a UN Conference on Environment and Development. Alternatively, you could say that never was such a conference more sorely needed – so long as it produces results. But what results? What is to be done? Well, that's not really in dispute. Ever since the first environment conference in Stockholm in 1972 – and the publication of the Brandt Report in 1980 and the Brundtland Report in 1987 – there's been very little argument about what should be done:

The catchphrase today is sustainable development. It comes from Brundtland and it contrasts a largely unsustainable present with our duty to respect the interests of future generations and the need for minimal standards of well-being world-wide. Arguing against sustainable development these days is tantamount to arguing in favour of sin.

But saying things is not enough. Protection of the environment requires conscious, positive, human intervention: legislation, enforcement, education, public information and debate. It needs

action like that taken by the Organisation of African Unity in 1988, banning the import of hazardous wastes and substantially reducing the trade as a result. There's no way round this. But conventional wisdom at the World Bank and GATT runs in precisely the opposite direction, towards unfettered competition for profit, open borders, deregulation, commercial secrets and letting the market decide.

Junkets like the UN Conference on Environment and Development may produce more cynicism than action. But unless we think of them as at least one of the available tools, we are toying with pessimism as if it were some self-indulgent luxury.

For a start, outside the official conference, Rio is likely to see the largest ever gathering of Non-Governmental Organisations (NGOs) at what's being called the '92 Global Forum. Their vitality, both North and South, is one of the more hopeful signs. The most effective weapon they have is their ability to think radically – to reflect and influence public attitudes. On environmental issues in the North they have clearly had an impact already. The challenge now is to develop and modify that experience by learning from the South.

Is there anything that the North can learn from the South? Environmental organisations in the North have in the past tended to treat the South as if it were a mirror of their own preoccupations. At best there's been a romantic interest in the environmental wisdom of indigenous peoples. Deep as that wisdom runs, and much as we may have to learn from it, the most relevant fact about indigenous peoples is that they continue to be persecuted to the verge of extinction.

But what about the vast majority who live in the cities, towns and villages of Latin America, Africa, Asia? What about those whom we in the North tend to think of as population rather than people? Is it true that people who live without adequate education or health care, often on the edge of hunger, are preoccupied with survival and have no wish to explore the global village?

Well, human survival is what sustainable development is supposed to be all about. When it comes to developing survival strategies the people of the South are experts. In fact they know a lot more about it than the self-proclaimed experts of the North – the World Bank officials who have the power to decide what shape survival should take. It is these people who should be taking lessons from the people of the South – not the other way round.

But something more than an exercise in humility is required. The experts of the North need to recognise that the people of the South matter as much as they do. If that were to happen, the world would have to become a very different place.

Take just one example. These days democracy is as much in vogue as sustainable development: But do we have a democratic world? Do we have one-person one-vote in the global village? If not, why not? What do we have and why? Answer these questions as you will, you are still left with the fact that if we did have global democracy, then the views

of people in the South would count a great deal more than they do now – they are, after all, the majority.

A couple of months ago I was listening to the veteran ecologist Edward Goldsmith at a public meeting in London. He was berating the powers that be for failing to tackle the world's environmental problems. It was, he confessed, a negative and depressing message. So what was to be done? He turned to a Canadian priest and a group of activists from the Pastoral Land Commission in Brazilian Amazonia who were sharing the platform with him. They had been struggling for years against brutal repression and for land reform. Also on the platform were campaigners against the Narmada Valley dams in India. '*Our future*', said Edward Goldsmith, '*rests with them.*'

It was a dramatic gesture. I suppose there was a dash of 1960s Third Worldism about it. I half expected a suitably green ghost of Che Guevara to descend onto the platform. But I also thought he was right. It's time to start listening.

Reading 4: Major events in environmental protection

1900–1950	Air and water pollution, related to the so-called Industrial Revolution, become a major issue as a result of the conflict between environmental protection and economic growth.
1953	Minimata Bay, Japan – Mercury discharge into a river from a factory. After people consume the fish from the Bay symptoms of mercury poisoning were observed: 649 people died, 1,385 were seriously affected, while 15,000 were also affected.
1962	*Silent Spring* was written by Rachel Carson. It is seen as the beginning of the modern environmental movement. The focus was on the use of pesticides on farms and the creation of 'rivers of death'. It also argued that the problem of pesticides was perpetuated by a problem of politics. *Silent Spring* gave impetus to the creation of the Environmental Protection Agency (EPA) in the USA in 1970, as well as the decision by the US Congress to move the Pesticides Regulation and Food Safety Inspection Service from the Agriculture Department to the EPA and to establish review, registration and information standards for pesticides.
1960s	Developing countries suffered major local environmental problems from point sources due to the poor initiation of general protection efforts, this being associated with the lack of investment capital and poverty. Discharges of plant nutrients and oxygen-consuming organic matter were key issues. In contrast, the magnitude of the readily visible and local disturbances to the environment of developed countries had been reduced, to some extent, by reducing point source pollution from chimneys and the sewers of industrial and municipal plants. On the whole, the spatial distribution and types of environmental problems increased on a global scale during this period.
1970s	Described very often as The Political Awakening. In 1972 an MIT report ('The Limits to Growth') was submitted to the Club of Rome. It was the first document in which scientists attempted to understand and predict ongoing growth trends in terms of population, demand for food, industrialisation, use of mineral resources and pollution. Using what they called a dynamic systems model, these scientists predicted that if growth trends in world population, industrialisation, resource depletion etc. continued unchanged, the limits to growth on earth would be reached within a period of 100 years. The result would be a rather sudden and uncontrollable decline in population and industrial capacity. No doubt, these reports raised the world's awareness of environmental problems; however, they have been criticised for ignoring issues such as technological progress, being based on physical factors and ignoring human and social factors including

wealth, population increase and age distribution. More importantly, developing countries felt that the 'Limits to Growth' was an attempt to stop economic development in those countries.

In 1972 the United Nations held a conference on The Human Environment in Stockholm, Sweden. At the conference it was recognised that pollution was the major concern for the developed countries while poverty was the major concern for developing countries. The latter were willing to adopt Western models of development and accept the environmental problems as part of the package. The conference concluded that there was need for global efforts and that nations and industries needed to work in harmony with an international understanding and action that would aim at raising the standard of the ecological health of the planet, by improving the physical and spiritual qualities of our relations to the Earth. One of the outcomes of the Stockholm Conference was the establishment of the United Nations Environment Programme (UNEP).

Pressure groups at both the national and international levels ensured that governments put in place a number of regulations governing air, water and habitat to deal with most of the Western environmental ills. Unfortunately, there was a marked increase of environmental problems including climate change.

1980 The Global 2000 Report (published in 1980) by the US government, formed a basis for the establishment of the World Commission on Environment and Development (WCED) in 1984 with Gro Harlem Brundtland, Prime Minister of Norway, as Chairperson. One of the tasks of the Commission was to re-examine the critical issues of environment and development and formulate innovative, concrete and realistic proposals to deal with them.

1987 In 1987, the WCED published its report, commonly referred to as 'Our Common Future'. This publication registers the fact that poverty is a major cause of environmental degradation, and in contrast to 'Limits to Growth' report, emphasised the need of economic growth to enable further environmental protection efforts. The report mentions eight basic principles for sustainable development. What is important at this point is that an understanding of the relationships between environment and development was developed and embodied in the concept of sustainable development. 'Our Common Future' also calls for responsible actions at the individual level.

1989 Following the WCED, there were several follow-up activities at the regional level, for example the Economic Commission for Africa (ECA). In 1989, the ECA hosted a conference with a view to considering how the recommendations of the WCED could be translated into actions in Africa.

A main working document called *Sustainable development In Africa: Issues and Suggested Actions* was produced and provided the background information.

A major recommendation of the conference was to immediately embark on developing African strategies for production and consumption that would stimulate economic activity in the rural sector by ensuring, among other things, the conservation of species and ecosystems; efficient management of water resources; national management of population, change and pressure; making rural credit available and accessible to farmers, particularly women and youth; and initiating of land reforms that would ensure long-term access to land for agricultural purposes, particularly food production.

1991 The Economic and Social Commission for Western Asia (ESCWA), representing all Arab countries in Asia and Africa, met in Cairo in 1991 and adopted an Arab Declaration on Environment and Development and Future Prospects. At the meeting, many declared their commitment to work individually and collectively for the achievement of sustainable development, through cooperative environmental programmes. These included active participation in sustainable and environmentally sound development, minimisation of harmful environmental impacts of economic development by incorporating environmental dimensions in economic and sectoral plans and policies and to formulate policies for development and for the exploitation of available resources, taking into consideration the protection of the environment.

Ministers attending the workshop recognised the importance of socio-economic factors in the management of natural resources through adoption of population policies and encouragement of consumption patterns that promote sustainable development. It is important to note that the protection of the global environment has been pushed to the top of many political agendas, and that the message of international effort has been accepted by world leaders of the North, South, East and West.

In 1991, the World Conservation Union (IUCN), UNEP and the World Wildlife Fund/Worldwide Fund for Nature (WWF) published *Caring for the Earth: A Strategy for Sustainable Living*, after a wide process of consultation.

Caring for the Earth is often described as a strategy for the kind of development that improves the quality of human life as well as a conserves the vitality and diversity of the Earth. It identifies nine principles that are interrelated and mutually supportive of a sustainable world. These are:

- respect and care for the community of life
- improve the quality of human life
- minimise the depletion of non-renewable natural resources
- keep within the Earth's carrying capacity
- conserve the Earth's vitality and diversity
- change personal attitudes and practices

- enable communities to care for their own environments
- provide a national framework for integrating development and conservation
- create a global alliance.

1992 The Rio/Earth Summit

Twenty years after the environmental conference held in Stockholm, over 100 Heads of States and 18,000 people gathered in Rio de Janeiro to address ways of dealing with the world's burdening environmental difficulties and development and security of its citizens. The Earth Summit addressed many vital issues and can be considered as a landmark in the development of environmental thinking and the broader recognition of the intrinsic relationship between environment and development. Most importantly, the Summit recognised that responsibility for sustainable development should not be left exclusively to governments, but must engage the actions of youth, non-governmental organizations, women, local governments, industries, communities and farmers. There was a direct call for partnership.

Five documents were produced by the Earth Summit:

- two international agreements
- two statements of principles
- one major action agenda.

The two international agreements are:

1 The *Convention on Climate Change,* which aims to stabilise greenhouse gases in the atmosphere.

2 The *Convention on Biological Diversity,* which requires that countries adopt ways and means to conserve the variety of living species, among other things.

The two statements of principles are:

1 The Rio Declaration on Environment and Development containing 27 principles that define the rights and responsibilities of nations as they pursue human development and wellbeing.

2 A statement of principles to guide the management, conservation and sustainable development of all types of forests, which are essential to economic development and the maintenance of all forms of life.

The major action agenda is Agenda 21, a blueprint on how to make development socially, economically and environmentally sustainable.

In response to Agenda 21, a number of countries – for example, Guyana, Jamaica, Nigeria, Pakistan and St. Lucia – have prepared

national documents referred to as National Environmental Action Plans or National Conservation Strategies, with the assistance of the World Bank and other financial institutions.

1994 The United Nations Global Conference on the Sustainable Development of Small Island Developing States (SIDS) held in April and May of 1994 was called by the UN General Assembly in December 1992, as it was felt that the small island developing states were faced with peculiar environmental and development problems including global climate change and sea level rise, toxic and hazardous substances, coastal and marine resources, freshwater and land resources, energy and tourism that needed special attention.

Further, the conference highlighted many disadvantages that derive from small size, which are magnified by the fact that many island states are not only small, but are themselves made up of smaller islands. The disadvantages include smallness of size, a narrow range of resources (which forces undue specialisation), excessive dependence on international trade and hence vulnerability to global developments, high population density, overuse of resources and premature depletion, threatened supplies of fresh water, high degrees of endemism and low levels of biodiversity, among others. At the conclusion of the UN Global Conference on Sustainable Development of SIDS, 111 governments adopted a Barbados Declaration and Programme of Action, which deals basically with strategies for development and the protection of the fragile environment of these states.

1995 The United Nations Intergovernmental Panel on Forests was established to promote the sustainable management of forests worldwide.

1995 Two international legal agreements, the United Nations Convention on Biodiversity and the United Nations Convention on Climate Change, were opened for signing in Rio de Janeiro and have since entered into force.

1995 The Social Summit: World Conference for Social Development was held 6–12 March 1995 in Copenhagen, Denmark. Governments adopt a Declaration and Programme of Action that represent a new consensus on the need to put people at the centre of development. At this Summit the world leaders pledged to eradicate poverty, support full employment, promote social integration and human rights protection, achieve equality and equity between women and men and ensure that structural adjustment programmes include social development goals.

1996 The United Nations Convention on Desertification was negotiated and was entered into force on 26 December.

1997 Earth Summit+5

In June of 1997, country representatives presented reports at the national level on the implementation of the 1992 Earth Summit's Agenda 21. The aim was to take stock of how well countries and

international organisations and sectors of civil society had responded to the challenge of the Earth Summit.

2002 World Sustainable Development Summit

A Summit on actions and results since the Earth Summit held in Johannesburg 26 August to 4 September. No new treaties were negotiated, but new targets were set.

2004 SIDS + 10

In 2002, the World Summit on Sustainable Development (WSSD) reaffirmed the special case of SIDS and highlighted a series of specific issues and concerns related to SIDS in the Johannesburg Plan of Action, adopted by the Summit. At the WSSD, the UN General Assembly called for a comprehensive review of the Barbados Programme of Action (BPOA) at an international meeting scheduled for 2004 in Mauritius. The main aim of the 2004 meeting is to renew political commitment by all countries for the full implementation of the BPOA.

Reading 5: The Declaration on Environment and Development

United Nations, Department of Economic and Social Affairs

1 Human beings are the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

2 States have, in accordance with the Charter on the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their environmental and development policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.

3 The right to development must be fulfilled so as to equitably meet development and environmental needs of present and future generations.

4 In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be in isolation from it.

5 All states and all people shall co-operate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people in the world.

6 The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International action in the fields of environment and development should also address the needs and interests of all countries.

7 States shall co-operate in a spirit of global partnership to conserve, protect and restore the health and integrity of the earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

8 To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.

9 States should co-operate to strengthen endogenous capacity building for sustainable development by improving scientific understanding through exchanges of scientific and technical knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.

10 Environmental issues are best handled with the participation of all concerned citizens at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

11 States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and development context to which they apply. Standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, particularly, developing countries.

12 States shall co-operate to promote an open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral action to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.

13 States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also co-operate in an expeditious and more determined manner to further international law regarding liability and compensation for adverse effects of environmental change caused by activities within their jurisdiction or control to areas beyond their jurisdiction.

14 States should effectively co-operate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health.

15 In order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for

postponing cost effective measures to prevent environmental degradation.

16 National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

17 Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

18 States shall immediately notify other states of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of these States. Every effort shall be made by the international community to help the States afflicted.

19 States shall provide prior and timely notification and relevant information to potentially affected states on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.

20 Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.

21 The creativity, ideals and courage of youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all.

22 Indigenous people and their local communities, and other local communities, have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognise and duly support their identity, culture and interest and enable their effective participation in the achievement of sustainable development.

23 The environment and natural resources of people under oppression, domination and occupation shall be protected.

24 Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and co-operate in its further development, as necessary.

25 Peace, development and environmental protection are interdependent and indivisible.

26 States shall resolve all environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.

27 States and people shall co-operate in good faith and in a spirit of partnership in the fulfilment of the principles embodied in this declaration and in the further development of international law in the field of sustainable development.

Source: The Rio Declaration on Environment and Development, 1992.

Reading 6: Earth Summit +5 success stories

United Nations, Department of Economic and Social Affairs

As part of the preparations for Earth Summit +5, the CSD Secretariat invited stories of successful activities that Governments, major groups or United Nations agencies undertook in response to the sustainable development challenge.

The success stories we have received so far show that sustainable development does work and many more successes are possible if the level of commitment is maintained in the future. Each story in this collection describes the results of committed actions, participatory processes, sharing of resources and knowledge, or creative partnerships.

Some cases involve community groups at the local level, others are large projects involving numerous parties. Regardless of the size or scope of these actions, each has already made a difference towards a sustainable future.

The implementation of Agenda 21 and other Earth Summit agreements is far from being complete. However, the Earth Summit +5 occasion is an opportunity to recognise the existing achievements of local and national governments, non-governmental organisations and the private sector, UN and non-UN international bodies as well as many others.

The views reflected are not necessarily those of the United Nations or its Secretariat.

Success stories from Africa

Sudan: SOS Sahel Community Forestry Project

Location

Villages on the left and right banks of the Nile, near Ed Debba, Northern Province, Sudan.

Responsible organisation/s

SOS Sahel in close cooperation with the Sudanese Ministry of Agriculture and the Forestry Department (FNC).

Description

Several of the highly fertile areas along this stretch of the river are being gradually buried by desert sand. Mobile dunes creep forward onto cultivated land, and windblown sand damages crops and machinery, fills wells and canals and buries houses. The process of desert encroachment has been exacerbated by tree cutting, overgrazing and the control of river flooding. The project has enabled people to grow shelterbelts and windbreaks and to stabilise mobile

dunes in order to protect farmland and homes, and has demonstrated to communities that they can help themselves to protect their environment. As rainfall in the area is negligible, all planting is at first reliant on irrigation. Deep-rooting species such as Mesquite (prosopic chilensis) which can tap the Nile's groundwater can be established after 8 months to 2 years of watering. Farmers are asked to provide their own irrigation wherever possible.

Issues addressed

Land restoration, agriculture, water management.

Objectives

Combating desertification.

Results achieved

- Raised awareness on the benefits of trees among all sectors of the community: farmers, women and schoolchildren and others to the causes and effects of sand encroachment.
- Constructed village nurseries with a total capacity of 53,000 seedlings as well as at least 500 'extension' nurseries in peoples' own homes. Women have been especially successful in producing seedlings suitable for shelterbelts, shade and fruit.
- Planted 53 km of shelterbelts, with survival rates at planting sites of 85 per cent, providing long-term benefits, requiring minimum of upkeep and improving microclimate for crop growth.

Lessons learned

The experience of participatory extension techniques will be valuable input for future work. Farmers are bringing new areas into cultivation by planting shelterbelts on the edge of the dunes and protecting and valuing what has been achieved so that the effects of the project will last beyond its duration. Following the success of the first phase, villagers from outside the original project area approached the project for technical assistance, Phase 2 is providing support to these additional villages.

Financing

Phase 1:IFAD, Rotary 3H

Phase 2: Dutch Government, I FAD

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Kenya: Community-based Maasai Housing Project

Location

Kajiado, Kenya.

Responsible organisation

Local non-governmental organisations spearheaded in their efforts by Intermediate Technology Development Group (ITDG), the Government of Kenya, residents of Kajiado.

Description

The Maasai Housing Project is a combined initiative involving community women's groups, the Intermediate Technology Development Group (ITDG), NGOs and various government departments. The project focused on training Maasai women to use improved traditional methods of housing construction.

Women were the focus of this project primarily for two reasons: women are traditionally the home-builders in Maasai society and 40 per cent of African households are headed by women. The traditional method of construction resulted in houses that have leaking roofs, poor ventilation and lighting, low ceilings. ITDG developed a ferro-cement skin roof technique that was taught to women in order to use affordable and appropriate technology to construct a leak-proof roof. Women were also trained in stabilised soil block production and use, and water jar construction.

The project has benefited about 500 members of 11 women's groups in Kajiado District. Women beneficiaries now have constructed homes that are leak-proof, have higher ceilings and better ventilation and natural lighting. An interesting finding of this project was that women had more control over housing construction as long as traditional materials and technologies were used; as soon as money-demanding techniques were employed, men took over the construction process.

Issues addressed

Human settlements, technology transfer, strengthening the role of women.

Objectives

To train women to use improved methods of home construction.

Results achieved

500 women were trained in home building technologies.

Lessons learned

It is sometimes useful to only target women and develop technologies with and according to the target group's needs. Appropriate technologies and targeting women improves the quality of life for all.

Financing

Seed money from the Government of Kenya.

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Zimbabwe: 'Give a Dam' Campaign

Location

Matabeleland South Province, Zimbabwe.

Responsible organisation

Local communities, district councils, the Government, NGOs and international aid agencies.

Description

'Give a Dam' Campaign is a joint collaboration of local communities, district councils, the Government, NGOs and international aid agencies to promote the construction and rehabilitation of small-scale dams and irrigation schemes for household use, watering vegetation and livestock.

Issues addressed

Sustainable water management for household use and agricultural irrigation.

Objectives

By creating small-scale irrigation schemes in rural areas, the Campaign is aimed at improving sanitation and agricultural production while it is also intended to minimise the adverse impact on the neighbouring environment and ecosystem.

Results achieved

Improved sanitation, enhanced agricultural productivity and expanded green areas.

Lessons learned

Small-scale irrigation schemes constructed by community members themselves have provided a manageable amount of water pools, improved sanitation, agricultural production and greening in the neighbourhood.

Financing

Community members provided labour as an in-kind contribution for constructing and rehabilitating small-scale dams and irrigation

schemes. The Government, NGOs and international aid agencies provide technical and financial assistance to carry out projects.

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Zimbabwe: The Zimbabwe Photovoltaic for Household and Community Use

Location

Zimbabwe.

Responsible organisation

Ministry of Transport and Energy, Department of Energy and UNDP.

Description

The Zimbabwe Photovoltaics for Household and Community began its work in 1995 to supply rural people with basic electrical services, generated by affordable solar technology. This project is succeeding in the transfer of new, environmentally sound technology on a national basis, with a strong participation of the private sector.

Issues addressed

The rural population in Zimbabwe is far removed from urban power supplies and lacks access to an environmentally sound and affordable energy generating technology. Instead these rural residents use charcoal as a primary fuel source. Carbon dioxide is also emitted in large quantities from the use of kerosene and candles. This initiative is aimed at providing an alternative source of energy, on an environmentally sound basis, targeting particular rural areas.

Objectives

Establishment of self-sustained avenues to fund and develop the use of photovoltaic systems in remote rural areas within the country.

Results achieved

The 4,000 installed systems have replaced the use of candles and kerosene thus reducing emissions of GHGs. The project has adapted well to the new technologies and designs as evidenced by the high quality of systems being installed. There has been a transfer of technology as most of the components are now being manufactured in the country. It is possible to assess the global benefits of the project by calculating the amount of kerosene, charcoal and candles which

would be used to produce an equivalent amount of energy as that produced by the system.

Lessons learned

Lasting public awareness, education and support are fundamental for success of this kind of initiative. Through a targeted media action, as well as workshops and meetings at the grassroots level, conducted with district and provincial councils, local NGOs and community groups, awareness of solar power and its benefits has spread all over the country.

Financing

Global Environment Facility (GEF) funded US$ 7 million grant.

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Success stories from Asia and the Pacific

Pakistan: Desert Reclamation using Shelterbelts

Location

Thai Desert, Punjab, Pakistan.

Responsible organisation

UNEP.

Description

The Thai area is tropical sandy desert spread over 2 million hectares (ha) and more than 90 per cent of the area consists of varying depths of sand. Winds are characteristics of the Thai desert and continue to blow in different directions throughout the year. This led to creation of sand dunes of various sizes throughout the area. Indiscriminate grazing of livestock and ruthless cutting of trees and shrubs has further accentuated the situation. Even roads and civil structures were under danger. Tree planting across the wind direction as shelterbelts was initiated by a PARC sponsored project in the area. Tamarix aphyila proved to be a very successful species for this purpose. Eucalyptus camaldulensis, Zisyphus mauritiana and Acacia hilotica were also used for this purpose. Now these windbreaks can be seen in

vast areas of the Thai desert. Fifty villages are involved in the project area.

Issues addressed

Land degradation.

Objectives

Desert reclamation

Results achieved

About 20,000 Hectares have been reclaimed and are now arable. All crops including wheat, pluses and even vegetables are being grown in the area. Also intensity of the sand storms has decreased. Reclamation made the area suitable for crop cultivation, production of timber and fuel wood, enhancing farmer income dramatically.

Lessons learned

The tree species used as shelterbelts well adapted to the area, being resistant to drought, grazing and mechanical injury of sand (especially Tamarix aphyila). The farmers were inspired by the great success of these species and they accepted this technology for wider adoption.

Financing

Government of Pakistan, also local farmers.

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Pakistan: Sustainable agriculture: an example at Panhwar Fruit Farm

Location

Panhwar Fruit Farm, Pakistan.

Responsible organisation

Sindh Rural Women's Uplift Group.

Description

The Sindh Rural Women's Uplift Group owns 108 acres (43 hectares) of fruit orchard in which they use 'organic and sustainable cultural practices' to fight against the use of synthetic pesticide and insecticide. The Group believes in maintaining soil and plant health to reduce disease attacks.

Issues addressed

Community participation; sustainable agriculture.

Objectives

Create greater awareness about, and promote the concept of sustainable agriculture.

Results achieved

Provided wind-breaks, restored the balanced pruning for admission of sun-light, mowed weeds and dumped them under trees as mulch for weed control, supplied micro and macro-nutrients and retaining moisture, applied micro-nutrients as foliar sprays. They also evolved their own system of irrigation by planting trees on ridges and applied water in the furrows between the two ridges and limited water application to optimum needs, created biological activity under the mulch put under the trees for soil's health.

Reduced water application to 40 per cent as against flood irrigation used 15 years ago. Obtained yields three times those of their neighbours or others in Pakistan and increased the income many fold.

Lessons learned

Extend the use of these techniques to reduce soil, air and water pollution from use of chemicals, which also have direct effect on the health of the living biotic life on land and water.

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India: 'Zero Garbage on Road'

Location

Ahmedabad City, Gujarat State, India.

Responsible organisation

Clean Ahmedabad Abhiyan Committee.

Description

The Clean Ahmedabad Abhiyan Committee was formed by concerned citizens, voluntary organisations and the Municipal Corporation to research and find permanent and sustainable solutions to the health hazard and sanitation problems caused by the decomposing garbage on urban roads. Through public awareness, households were involved with segregating wet and dry garbage. A special bag with three compartments was developed to segregate and store recyclables – paper, plastic and miscellaneous. The heavy-duty bags are reusable and last for two years. Segregated recyclables are

collected from each house by 'rag-collectors' who have been each assigned to 100–200 houses. The increasing multi-storey apartment societies use 'community bins' for collection of kitchen waste from 30 families. A specially designed truck removes and replaces full bins. A low-cost kitchen waste digester and decomposer has also been developed.

Issues addressed

Solid waste management; recycling; public health; public awareness and participation.

Objectives

- 'Zero Garbage on Road'.
- Minimum landfill – Maximum recycling.
- Creation of economical benefits for poor through self-employment
- Redesign of municipal waste collection system.

Results achieved

- Establishment of a system of collection of dry and wet waste for recycling and use as compost.
- Income generation and confidence building for rag-collectors through a cooperative organisation.
- Involvement of women's organisations in organising the collectors.
- Improvement of health standards in the community.
- Development of a low cost kitchen waste digester.

Lessons learned

Organisation of voluntary participation for benefit of all levels of the community.

Recycling focus.

Use of media to relay frequent messages on cleanliness.

Development of low-cost appropriate technology.

Financing

Voluntary contributions.

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India: Lignite and biotechnology

Location

Neyveli, India.

Responsible organisation/s

Neyveli Lignite Corporation (NLC) within the Ministry of Coal. Situated in the south of India in Tamil Nadu, NLC mines 11 MT of lignite annually, of which 9.5 MT are used for electricity generation. The industrial aspect of activities is supported by the United Nations Industrial Development Organization (UNIDO).

Description

The project was initiated to facilitate the establishment of a Lignite Fuel and Energy Research Institute (LERI) at NLC, in order to ensure that Indian lignite is utilised to its full potential and that environmental problem stemming from its use are minimised. One aspect of the project is to assist NLC with the industrial aspects of its work on mine spoil reclamation. The mining operations at NLC covers a huge area with mine spoil heaps, and the problem continues to grow. NLC explored ways to overcome this concern.

The main problem is that the mine spoil is devoid of both humic substances and micro-organisms and hence unable to support crop growth. NLC undertook tests to enrich the sterile mine spoils with additives, in order to transform the spoils into a suitable substrate for plant growth. The tested additives include bio fertilisers, humic acid, other organic substances and inorganic fertilisers. These were tested in various combinations with a large variety of plant species, including maize, millet, rice, sugarcane, fruit trees and flowers. The bio fertiliser and the humic acid supplements tested are being produced on a pilot scale by NLC, and lignite itself is one of the raw materials in the production process. The bio-fertiliser is produced by growing five strains of micro-organisms in fermentors. These are harvested and absorbed into lignite to produce a jelly-like substance that is the *inal* product. The humic acid is currently produced from lignite by digestion with potassium hydroxide. This produces an undesirable effluent.

The project provides support towards the development of the production processes for the bio fertiliser and the humic acid and a new biotechnology process for producing humic acid is being developed. In addition to reducing production costs, this will probably also alleviate the need for the harsh chemicals that are used in the present production process, and thus reduce the environmental impact of the process. It also provides an elegant solution to an environmental problem: using the material extracted from a mining operation, and biotechnology, to alleviate the environmental problem caused by the mining.

NLC is also investigating biotechnology solutions to other environmental problems. These include the biological treatment of

effluents, including effluent from the lignite briquetting and coking plant to reduce phenol content, and for reclamation of the ashpond, which now covers more than 25 hectares. NLC is also monitoring the fate of residual chemicals in the environment.

Issues addressed

The operations at NLC had, and continue to have, considerable environmental impact. The project supports the above biotechnology approach which may be able to significantly reduce some of the negative environmental effects. Many other mining sites in India, and many other developing countries with mining operations, face similar environmental problems. There is thus considerable potential for applying the products and technologies developed at NLC at other sites both within and outside of India.

Objectives

To assist NLC to develop technologies which will mitigate the environmental consequences of past and present mining and related activities, and which may be replicable at other sites.

Results achieved

Technologies have been developed which can effectively reduce the environment impact of mining activities.

Lessons learned

Environmental protection technologies are not always restrictive to industry nor are they necessarily expensive.

Financing

The Government of the Federal Republic of Germany through the Industrial Development Fund.

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India: Minimising waste by DESIRE

Location

India.

Responsible organisation

United Nations Industrial Development Organization (UNIDO).

Description

The reduction of industrial pollution by means of waste minimisation – also known as cleaner production and pollution prevention – has been identified as the key to ecologically sustainable industrial

development. Cleaner production improves environmental quality by eliminating waste at the source. It requires the continuous application of an integrated preventive environmental strategy. Giving top priority to waste minimisation in the industrial sector, the Ministry of Environment and Forests of India issued a policy statement on pollution abatement in 1992. UNIDO was asked to help implement its policy on waste minimisation by assisting small-scale enterprises to adopt cleaner process technologies.

A project called Demonstration in Small Industries for Reducing Wastes – abbreviated to DESIRE – was started in early 1993. Using an approach based on the work of the United States Environmental Protection Agency and the Netherlands Organisation for Technology Assessment, international and local experts initiated waste reduction audits in four agro-based pulp and paper, four textile dyeing and finishing, and four pesticide mills. Twelve priority areas were identified in the participating companies and, in each case, an analysis was conducted so that the relative reduction in pollutant load could be estimated. Altogether, more than 500 pollution prevention options were identified.

The Ashoka Pulp and Paper Company participated in the DESIRE project with the twin objectives of production cost reduction and cost-effective compliance with environmental regulations. Pressure from the public to improve environmental performance and the need to conserve water, especially in summer months, were other reasons behind the company's decision to actively pursue waste minimisation. Ashoka has already implemented 24 waste minimisation options, some 13 options are still under implementation.

UNIDO has undertaken similar projects in Africa, Asia and Latin America. These types of demonstration projects require only brief periods of international expertise.

Issues addressed

Waste minimisation in industrial sectors through adopting cleaner process technologies.

Objectives

To provide assistance to the Government of India in implementing its Policy Statement for Pollution Abatement by reducing production cost and cost effective compliance with environmental regulations.

Results achieved

Collectively, the 12 companies spent US$ 300,000 to implement pollution prevention options and saved US$ 3 million in raw materials and waste-water treatment costs. The results of the DESIRE project were published as simple guidelines for waste minimisation in a booklet called 'From Waste to Profits'. The most impressive savings were in the pulp and paper sector. In the Ashoka Pulp and Paper Company, a total of US$ 95,000 was invested in the 24 options implemented so far, with net annual savings of about US$

160,000. The overall payback time of the implemented options is less than seven months.

Lessons learned

The project has demonstrated that waste minimisation can help cut pollution and be a profitable business at the same time. It has demonstrated that environmental protection is a highly productive cash outlay, especially when directed towards the production process itself rather than end-of-pipe treatment. The key to success lies in the sustained involvement of dynamic local experts and committed factory managers who are willing to open their factories to outside scrutiny.

Financing

The United Nations Development Programme (UNDP) funds.

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Kiribati, South Pacific: Assistance to the Solar Energy Company

Location

North Tarawa, Kiribati, South Pacific.

Responsible organisation/s

Implementing Agency: the Solar Energy Company under the responsibility of the Ministry of Works and Energy of Kiribati. Co-operating agency: JICA, Japan. UNDP/BPPS/SEED/Energy and Atmosphere Programme for Technical Assistance and Monitoring.

Description

The project provided the Kiribati Solar Energy Company (SEC) [with assistance] in order to enable it to provide electricity service as a micro utility in an effective manner. The UNDP assistance focussed on technical training of SEC personnel on photo voltaic systems and management training in accounting, billing, spare parts inventory, etc.

Issues addressed

Promoting use of renewable sources of energy; participation of women.

Objectives

To assist the Government of Kiribati in meeting the basic electricity needs of rural and/or remote communities in an efficient, least costly and reliable manner.

Results achieved

Training of the assistant manager in the design, installation, testing, commissioning, operation and maintenance of photo voltaic systems and preparation of technical specifications, tender documents and evaluation of tenders. Procurement and installation of computer hard- and software required for proper management activities (e.g. billing, accounting, spares inventory). Development of a computer-based management system designed for local conditions. On-the-job training in management procedures of staff of the SEC. The provision of electricity enables children to study at night, women to devote more time to weaving mats of pandanus leaves which they sell to generate extra income, fishermen spend more time out at sea – as repairing nets and cleaning and salting fish can be undertaken at night – and radio has brought entertainment and access to programmes dealing with health, child care, sanitation, etc.

Lessons learned

Complementing institutional strengths on project levels is an approach that can also be applied elsewhere.

Financing

OPEC Fund for International Development through the UNDP Energy Account administered under the UNDP/BPPS/SEED/Energy and Atmosphere Programme. The JICA/UNDP project was instrumental in assisting SEC to apply for additional financial means and an EU-sponsored project for Solar Home Systems in the region.

Contact

UNDP/BPPS/SEED/Energy and Atmosphere Programme

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The Philippines: Community-Based Seed Banking and Seed Propagation of Indigenous Agro-Forestry Species (IAS)

Location

Sitio Apnit, Longos, Cabaugan, Zambales, Philippines.

Responsible organisation/s

Volunteers in Scientific and Technological Action, Inc. (VISTA) Partner Peoples' Organisation: Longos Upland Farmers Association, Inc. (LUFA).

Description

Aimed at establishing an efficient system for the identification, collection, preservation and propagation of indigenous agro-forestry species (IAS), the project was identified in 1991 after the Mt. Pinatubo eruption which brought considerable destruction to communities in Zambales.

The project has four components: nursery establishment, collection and propagation of seeds/seedlings and out planting of IAS, capacity building for the local communities on various reforestation technologies, research and documentation.

An equally important component of the project is the information campaign promoting the use of indigenous agro-forestry species through comics/ illustrated primers used by the local schools.

Issues addressed

Biodiversity conservation.

Objectives

- To identify, retrieve, upgrade and preserve existing IAS specifically endangered species of utmost importance and with great potential in reforestation, set-up strategic community-based seed production areas and nursery in the project site.
- To develop and upgrade capacities of target communities in reforestation and nursery establishment through technology transfer and skills development.
- To produce topical training modules for community-based reforestation and nursery establishment.
- To provide economic opportunities through the development of marketable IAS seeds and seedlings.

Results achieved

Establishment of a community-based nursery and production of 13,990 seedlings using 17 species of agro-forestry trees. These seedlings were out planted in the communal forests of the partner peoples' organisation (PO). Identification of data gaps on IAS and establishment of an efficient system to identify, collect and produce seedlings of IAS.

A total of 20 indigenous agro-forestry species were identified and collected under the project.

Establishment of a seed laboratory to undertake research studies including research into packaging of sample seeds for

planting/distribution. Production and dissemination of information materials to the local community and other farmer organisations and NGOs. The project area has been chosen as the model site of the Integrated Social Forestry Project (ISFP) of the Department of Environment and Natural Resources (DENR). As a result, DENR has expressed its intention to turn over the sole management of the project site to the local community organisation (LUFA).

The Foundation for the Philippine Environment (FPE) is supporting the next two years of the project operations.

Lessons learned

Forging farmer-scientist partnerships to build a bottom-up approach is useful to implement and manage community-based projects requiring technical assistance.

Sharing of technology, indigenous knowledge, and skills has ensured the sustainability and continuity of the project.

Indigenous species are already suited to the agroclimatic conditions of the area hence would mean almost 100 per cent survival upon out planting. Research and process documentation are critical to fully capture the dynamics and impact of the project in the community, including developing the mechanism for project replication.

The first year of project implementation served as a take-off point for continuous seed identification, seed collection/retrieval, seedling production, and propagation.

Financing

The project was supported through a grant from the UNDP Global Environment Facility-Small Grants Programme (UNDP GEF-SGP).

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Papua New Guinea: The Biodiversity Conservation and Resource Management Programme

Location

Papua New Guinea.

Responsible organisation/s

Department of Environment and Conservation (DEC) National Resource Institute, University of PNG, Foundation of Peoples of the S. Pacific, National Resource Authority, Forest Research Institute, and the Research and Conservation Foundation.

Description

The Conservation and Resource Management Programme (Bio diversity Programme) was established in 1993. The Bio diversity Programme is part of a suite of interventions developed under PNG National Forestry and Conservation Action Programme (NFCAP), an outgrowth of the World Bank's Tropical Forest Action Plan (TFAP). The purpose of the NFCAP was to effect institutional, financial and regulatory reforms, to bring forest industry under control and promote forest conservation objectives.

Issues addressed

Bio diversity conservation and environmental management.

Objectives

- To build linkages between the welfare objectives of local communities and bio diversity conservation goals, by providing communities with development support.
- To establish two pilot areas for Integrated Conservation and Development (ICADs) to develop innovative methodologies for conservation of bio diversity.
- To provide institutional strengthening to DEC for conservation of bio diversity.
- To establish an institutional, legal, financial, and policy framework for the expansion and future maintenance of the country.

Results achieved

Two ICAD sites were selected and activities began for their establishment. The activities at the first site, Lak, were recently terminated, however, because of the difficulties encountered when trying to secure a conservation compact in an area with ongoing and substantial conflicts over land use. The activities at the Ramu ICAD site began in October 1996. To avoid similar problems, the inception stage of this activity is focusing on engaging the community and determining the social feasibility for the conservation sites. The objectives have been achieved and the Conservation Resource Centre is nationally recognised as a think tank for conservation in PNG.

Lessons learned

The Lak ICAD activities were ultimately deemed very useful because important lessons for future ICAD sites were learned. Project personnel have been essential in assisting DEC with technical projects, including completion of the Country Study on Biological Diversity (assessing the costs, benefits and unmet needs for conservation) and the Bio diversity Data Management Project. This support has been widely acclaimed.

Financing

Funded by a US $5 million Global Environment Facility (GEF) grant, and US $60,000 in co-financing from UNEP. UNDP is the implementing agency.

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Bangladesh: Cooperative Dairy Extension Programme

Location

Baghabarighat, Takerhat, Manikganj, Tangail and Dhaka in Bangladesh.

Responsible organisation/s

FAO as Executing Agency, and Ministry of LGRD as implementing Agency.

Description

The project set up a network of village milk producers' cooperative societies known as Dughda Utpadankari Samabaya Samities (DUSS) to provide an assured market outlet for surplus milk produced by the small farmers in these remote areas.

Issues addressed

Developed a self-sustaining capacity for maintenance and operations of physical, social and economic components leading to sustainable human development.

All families became owner of the house through collection of hire-purchase fees within 10 years.

Increased quality of life as well as achieved sustainable livelihoods through vocational education, skilled development training, credit delivery for income generating activities.

Objectives

The project had the following overall development objectives:

1 raising the subsidiary agricultural income of small farmers in relatively remote rural areas by organising a cooperative system to purchase, on a regular basis, the surplus milk after meeting farmers' domestic requirements;

2 ensuring an adequate supply of safe milk and milk production to urban areas; and thereby

3 creating urban jobs in milk production, distribution and marketing.

Results achieved

Security of land tenure and house ownership to 2,600 families with a total population of 11,000 people.

The project implemented basic infrastructure services, core houses and community facilities such as opportunity for income generating activities, safe drinking water supply, sanitation and sewerage, embankment for flood protection and overall environmental enhancement for the community as a whole.

Community facilities supported by the international NGOs are:

- women's training centre for 250 women
- pre-school education unit for 225 children
- vocational education for 574 children
- preventive health programme
- nutrition/rehabilitation unit for 100 children/ mothers.

Since the inception of the project, average family income increased 300 per cent over seven years. Created positive impact on living and working condition, on income generating potential, on social services and women and children.

Lessons learned

The project assisted the Government to formulate dairy policies where none were in existence before. The project effectively consolidated the dairy cooperative system and successfully strengthened the marketing practices of BMPCUL. In addition to milk production, the Baghabarihat plant converts surplus milk into milk powder, butter and clarified butter for city markets. The Manikganj and Tangail plants being relatively close to Dhaka have only chilling plants while Takerhat at a good distance has a pasteurising facility. Some new products were introduced and packaging and 'point of sale' materials improved.

A total of 25 model DUSSs were established, 10 in Baghabarighat and 5 in each of the other three milk shed areas to serve as demonstration of ideal societies.

The project inputs helped to a great extent in rehabilitating the non-functional DUSSs. A total of 42 existing DUSSs were rehabilitated. The DUSSs form the backbone of BMPCUL and are managed in a truly cooperative manner. Every member has to pay one taka as admission fee, another one taka for a thrift deposit and ten taka ten for the purchase of one share. They deliver their milk to the DUSS for which they receive payment on a daily or weekly basis. The DUSSs deliver the bulk milk to the designated point of collection for onward transmission to the BMPCUL factory and receive weekly payments according to the quality and quantity of milk supplied.

The milk transportation from the village societies to the BMPCUL factories was changed during the project period, from the high cost motor launches to mechanised country boats and from trucks to manual rickshaw vans with technologies provided for cooling.

Training over 310 DUSS staff was completed, who continue to support the activities of the farmers. Demonstrations of new activities, such as urea molasses block making, fodder cultivation or cattle feed manufacture, production and handling of clean milk and modern animal husbandry practices, were shown to the farmers during the training.

Spearhead teams were constituted to strengthen the extension service. The education of the DUSS members is now being undertaken through the extension officers, veterinary officers and society organisers. Video films on A.I. calf-rearing, clean milk production, fodder cultivation and disease prevention have been made, using FAO filmstrips and Bengali narration for showing them in villages as a part of the extension programme. The extension aids produced by the project assistance are being used extensively in the milkshed area of BMPCUL for educating the farmers.

Mobile veterinary clinic of BMPCUL continues to function.

Financing

UNDPIPF.

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Bangladesh: Urban Squatters Resettlement Project

Location

Local level programme on 87-acre site in Mirpur area, on the outskirts of Dhaka, Bangladesh.

Responsible organisation

UNDP

Description

Resettlement/rehabilitation of about 3,000 squatter families with support and services such as providing low cost housing, land and infrastructure development, community services, socio-economic development and assisting, through NGO involvement, in income-generating activities, addressing issues related to equity, benefits to women and children.

Issues addressed

- Increased quality of life.

- Sustainable livelihoods through vocational education.
- Skills development training.
- Credit delivery for income generating activities.
- Equity, human rights, benefits to women and children.

Objectives

To assist the Government of Bangladesh in its efforts to provide appropriate housing and basic community services to the urban poorest without shelter. In response to this objective it is intended to implement a pilot project to develop a model that will serve as the guide to formulate a national strategy and methodology in providing low-cost housing on a self-help basis for low-income urban peoples in the capital city and elsewhere in the country.

Results achieved

Security of land tenure and house ownership to 2600 families with a total population of 11,000 people. The project implemented basic infrastructure services, core houses and community facilities such as opportunities for income generating activities, safe drinking water supply, sanitation and sewerage, embankment for flood protection and overall environmental enhancement for the community as a whole. All families became house owners through the collection of hire-purchase fees within 10 years: an example of the poor's access to resources and ownership. Since the project started, average family income has increased 300 per cent over 7 years. Created positive impact on living and working conditions, on income generating potential, on social services and women and children. Community facilities supported by the international NGOs included a women's training centre for 250 women, pre-school education unit for 225 children, vocational education for 574 children, preventive health programme, a nutrition/ rehabilitation unit for 100 children/ mothers.

Lessons learned

Asset-less people can be resourceful if there are opportunities created within an appropriate programme, and firm commitment by the government.

This programme has a combination of basic needs delivery through participation of the concerned people, government, development partners and the civil society working together. The technical assistance provided by the UNCHS and UNDP and the capital investment of UN Capital Development Fund, along with the NGO assistance, have resulted in establishing a systematic approach in implementation and development of human empowerment and settlement projects.

Keeping the level of the unit cost of resettlement within range of the urban poor has led to replication of the operation. The programme should be appropriate with a sufficient level of self-help initiative and

the involvement of other partner organisations in the project management and financial support systems.

Financing

UNCDF provided US$4,876,000. UNCHS provided technical support. Government purchase of the land for resettlement, flood protection and project administration. UN Capital Development Fund contributed to housing and infrastructure, site development, income generating fund and programme support. UNDP contributed with some funding providing technical support costs such as expatriate civil engineers, support personnel for administration, local subcontractors/ consultants and equipment. UNICEF contributed by supporting community water supply and sanitation programmes. Local and international NGOs also contributed in community development activities.

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Japan: Rainwater Storage and Utilisation

Location

Sumida, located in the eastern section of the Tokyo Metropolitan Area, Japan.

Responsible organisation

City of Sumida.

Description

The Municipality of Sumida introduced different rainwater management measures to solve water shortages and flooding problems. A municipal study showed that rainwater was safe for non-drinking purposes and could be used for drinking if sterilised. Given these results, rainwater utilisation has since been incorporated into the city's operations and has been recommended to private institutions.

Rainwater is collected on roofs and is directed to below-ground storage tanks through a net, a basket or a precipitation box to prevent dirt and other debris from getting into the tank. The water is then pumped to a delivery tank located on the roof or on a higher level floor (in order to increase the pressure) from where it is directed to the plumbing system.

Stored rainwater is generally used to supply water for toilets. To avoid problems during the dry season, rainwater users are encouraged to

connect to the municipal water system to prevent shortages in the building. Several homes, businesses, and institutions, including City Hall, have now installed the relatively inexpensive rainwater collection and storage systems. Costs are typically recovered within ten years through savings on city water fees. The city has also begun to install community-level rainwater collection systems which will provide water for fire fighting and drinking in case of emergency.

Issues addressed

Water management

Objectives

- Promote local, self-supporting water supplies.
- Prevent flooding.
- Address disaster relief.
- Restore the urban water cycle by returning rainwater to local underground aquifers.

Results achieved

Resurfacing sidewalks with permeable pavement to allow for more groundwater recharge. One sixth of the city's sidewalks are currently permeable and the city is planning to convert all sidewalks to permeable pavement. Establishment of rainwater storage and utilisation systems.

Lessons learned

The technology for rainwater utilisation is relatively simple, inexpensive and highly transferable. These technologies are especially appropriate for cities located in regions which have alternating rainy and dry seasons, and which suffer from flooding, water shortages, land subsidence, and/or restricted local water supplies. Implementing rainwater utilisation requires acceptance by municipal officials as well as cross-departmental cooperation and coordination. Educational campaigns are necessary to make local residents and businesses aware of the potential benefits and long-term cost savings.

Financing

The cost of installing a rainwater storage and utilisation facility was financed out of the budgets of the municipal departments that constructed these facilities in their buildings. Individual homeowners and private companies finance these systems independent of the municipality. The resurfacing of city sidewalks was financed from the operational budget of the Department of Civil Engineering.

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For more information:
http://www.un.org/esa/earthsummit/

Reading 7: A first list of good practice in sustainable development

JWLTA. January 2005.

1 An example of a tangible success of the South African organisation ComMark is making local business service markets work more effectively and inclusively for a growing portion of the thousands of emerging small wool farmers who were historically excluded from high value marketing channels. Shearing, grading, sorting, marketing, veterinary services, etc. have all been improved, and commercial wool buyers are now entering rural markets which they used to ignore because the quality and credibility of the wool supply was too poor. The vision is to leave behind a well functioning market which is driven by the logic of the transactions for all parties, and which does not rely on outside facilitation or subsidy to work. [www.commark.org;]

2 In Bulgaria employees of the Embassy of The Netherlands prepared a meal for children in an orphanage, at their own cost, and they collected money to buy new clothes for the children from clothing producers in a poor part of Bulgaria, resulting in job opportunities there.

3 In the United States the National Congress of Neighbourhood Women is involved in sharing community strategies globally. Organisations from three low-income communities across the USA have come together to share the information and knowledge they accumulated. The three organisations from Appalachia, New York City and St. Louis are also creating 'Living Learning Centres', community centres to permanently house long-term community leaders and activists, providing peer training, facilitating information-sharing, and running documentation programmes. The overall purpose of this project is to empower the communities and to further build social movements. The participating organisations have all been linking themes in their own community-development work to global policy-making debates and agreement-setting processes for the past five to seven years. Each community brings a variety of partnerships with universities, faith-based institutions, corporations, and others. [huairou@earthlink.net]

4 In Sweden a number of small businesses work together to reactivate a rural community by refurbishing an old, empty school to accommodate 4 to 6 small companies plus one artist. In addition, the building will be made suitable for small scale social and cultural events like family parties and artistic performances (folk music, jazz, theatre, etc.). The participating local and foreign companies all work internationally in the field of environment and energy consultancy and project and product development, the latter related to the forest industry. In this way

they create a 'Centre of Excellence' with complementary competences. The activities in the building will be supported by a receptionist/ secretary/ computer specialist and high-speed internet access. [kant@xs4all.nl]

5 Dutch foreign policies, including development co-operation, try to prevent and combat political, social and economic exclusion of various categories of people and to promote ecologically sustainable development. Apart from assistance in developing countries, the Dutch Government focuses on influencing debates among rich countries, e.g. to open up their markets for products and services from poor countries and to adopt suitable environmental policies. Coherence of policies and efforts to go beyond short-term, own national interests are considered as major issues to create a healthy global society. [www.minbuza.nl/default.asp?]

6 One of the artists in our circles discerns 3 types of behaviour contributing to an acceptable social environment: (1) The daily life relationship with neighbours: Keep on talking if some disagreement occurs, inviting close neighbours whatever their ethnic group or religion is, and continuing to have a warm and chatting attitude with them, even if they don't come. Making an effort to speak the local language as much as possible, wherever you are, but also explaining, when needed, that your cultural difference and your difficulties in understanding all the standards of the country where you live has absolutely nothing to do with contempt for the local culture, even if you don't always agree with some aspects of it. (2) Personal mental attitude: keep thinking! Try to overcome your first emotional reactions when tensions occur and analyse situations in order to think about short- or long-term solutions, even if the complexity is such that you know it might be in vain. Remember that we can't afford to feel desperate. Read books that can help you to improve your comprehension, especially the ones that expose you to interdisciplinary attitudes, because they often offer a good start for effective and efficient thoughts. (3) Art practice: I try to stimulate the communication between artists, and between artists and non-artists, developing 'a data bank of actions, thoughts and aesthetics to experiment with sustainable future realities'. Elements of this databank can form a 'social fiction laboratory', that doesn't analyse situations in a scientific way, but that functions more in the way children play: we play future scenarios, as we used to play cowboys, princesses or knights. Fun and seriousness combined. [haudelebars@planet.nl]

7 The Northern part of The Netherlands has been earmarked by the national government as the testing ground for sustainable energy. A programme called 'Energy Valley' coordinates activities in the field of solar energy, wind generated energy, bio fuel production using various types of biomass, infusion of

hydrogen in gas distribution systems, etc. [www.Energyvalley.nl; vanwerven@energyvalley.nl;]

8 In Zululand, South Africa, the titanium-containing beaches and dunes, where sea turtles come to lay their eggs in the warm sand, are now officially protected by declaring the Greater St Lucia Wetlands area – with the unique ecosystem of a sub-tropical estuary – an international heritage site. However, pressure from the mining sector and rising human and cattle populations is still high on this precious nature reserve. In order to make the area not only ecologically sustainable but also economically and socially, it is important to expand the eco-tourism sector. You are thus invited to visit the St Lucia International Heritage Site, close to Mozambique. [www.unep-wcmc.org/sites/wh/st_lucia.html; www.ecoafrica.com/african/travel/Zululand.html]

9 The Dutch city of The Hague has established a volunteer-run Tourist Assistance Service (TAS), providing practical and emotional support to foreign tourists, conference participants and businesspersons who are visiting The Hague or Delft and who have been the victims of crime or accidents. Visitors who lost, for instance, their passport and/or wallet are facilitated to phone home and they are assisted to arrange practicalities with embassies, banks, etc. TAS is an integral component of the Haaglanden Police Force, with an office and a telephone help line {+31.(0)70.4244000} in a police building. It handles about 500 cases annually, mainly in the period April through September. Most volunteers are women.

10 A Dutch development corporation specialist with a background in engineering, successfully supported the promotion of so called 'appropriate technology', e.g. in the form of a rope pump to be used in shallow wells. This rather simple technology has now been adopted in large parts of Nicaragua and other Central American countries. The Dutch specialist is currently using the story of the rope pump as an example to show children in Dutch schools that you don't have to become depressed and fatalistic when you realize that mankind is destroying its own environment due to excessive population growth in poor countries (and extreme negligence in rich countries). He shows that some funds and concerted effort can make a difference in terms of poverty alleviation and that this in turn leads to lower birth rates in poor countries, with positive environmental effects. He also indicates what can be done in The Netherlands to narrow the divide between rich and poor countries and makes clear how people in rich countries can limit the use of natural resources like water. [www.ropepumps.org; holtslag.dapper@wxs.nl;]

11 The Hague and several other Dutch cities have created extensive networks of bicycle lanes and they regularly organise Vehicle-free Sundays. On these days, no motorised transport is allowed in the city (centre). People can cycle and walk everywhere and children can play freely in the streets. Old-fashioned communal games are

revived in some neighbourhoods during these – festive – days. Lobby groups now promote more car-free days and they promote the creation of more car-free zones within cities.

12 It has been suggested to organise Global Moments of Silence and Internal Reflection, at least once a year, e.g. for one or two hours. Everybody should then try to think about who you are to yourself and to others; how much physical and socio-economic space you claim and how much space you give back to the rest of humanity.

13 In Benin and Ghana the Dutch government supports agricultural innovation programmes 'to make science and technology work the African way, from within and by (young) Africans'. One of the starting points for sustainable development and sustainable living in these programmes is: finding solutions to problems by doing, based on self confidence and local initiatives, using indigenous talents and existing social organisations. [www.north-south.nl]

14 The Mondrian College in The Hague honoured the recent immigrant from Morocco who happened to be number 2,000 on a list of students involved in a course to learn the Dutch language and be exposed to Dutch culture (mainly via role plays). He received a bicycle, an important (and sustainable) means of transport in The Netherlands. The bike was wrapped in green and yellow paper, symbolizing that the student had to go through moments of irritation, especially when he was confronted with (typical Dutch?) humour that he did not understand initially.

15 In the framework of the Global Water Partnership, a best practice booklet on water management has been produced: 'Ideas for Local Action in Water Management' written by Frank van Steenbergen and Marten van Ittersum. An example of sustainable water management in India is the use of small plastic tubes, normally used to prepare 'Pepsi-ice' (water-based ice cream for human consumption) to irrigate crops. By pinching small holes in the plastic pipes, a simple but effective and efficient drip irrigation system is created. [www.gwpforum.org; fvansteenbergen@compuserve.com]

16 The South African Youth Development Network (YDN) is pioneering innovative programmes, focusing on marginalised youth, partially in co-operation with the private sector: e.g. enabling youngsters to become more self confident, acquire useful skills and gain work experience for instance via the four phases programme of the School Leavers Opportunity Trust (SLOT), starting with an 11-day course in fundamental life skills like communication, basic social orientation, self awareness plus career and work planning, followed by a second phase of vocational training up to one year, provided by existing training providers. By the end of their practical training, youngsters decide whether to pursue self-employment or formal employment. The third phase consists of providing an intensive

three-week course in Advanced Business Skills. By the end of this course, trainees have a Personal Marketing Plan for seeking employment, and/or a Business Plan to initiate a micro-enterprise. The last phase provides support. For youth seeking employment SLOT offers real work experience in the form of internships of up to three months in a company in need of the technical skills acquired in Phase 2. For trainees that will start a small business, SLOT offers one-on-one business consultancy, leading to a successful loan application and business start-up. Ongoing support in tendering, quoting and bookkeeping is a precondition for continued assistance. [www.ydn.org.za;]

17 The Dutch Ministry of Foreign Affairs aims to limit the number of flights of its personnel, and from its operational budget it supports the Dutch organisation Trees for Travel, to (partially) compensate for the air pollution caused by business trips of employees of the ministry. Funds are used to (re-)plant forests in developing countries. The environmental costs of a trip from Amsterdam to Mexico City and back are calculated at 34 Euro (to compensate for 3,75 tons of CO2). Last year the ministry paid about 74.000 Euro to compensate for 5.620 tons of CO2. The money was used to plant trees in Ecuador and Uganda. The ministry tries to motivate other internationally operating organisations to consider similar compensation measures. The ministry is also using so-called 'green electricity' generated by windmills, and it uses energy efficient lamps in its building.

18 During the 2004 World Urban Forum in Barcelona, Spain, a youth event has been organised by Dutch organisations. During this session mister Shamiel Abrahams from the poverty stricken Cape Flats in Cape Town, South Africa, impressed the audience when he spoke about peace as youth dream about it, provoking a moment of hope, joy and happiness. During the forum another hopeful process was concluded, preventing the violent eviction of slum dwellers in Nairobi, Kenya, particularly in the squalid slums of Kibera, Korogocho, Kariobangui and others. UNHABITAT promotes the policy that other city governments also recognise the right of slum dwellers to a safe place to stay, enabling them to work for a decent life for themselves and their children. [www.unhabitat.org]

19 The London School of Hygiene and Tropical Medicine is making progress in scientific research to optimize the sustainable use of natural products like the leaves of the Indian Neem tree, especially in the fight against malaria. Another positive development in malaria prevention is a successful experiment with breeding mosquito fish in India. These small, guppy-like fish eat mosquito larvae. [www.lshtm.ac.uk/research]

Reading 8: Sustainable livelihoods approach

1 What is a sustainable livelihoods approach?

The UK DFID Guidance Sheets give the following definitions (adapted from Chambers and Conway, 1992).

> "A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living."
>
> "A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base."

Alongside its commitment to promoting sustainable livelihoods (SL), the 1997 UK White Paper also commits DFID to promoting human rights through policy and practice (check 'International Development Strategies' on the DFID website). Rights-based and SL approaches are complementary perspectives that seek to achieve many of the same goals (for example, empowerment of the most vulnerable and a strengthened capacity of the poor to achieve secure livelihoods). The primary focus of the rights perspective is on linkages between public institutions and civil society and, particularly, on how to increase the accountability of public institutions to all citizens.

The livelihoods approach recognises the importance of these links and of enhancing accountability, though it takes as its starting point a need to understand the livelihoods of poor people in context. From this starting point it then tries to identify the specific constraints that prevent the realisation of people's rights and consequently the improvement of their livelihoods on a sustainable basis.

The SL approach is based on a number of core principles and a framework for analysis and design.

Core principles

People-centred. At a practical level, the approach:

- starts with an analysis of people's livelihoods and how these have been changing over time;
- fully involves people and respects their views;
- focuses on the impact of different policy and institutional arrangements on people/households and on the dimensions of poverty they define (rather than on resources or overall output per se);
- stresses the importance of influencing these policies and institutional arrangements so that they promote the agenda of the poor (a key step is political participation by poor people themselves);

- works to support people to achieve their own livelihood goals (though taking into account considerations regarding sustainability).

Holistic. The livelihoods framework is not intended to be an exact model of the way the world is, nor does it mean to suggest that stakeholders themselves necessarily adopt a systemic approach to problem solving. Rather, it aspires to provide a way of thinking about livelihoods that is manageable and that helps improve development effectiveness.

- It is non-sectoral and applicable across geographical areas and social groups.
- It recognises multiple influences on people, and seeks to understand the relationships between these influences and their joint impact on livelihoods.
- It recognises multiple actors (from the private sector to national level ministries, from community-based organisations to newly emerging decentralised government bodies).
- It acknowledges the multiple livelihood strategies that people adopt to secure their livelihoods.
- It seeks to achieve multiple livelihood outcomes, to be determined and negotiated by people themselves.

The unit of analysis in livelihoods investigation is likely to be an identifiable social group. It is critical not to assume homogeneity in populations or within households themselves. Relevant social divisions may include those relating to class, caste, age, ethnic origin, gender; they can only be defined and agreed through an iterative process of participatory enquiry at community level.

Dynamic. It seeks to understand and learn from change so that it can support positive patterns of change and help mitigate negative patterns. It explicitly recognises the effects on livelihoods of external shocks and more predictable, but not necessarily less damaging, trends. It calls for ongoing investigation and an effort to uncover the nature of complex, two-way cause and effect relationships and iterative chains of events.

Building on strengths. An important principle of this approach is that it starts with an analysis of strengths, rather than needs. In 'livelihoods focused' development efforts, a key objective will be to remove the constraints to the realisation of potential. Thus people will be assisted to become more robust, stronger and better able to achieve their own objectives.

Macro-micro links. Development activity tends to focus at either the macro or the micro level. The livelihoods approach attempts to bridge this gap, emphasising the importance of macro level policy and institutions to the livelihood options of communities and individuals. It also stresses the need for higher level policy development and

planning to be informed by lessons learnt and insights gained at the local level.

Sustainability. Livelihoods are sustainable when they:

- are resilient in the face of external shocks and stresses;
- are not dependent on external support (or if they are, this support itself should be economically and institutionally sustainable);
- maintain the long-term productivity of natural resources;
- do not undermine the livelihoods of, or compromise the livelihood options open to, others.

There is much congruence between the sustainability concerns of the livelihoods approach and National Strategies for Sustainable Development (NSSDs). To be effective, NSSDs must build on extensive stakeholder participation, coupled with a strategic and long-term approach to development. Both these features are also key to the success of the livelihoods approach.

Framework

The framework for livelihoods analysis and its contribution to the design and management of interventions is shown in Figure 1.

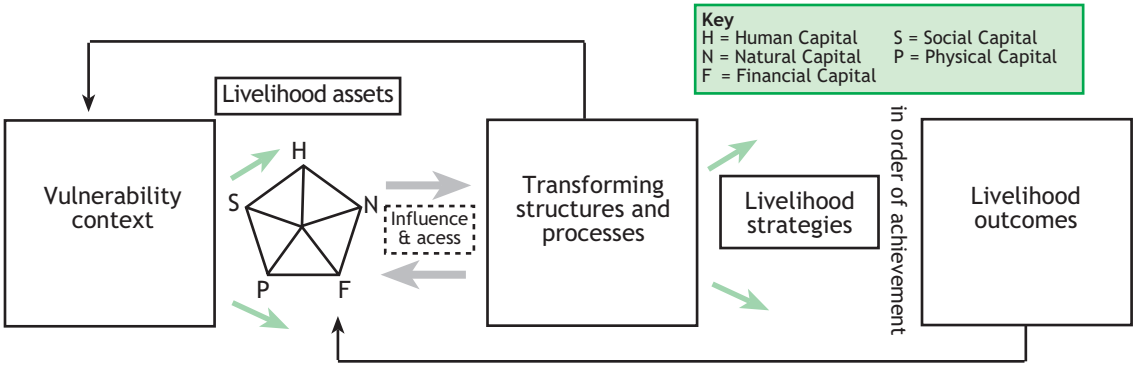

Figure 1: Sustainable livelihood framework

The vulnerability context may include population trends, resource trends (including conflict), national/international economic trends, trends in governance (including politics), technological trends, human health shocks, natural shocks, economic shocks, conflict, crop/livestock health shocks, seasonality of prices, production, health and employment opportunities.

Human capital represents the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives. At a household level human capital is a factor of the amount and quality of labour available; this varies according to household size, skill levels, leadership potential, health status, etc.

Social capital is taken to mean the social resources on which people draw in pursuit of their livelihood objectives. These are developed through: networks and connectedness, membership of more

formalised groups, relationships of trust, reciprocity and exchanges that facilitate co-operation, reduce transaction costs and may provide the basis for informal safety nets amongst the poor. Some people choose to distinguish between social capital and 'political capital', derived from access to wider institutions of society, though both are included here.

Natural capital is the term used for the natural resource stocks from which resource flows and services (e.g. nutrient cycling, erosion protection) useful for livelihoods, are derived. There is a wide variation in the resources that make up natural capital, from intangible public goods, such as the atmosphere and biodiversity, to divisible assets used directly for production (trees, land, etc.).

Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods. Producer goods are the tools and equipment that people use to function more productively. Infrastructure consists of changes to the physical environment that help people to meet their basic needs and to be more productive. The following components of infrastructure are usually essential for sustainable livelihoods: affordable transport; secure shelter and buildings; adequate water supply and sanitation; clean, affordable energy; and access to information (communications).

Financial capital denotes the financial resources that people use to achieve their livelihood objectives. There are two main sources of financial capital: available stocks, which can be held in several forms such as cash, bank deposits, liquid assets such as livestock and jewellery, or resources obtained through credit-providing institutions; and regular inflows of money, including earned income, pensions, other transfers from the state and remittances.

Transforming structures and processes are the institutions, organisations, policies and legislation that shape livelihoods. They operate at all levels, from the household to the international arena, and in all spheres, from the most private to the most public. Structures are the organisations, both private and public, that set and implement policy and legislation, deliver services, purchase, trade and perform all manner of other functions that affect livelihoods. Processes determine the way in which structures and individuals operate and interact. They include macro, sectoral, redistributive and regulatory policies, international agreements, domestic legislation, markets, culture, societal norms and beliefs, and power relations associated with age, gender, caste or class.

Livelihood strategies are the range and combination of activities and choices that people make/ undertake in order to achieve their livelihood goals (including productive activities, investment strategies, reproductive choices, etc.). This is a dynamic process in which people combine activities to meet their various needs at different times. Links between urban and rural centres will need to be explored, as will the implications for decision-making and asset usage of split families. It is important to recognise that people compete (for jobs, for markets, to

secure better prices, etc.). There is no 'solution' to this problem. However, its existence does underscore the importance of extending choice and opportunities for the poor and building up their ability to take advantage of these opportunities, and thinking about safety nets for those who remain unable to achieve their livelihood objectives in what will always be a competitive environment.

Livelihood outcomes are the achievements or outputs of livelihood strategies. We should not assume that people are entirely dedicated to maximising their income. It is hard to weigh up the relative value of increased well-being as opposed to increased income, but this is the type of decision that people must make every day when deciding which strategies to adopt. There may also be conflict between livelihood outcomes. Examples are when increased income for particular groups is achieved through practices that are detrimental to the natural resource base, or when different family members prioritise different livelihood objectives – some seeking to reduce vulnerability, while others seek to maximise income streams. There is a close relationship between livelihood outcomes and livelihood assets, the two being linked through livelihood strategies.

2 Who are the stakeholders in a sustainable livelihoods approach?

The approach will normally involve a stakeholder analysis to identify primary and secondary stakeholders and the relationships between them. Stakeholder analysis can help to reveal, for example:

- the capacities of different stakeholders to participate in (and benefit from) development activity, and their perspectives on that activity;
- the relative political power, access to information and institutional means to command attention (including blocking change) of different groups;
- the complexity of organisational relationships;
- the area and sources of power and patronage;
- who depends on which environmental resources and services and how they are affected by change;
- gaps and overlaps in the roles and functions of different stakeholder groups.

If carried out properly, stakeholder analysis also helps bring the poor into the development process and ensure that their views are incorporated in decision-making. Primary stakeholders are those that are directly affected by an activity (e.g. the desired beneficiaries of a project and the implementing agencies). Secondary stakeholders are indirectly affected by the activity (e.g. non-beneficiaries whose access to a resource may be affected, traders who may benefit, etc.).

As with the complementary rights-based approach, the livelihoods approach may entail broadening the types of stakeholders generally involved in enterprise development, to acknowledge the needs of:

- poor entrepreneurs, including women, the poorest and most disadvantaged and particularly those involved in micro-enterprise,
- workers in enterprises of all sizes,
- other affected poor and disadvantaged people in the households, communities and markets where enterprises are being promoted.

3 The sustainable livelihoods approach and enterprise development

The livelihoods approach fits naturally with enterprise development, since enterprise is a key component of people's livelihoods. Many if not all elements of the principles and framework will be familiar to practitioners. The principal implication of the approach for enterprise development is to encourage a broadening of the analysis, so as to give greater assurance that an intervention will meet its objectives and be secure (sustainable) in the face of shocks and stresses.

An investigation of livelihood strategies may reveal a wide range of alternatives and options. The most visible livelihood strategy may not be the most important. Furthermore, there may be wide, but not immediately apparent, differences between the livelihood strategies of various social groups within a community. Other general concerns when conducting analysis of strategies are:

- Investigations that focus on income sources may neglect other considerations. The approach encourages a broad view of what people are trying to achieve (livelihood outcomes) rather than what they may be doing at any point in time. Issues to be addressed include: the way in which people use their assets (to maximise income or minimise vulnerability?); which assets they choose to invest in and which they chose to run down; where they are obtaining the skills necessary to pursue different strategies; and the money-saving (as opposed to money-earning) or non-monetary (e.g. domestic) activities they undertake.
- Different household members may adopt very distinct livelihood strategies. The household may therefore not be the most appropriate unit of analysis. 'Unpacking' what goes on within the household is a key step.
- Livelihood strategies are in a continuous process of flux: people adapt to evolving threats and opportunities, changing livelihood objectives and also as their own capabilities alter during their lifetimes.

The design of an intervention is likely to draw on some form of livelihoods analysis. In practice, this is likely to mean:

- Explicitly relating programme outputs to improved livelihood outcomes (not just to resources or sectoral outputs).
- Exploring and addressing the multiple factors that influence livelihood quality. This is facilitated by use of the non-sectoral SL framework that explicitly highlights the central impact on livelihoods of policy and institutional issues.
- Incorporating principles of flexibility and responsiveness to people's changing needs (through, for example, adopting process approaches and conducting periodic participatory reviews).
- Seeking partners that can embrace and 'mainstream' an SL approach in wider work. The approach can be used to reorient existing programmes to produce better livelihood outcomes.

Research may need to be broadened to include a policy and social change perspective. One possible breakdown is as follows:

- Social relations: the way in which aspects such as gender, ethnicity, culture, history, religion and kinship affect the livelihoods of different groups within a community or neighbourhood.
- Social and political organisation: decision-making processes, civic bodies, social rules and norms, democracy, leadership, power and authority, rent-seeking behaviour (if any).
- Governance: the form and quality of government systems (structure, power, effectiveness, efficiency, rights and representation).
- Service delivery: the behaviour, effectiveness and responsiveness of state and private service delivery agencies.
- Resource access institutions: how the institutions that determine access to resources function.
- Policy and the policy process: the effect on livelihoods of key policies (and legislation) and the way in which policy is determined (by whom, for whom and influenced by which groups?).

This is a broad agenda that requires a wide range of analytical skills and techniques: social, political, organisational, managerial, economic, operational and technical. Potentially, the approach could entail considerable extra time, effort and cost. It is important to focus on the principles of the approach, and concentrate on those aspects of the framework that may be particularly important for a given intervention. A particular focus should be placed on issues of sustainability: are policies, institutions and processes sustainable over the longer term? Do they promote social sustainability and create an overall enabling environment for sustainable livelihoods?

4 Implications of the sustainable livelihoods approach for impact assessment

An SL approach can be applied to review existing projects and programmes, even if these were not originally designed using an explicit SL approach. A livelihoods review brings a new perspective. It provides an opportunity to stand back and explore how a project or programme is affecting the livelihoods of the poor, and to see how these impacts can be enhanced. There is no set approach, but such a review should aim to shed light on:

- the ways in which project/ programme activities are directly and indirectly affecting people's livelihoods and the context that shapes them;
- whether people's own livelihood priorities are being addressed;
- how people's livelihood strategies are affecting their participation in and benefit from the project or programme;
- how activities can be adapted to enhance livelihood impacts for target groups while remaining consistent with the overall project purpose.

Normal monitoring and evaluation (M&E) usually measures progress towards the outputs and purpose in a project log frame. For projects not designed using an SL approach, a livelihoods review will go beyond log frame targets to address livelihood impact. If poverty elimination appears as the overall project goal, a livelihoods review will also provide an opportunity to revisit the poverty objective, to assess the project's contribution to it, and to reorient if necessary. A wider livelihoods review may also be incorporated into 'normal' M&E activities, including output-to-purpose reviews and end-of-project impact assessments.

The SL approach is about supporting people to achieve their own livelihood goals (with the proviso about sustainability). Livelihoods programmes should therefore be judged on whether they contribute to the achievement of the livelihood outcomes that people consider important. One way of ensuring this is to negotiate indicators with particular groups and to draw these groups into monitoring processes. Care should also be taken to observe unplanned changes associated with development activity (for example, changes in social relations, accumulation or loss of assets by particular groups, etc.). There are, though, several difficulties in this area, including that:

- different outcomes may conflict;
- some outcomes (such as increased well-being) may be extremely difficult to translate into monitorable indicators;
- it is hard to ensure objective monitoring of impact by groups with different interests, especially when they themselves do not prioritise a given outcome (e.g. environmental sustainability).

As always with development activity, it is hard to achieve an adequate understanding of the nature of causality, though the comprehensive approach of the livelihoods framework may provide some assistance here.

SL principles also emphasise the importance of learning throughout implementation. Impact assessment is a key step in the learning process. It should aim to derive lessons about what is effective in achieving poverty reduction and what is not, and help adapt activities to changing livelihood circumstances.

At the same time, the very strengths of SL pose challenges for impact assessment. How can impact assessment:

- embrace SL's people-centred and participatory principles?
- be holistic, monitoring changes across a wide range of livelihood priorities and influences?
- support a process, 'learning' approach?

A range of impact assessment tools can be used/ adapted to address these issues. However, having a clear understanding of the objectives of impact assessment (for whom, by whom and for what purpose is the information collected) is as important as the selection of particular instruments. If livelihood trends are to be monitored over the longer term, formal and informal institutions in recipient countries must assume a greater, long-term role. This implies the need for skills development, adequate resources and – most challenging of all – an institutional environment in which on-going monitoring and evaluation is perceived as a useful input to policy review and resource allocation processes. It also means that proposed monitoring systems should build on, and integrate with, existing monitoring and management information systems within relevant organisations.

What matters in an SL approach are changes in people's livelihoods – rather than in resources per se. Impact assessment must therefore look beyond activity-based indicators of progress and resource-based definitions of change to measure achievements from the perspective of partners and beneficiaries. This implies a high degree of participation in the design, monitoring and assessment of performance indicators.

There is no single definition of people-centred impact assessment. Approaches such as beneficiary contact monitoring, stakeholder analysis and participatory assessment commonly include one or more of the following elements:

- indicators are identified by and negotiated with partners/ beneficiaries;
- partners/ beneficiaries are responsible for data collection and analysis;
- people's attitudes to change are highlighted (in addition to physical measures of change);

- partners/ beneficiaries play a key role in judging performance directly (through assessment of indicators and results) and/or indirectly (through periodic 'client satisfaction' surveys).

SL approaches draw attention to the links between livelihood 'components'. Improvement in one element (e.g. the policy environment or access to an asset) cannot be judged a success before the second-round effects on other livelihood components have been assessed. This implies the need to monitor a wider range of livelihood indicators so that intended and unintended, direct and indirect consequences of development activity are understood. One way to capture knock-on effects is through behavioural change indicators (e.g. an increase in the time/ labour allocated to productive activities may be shown to be a knock-on effect of improved access to health services). In practice, impact assessment cannot 'assess' livelihoods in their entirety. But it should address both the positive and negative effects of project activity on livelihood systems as well as the inverse: the effects (constraints/ opportunities/ assumptions) of livelihood systems on project activities. Relatively simple indicators or checklists can be drawn up to measure these.

Involving partners in the selection of indicators and keeping design simple will improve the likelihood that impact assessment activities will continue post-project. Participatory assessment should be complemented with some degree of external assessment – for example, of environmental, health and national-level benefits, of which participants may have little awareness. External assessment can also help reduce possible bias within projects.

Impact assessment should strive to monitor both policy-level and local-level changes, as well as the links between them. Measures of institutional change (e.g. changes in service provision, representation in decision-making processes) should be supplemented by monitoring local perceptions of change, using techniques such as institutional mapping. If possible, changes in local behaviour or conditions resulting from institutional change should also be measured. However, lags between institutional/ policy reform and its wider effects may constrain what can be measured. Another concern is that institutional change rarely affects everyone equally and various groups are likely to have highly divergent opinions about change. Differences in impact between groups – especially negative impacts on particular groups – should therefore be monitored and considered in the context of the overall poverty elimination objective.

The SL approach endeavours to ensure that external support reinforces positive patterns of change and mitigates negative trends. A mix of indicator-types is required to capture dynamic processes.

- Outcome indicators: these relate to longer-term targets. Measurement indicates what has been achieved (lagged indicators).
- Process indicators: these measure on-going progress towards planned outcomes.

- Leading indicators: these suggest what will happen, especially over the longer-term (e.g. indicators of behavioural change provide early evidence of progress). They can usefully feed into subsequent ex post evaluations and impact assessment.

Process and leading indicators must include: (a) explicit identification of the cause and effect relationships linking them to intended outcomes; and (b) quantity and quality measures that assess adherence to agreed 'standards' (e.g. levels of participation, representation of different groups).

The SL approach calls for a mix of complementary indicators to assess livelihood change. A single 'objective' measure of performance (e.g. $/day) is insufficient. However, combining multiple quantitative and qualitative indicators can pose problems.

- Beneficiary-defined, qualitative indicators are often context-specific. It may be difficult to derive from them summary measures of overall project or programme performance.
- Indicators used for internal project learning may not fit well with donors' external obligations (e.g. reporting on agreed targets, accountability). Openness and transparency are required when negotiating which criteria will be used to determine change and progress.
- SL project indicators may not have direct equivalents within national and international development targets (though new poverty assessment methodologies may help identify links). Even when there are direct equivalents, time lags and slow replication suggest that higher-order indicators will be relatively insensitive to immediate project-level changes. Nevertheless, higher-order indicators can provide a benchmark and/or framework for the design and interpretation of project indicators. Linkages can be further enhanced through the use of cascading log frames in programme planning.

Tensions between quantitative and qualitative indicators should not be exaggerated. Many qualitative techniques use quantitative measures (e.g. ranking and scoring) and in practice the two are complementary. Similarly, 'abstract' indicators, such as client satisfaction, can be compared across projects, regardless of context.

It is important not to try and measure everything. Focus on key linkages, keeping in mind other potential issues identified using the SL framework. An 'institutional map' locates a group in terms of its relationships with other organisations and the importance (to the group) and strength of these relationships. The approach can be used to determine, inter alia, where the group is now, where it would like to be and changes in relationships over time. The distinction between process indicators and outcome indicators is important. Process indicators may suggest that a project is doing very well (e.g. the participation of excluded groups may be increasing), while outcome

indicators may be disappointing. Understanding cause and effect relationships is therefore critical.

Reading 9: A revolution of ideas and action

Interview with Andrew Simmons by Monte Leach

A profile of Goldman Environmental Prize winner, Andrew Simmons, who mobilises young people in his native Grenada and elsewhere to become engaged in shaping the future of their countries.

Andrew Simmons, winner of the Goldman Environmental Prize, has spearheaded a community-based environmental movement in St. Vincent and the Grenadines, an island nation in the eastern Caribbean. In 1978, as a teacher and the only employed teenager in his community, Simmons established JEMS Progressive Community Organization to help local communities stop the destruction of the nearby King's Hill Forest Reserve. Since this successful effort, Simmons has continued to encourage community participation in local decision-making, and has helped implement water projects and a number of other activities, including clean-up campaigns and leadership training for youth.

Simmons founded the Caribbean Youth Environment Network and currently works as Director of Community Services for St. Vincent. Through the United Nations Environment Program, Simmons has advised on the development of similar youth programs in other countries.

Monte Leach: As I understand it, you started working in your community when you were only a teenager. What prompted you to start your community work?

Andrew Simmons: Before 1972, about 95 per cent of the people on the island were employed, on three or four agricultural estates. With the oil crisis in 1972, and the increased cost of fuel, these estates closed down. Unemployment went from 5 per cent to about 90 per cent.

One of the oldest forest reserves in the world is located on our island. It was established on about 52 acres of land in 1791, and is called King's Hill Forest Reserve. After the oil crisis, as a means of survival, people began cutting down trees for fuel wood, and destroying the wildlife.

In 1977 we started discussing what we could do as young people to stop the environmental destruction. One year later 52 of us came together to start an organization [JEMS Progressive Community Organization]. We started going into the community, telling people to stop cutting down the trees. But I think we learned a harsh lesson when we were confronted by one parent who told us: *"How do you expect me to get food? I can't buy natural gas, how do you expect me to get food to feed my children, to send them to school?"*

So we started to have discussions. We changed our entire strategy in terms of how people within the community could work with us to

save the forest. One of the major problems in that community was illiteracy. Illiteracy was estimated at over 60 per cent among adults. So we started a literacy program. We ran classes four evenings per week. I recruited other teachers and other persons in the organization who were going to secondary school. They worked as volunteers. I trained them to work with others.

ML: You taught literacy, but how did you answer that woman who asked you *"How do I feed my kids?"*

AS: We discussed economic alternatives with the people in the community. We started training people, mainly women, in terms of employment-creation skills – such as electrical wiring, and building-construction skills. A number of them are working now as carpenters, masons, that type of thing. And also we looked for other training opportunities within St. Vincent and outside of St. Vincent, and sometimes we were able to get the Organization of American States (OAS) to provide that type of training. Because we were able to provide this alternative, a number of people are presently employed, and work with us in protecting the forest reserve itself.

Because some of them have land available, we also trained a number of them in animal husbandry techniques so that they could improve their flocks, and in agriculture techniques so that they could produce better quality crops, using less land and fewer resources. We also worked with developing renewable energy sources.

We set up within all the schools in the area what we call "Youth Environmental Service Corps" – the abbreviation is YES. We provide training for youth within the school itself. They are involved in community clean-up campaigns, tree planting exercises, using popular theatre as a medium for getting the community involved.

ML: Why did you decide on popular theatre as a community organizing approach?

AS: In the early stages, it was difficult to get people to come to meetings. We used to go house to house, but if you wanted to meet all of them together, they wouldn't come. So we went into the community, talked to people, and did the basic research on local issues. Then we would devise a play with songs that would highlight a community problem, and possible solutions to the problem. We would go back into the village, invite everybody into the village square, and perform the play and songs. Then we would have a discussion. We found that has been extremely effective in terms of getting the entire village to participate – men, women, and children.

ML: How do you apply what you have learned in St. Vincent to the other countries in the area?

AS: With funding from the United Nations Environment Programme, we established a regional network called Caribbean Youth Environment Network. Twenty countries are involved, from the Dominican Republic and Haiti, to Guyana and Belize, involving four

languages – English, French, Spanish, and Dutch. My work is mainly among young people.

ML: And why do you focus on the young people?

AS: Because the future of the earth itself is on the side of the children. As adults, we are fixed in our ways, and it is extremely difficult to change. But we have learned from our work in St. Vincent that if you work on the kids, it is very easy to get the parents to be a part of it.

In St. Vincent, in 1992, I was able to raise funds from the Canadian Government and the Government of St. Vincent to set up an environmental day-care and pre-school facility, teaching children between 18 months old to four years, about the environment.

ML: How do you teach an 18-month-old infant about the environment?

AS: My first training was in education, although I went back and did a master's degree in economic development. I use Piaget and Montessori and other psychologists who concentrate on working with children. We use clay. We take them on nature walks, and start to teach them about the importance of the environment. Although some of these children just started speaking, we found that they would go back and encourage their parents to take them on walks out in the fields and woods, to look at butterflies and other creatures.

We're doing this only in St. Vincent now, because we don't have the funds to expand. But because of the success of the YES groups in St. Vincent, in the primary and secondary schools, we were able to get other groups that we were working with to set up similar types of programs within their country, in Barbados, Antigua, Trinidad, Guyana, and elsewhere – 20 countries in all. I set up national coordinators, whose role is to organize networks within their country. We meet twice a year, bringing everybody together. We train them in new skills, and look at the structure of the organization and what new strategies we should put in place for the future.

ML: It sounds as if the participation of the people, at the village level, is the basis of your work?

AS: Yes, that is the major ingredient. Development is a process of change, a process where people should be at the centre, where they can shape their own existence. That is something we have been practising. We talk about empowerment of local people, building their self-esteem, giving them confidence so that they themselves can shape the type of development that they want to take place within their community.

ML: How do you help build their self-esteem?

AS: By training, and also through demonstration projects. We usually start with small projects, small problems, and we work with them in finding solutions. Then gradually we go into the bigger problems,

bigger issues, and they have developed the confidence in themselves to deal with them. We have developed our own library, where we provide them with information. We bring them together once a month to discuss the issues that confront the community, and also bring people who are trained in specific areas to work as resources for them in the field.

Our duty from the organizational level, although we are also from the community, is to facilitate the process. We take them through a process. They identify the issues, and decide what they want to do about them. We use a number of different strategies, for example, popular theatre, in terms of getting them to recognize their weaknesses, devise strategies, and also implement the program themselves. We come back from time to time to help them evaluate their efforts.

ML: What's the missing ingredient today in dealing with development issues?

AS: The missing ingredient is that we don't involve the people. We don't see them as an important element within the development process. The masses, in a sense, have been stifled. You don't listen to them, you don't consult with them. You sit in your office because you think you are trained in an area, and you jot down the whole plan, and then you try and dump this plan on the people, and expect the people to be involved with it. If instead we look at it from the bottom up, in terms of getting people to participate, listening to their views, and then after that shaping the policy, rather than us setting the policy first, I think things would be much better. To me, that's the most important lesson that I have learned from this experience.

ML: Any other points you wish to make?

AS: We usually put issues like economics, environment, development, and population into compartments. A typical example is the UN. We have seen important conferences like the UN population conference, and the women's conference in Beijing and others, divert the main attention away from the major issues that face the world, the major conflict between developing countries and the West in terms of trade and the transfer of technology. In the years ahead, we may find that we did not achieve anything of great importance during these conferences because of the small compartments into which we divide the issues.

ML: What gives you hope?

AS: I have hope that once we concentrate on working with the young people, there will be changes when they become adults. Nowadays young people are taking action, applying pressure on their parents, taking strong leadership positions. I have seen that in the Caribbean. I have seen that within Africa, and also in a number of parts of Europe. There have been quite a lot of positive changes and actions that have taken place. I believe there will be a revolution in terms of

ideas and action that we will see in the next 10 years, or even sooner, that will completely transform the world. That is what I believe.

From the July/August 1996 issue of *Share International*

Reading 10: Building a National Youth Environment (YES) Service Corps for the Commonwealth of Dominica

The Youth Division/Y.D.D. – Commonwealth of Dominica

Introduction

Our vulnerability as Small Island Developing States necessitates that we plan our development taking into account the nature and state of our marine and terrestrial environment. As small states with limited land space, small population, limited resources and small open economies we must embark on a development path that takes into account these factors as well as the fragility of our eco-system, the participation of all our people and the involvement of every social group.

Dominica has been described by many as the last natural wonder/ paradise in the Caribbean. The island's vulcanological manifestations are reflected in an abundance of fumaroles, hot springs, towering mountains and spectacular waterfalls and a one of its kind boiling lake, which is considered the largest in the Western Hemisphere. In addition, the island boasts some spectacular underwater scenery, large numbers of sperm whales and dolphins, hundreds of bird species, reptiles and other species of fauna, a diverse flora and some of the largest tracts of virgin tropical rainforest in the Caribbean. Its forest and natural heritage contribute much to its own survival.

Agriculture, which is the mainstay of the economy, depends on the fertile land of the countryside. Water for home consumption, agriculture and industry is largely dependent on the high precipitation of the forest and mountains which in some parts of the interior produce more than 300 inches of rain annually. This island is also home to the indigenous Caribs, a vibrant folk culture, traditions of community spirit and an engaging and warm people. It is a world removed from what is described as modern, yet it is an increasingly vital part of the global eco-system on which much of what is modern is increasingly dependent.

But all this does not suggest that there are no problems in paradise. On the contrary, our Nature Island is in conflict between those who want to use our natural resources in ways that conserve our natural and historical heritage for present and future use, and those who want to see it overrun by programmes and practices that consume these resources with little regard for long-term implications and for nurturing and enhancing the natural resources. There are pressures for land, especially for agriculture and housing. This means that without proper land use policies there is a potential danger that our long practice of forest conservation will be seriously compromised for quick economic gains. We witness daily occurrences of practices

which impact negatively on the marine and terrestrial environment. There are also problems of poor waste management, overuse of agro-chemicals and poor agronomic practices to cash in on export agriculture. All these poor practices and problems mitigate against us making full use of our resources and are potentially dangerous to the long-term economic and environmental sustainability of our country.

This therefore suggests the need for a new direction in development planning and thinking. A new paradigm is needed to place the environment, the people and social groups at the heart of development. The youth, who constitute a major social grouping, have been largely alienated by recent development programmes. We have tended to give them a limited space and to expose them to a limited body of knowledge. A new development paradigm must not only seek to increase opportunities in the areas of education and job creation, but must also bring them into the arena of national development thinking and practice. To be consistent with the major focus on eco-culture and eco-centred development activities like ecotourism, we need a new discourse with our young people. They must become involved in the emerging debates on sustainable development, develop their own programmes that are consistent with our national development objectives and must assume leadership roles in the new environment and development movement.

Rationale for a YES Corp

A YES Corp is being considered as a possible mechanism for involving the youth in activities and programmes which place people and the environment at the centre.

Our young people have not been sufficiently mobilised to work for the protection and management of the environment. The YES Corp will present them with opportunities to study, research and develop programmes focused on the environment. They will be assisted in acquiring the necessary skills and tools to investigate issues of environmental concerns/ management, develop practical programmes and projects that best utilise their creativity and energies, and develop enterprises that are economically and environmentally sustainable.

A YES Corp will help build a new consciousness among youth island-wide, on the importance of conservation, management of the environment and sustainable development. It will also enable the thinking, concerns and experience of youth to influence major national policy decisions aimed at development which integrates young people in meaningful social, cultural and economic programmes. In particular, a YES Corp will help ensure that an education reform programme will incorporate knowledge and thinking about the environment and development into the curricula of the school system.

The operation and programming of the YES Corp will be influenced by major national issues such as:

1 Agriculture – A new and modern agriculture must develop practices that are consistent with environmental sustainability including proper land use methods and systems that are self-sustaining.

2 Tourism – Tourism development must be planned and managed to avoid conflict with our fragile eco-systems and to avoid alienating the youth and other people. We need to place emphasis on ecotourism so as to minimise potential conflict and to ensure maximum local involvement and benefit.

3 Conservation and environmental management must become a way of life for all Dominicans. This relates and impacts on issues such as waste management, protection of forest reserves and water catchment areas, tourism, fisheries, agriculture and agro-industries.

4 Participation – reinvigorate the traditions of service and volunteerism among youths, nationwide.

Objectives of the YES Corps

1 To educate and train a cadre of young people on issues related to the environment and sustainable development.

2 To mobilise a corps of young people at the community and national level to participate in activities for the preservation and management of our natural resources.

3 To develop a national organisation to capture the synergies of young people in activities which promote sustainable development as well as build individual and institutional capacity to implement programmes that achieve concrete measurable results.

4 To identify income generating projects which encourage the sustainable use of natural resources.

Description of the YES Corps

A National YES Corps will be made up of community-based associations/ groups and a national organisation working on initiatives that promote the sustainable use of local resources including the young people themselves. The corps will place emphasis on activities that seek to address issues related to environmental degradation and the proper management of natural resources including clean-up activities, building of nature trails, training and education of young people, developing mini-parks for recreation and cultural purposes and other activities.

The work of the corps will be based largely on volunteerism and service to the community. It will strive to inculcate in its members not only a greater appreciation of the environment but also love of the country, patriotism, the importance of collaboration and co-operation and a better understanding of their role in the economic and social

development processes. Efforts will be made to develop projects that are economically self-sustaining and of an income generating nature so as to allow more opportunities for direct incentives to those who agree to serve. A major part of the movement's work will be in seeking to create more avenues for socially stimulating activities, including camps, exchange programmes at home and overseas, investigation trips/ missions, cultural events and meetings.

Short to medium term goals/ activities

I A process of clarifying the main goals and setting objectives for the movement.

II Building a consciousness among youth on environmental issues.

III Offering opportunities for training, exchange visits, etc. for a cadre of youth leaders.

IV Mobilising resources, including the identification of around 10–20 youth leaders, and finance to implement a three to five year programme.

V Organising a National Youth Consultation on the Environment by January 31,1996.

VI Report to the Minister of Education and Youth Affairs by March 31, 1996.

VII Launching of the National YES Corp by April 30, 1996.

VIII Building a National Organisation, including village and district associations, a secretariat and a national body.

IX Developing education and training programmes for young people island-wide.

X Developing media and educational material for an education campaign.

XI Mobilising youths at the village, district and national levels for programmes and activities organised by the YES Corp.

XII Participation in such national programmes as Youth week, National Clean-Up Campaign etc.

XIII Participation in regional events including a meeting of the Caribbean Environmental Youth Network scheduled for Dominica between December 10–17,1995.

XIV Contribute to the emerging regional consensus on the Small Island Developing States (SIDS) Programme of Action, relating to the importance of natural resource management as the core of a vibrant society and economy.

XV Identifying income-generating opportunities for young entrepreneurs related to the sustainable use of available resources in such areas as tourism, agriculture and arts and craft.

Organisation and structure

The YES Corps will be opened to young people, male and female, between the ages of 13–29 years in schools and from the communities around Dominica. The following structure will emerge to ensure the best possible use of resources, effective management and leadership, and proper communication:

1 An advisory body to be appointed by the Minister Responsible for Youth Affairs. This body will include representation from the Ministry of Agriculture and the Environment, the Local Government and Community Development Department, the Dominica Conservation Association, the National Youth Council, the Ministry of Tourism or the National Development Corporation (NDC), among others.

2 A Secretariat – This will be made up of staff comprising a full-time coordinator, a financial comptroller, an administrative assistant, a programme officer, and volunteers.

3 A National Executive Committee headed by a Co-ordinator, and various secretaries for programmes of the YES Corp, including education, projects, finance and community activities.

4 Village and District Associations with executive bodies along similar lines to that of the national body.

Reading 11: Women and the environment

> "Advancing gender equality, through reversing the various social and economic handicaps that make women voiceless and powerless, may also be one of the best ways of saving the environment, and countering the dangers of overcrowding and other adversities associated with population pressure. The voice of women is critically important for the world's future – not just for women's future."
>
> Amartya Sen

The direct and critical relationship between women and natural resources draws its strength not from biology – that is, not because women are born female – but from gender, and the socially created roles and responsibilities that continue to fall to women in households, communities and ecosystems throughout the world.

Women have primary responsibility for rearing children, and for ensuring sufficient resources to meet children's needs for nutrition, health care and schooling. In the rural areas of developing countries, they are also the main managers of essential household resources like clean water, fuel for cooking and heating and fodder for domestic animals. Women grow vegetables, fruit and grain for home consumption and also for sale – often, as in much of Africa, producing most of the staple crops. In South-east Asia, women provide 90 per cent of the labour for rice cultivation.

Bangladeshi woman cooks with crop residue. Indoor air pollution kills more than 2.2 million people each year in developing countries.

Shehzad Noorani, Still Pictures

Women are more than half (51 per cent) of the world's agricultural work force. As economic opportunities open up, women in developing countries are growing, processing and marketing non-food products made from natural resources, for consumption at home and, increasingly, overseas.

In Burkina Faso, for example, women are producing hundreds of tons of shea butter each year, selling much of it to European cosmetic markets. In Colombia, thousands of female workers are tending flowers for sale in the United States. But such livelihoods can also present new environmental and health risks: it is estimated that flower workers in Colombia are exposed to 127 different types of chemicals,

many of which have been banned in the United States and the United Kingdom.

Many of these activities take place in the interstices of men's use of resources. Women occupy niches allowed by traditional gender structures or opened up by economic and social change. In coastal Mozambique, women are not allowed to come close to the boats men use for ocean fishing, or to do such fishing themselves, although they process and market the men's catch. Their aquatic space is close to the shore, where they harvest and sell shellfish, crabs and other small sea creatures – women's work that provides about 20 per cent of average monthly household income according to a recent study.

As poverty persists and, in many parts of the world, deepens, women's income from such activities becomes critical to family survival – reinforcing the importance of the environment in women's lives (and increasing the dangers posed by degraded environments). In the growing number of female-headed households, this work is essential, particularly for children; women already head almost a quarter of rural households in the world's poorest countries. Women's income can also create the conditions for expanded opportunities, choices and autonomy – all of which advance the larger goal of gender equity and equality.

How Environmental Degradation Affects Women

Women have the responsibility for managing household resources, but they typically do not have managerial control. Given the variety of women's daily interactions with the environment, they are the most keenly affected by its degradation. For example:

- Deforestation or contamination increases the time women must spend seeking fuelwood or safe, clean water, and increase women's risk of water-borne disease. In the state of Gujurat, India, women now spend four or five hours a day collecting fuelwood, where previously they would have done so once every four to five days.
- Soil erosion, water shortage and crop failures reduce harvest yields; soil exhausted from over-use reduces the productivity of household gardens.
- Toxic chemicals and pesticides in air, water and earth are responsible for a variety of women's health risks. They enter body tissues and breast milk, through which they are passed on to infants. In a village in China's Gansu province, discharges from a state-run fertilizer factory have been linked to a high number of stillbirths and miscarriages. Water pollution in three Russian rivers is a factor in the doubling of bladder and kidney disorders in pregnant women, and in Sudan a link has been established between exposure to pesticides and perinatal mortality – with the risk higher among women farmers.

- In urban settings in particular, air and water pollution can be extreme, and sanitation and waste treatment poor or non-existent, presenting new threats to health, particularly for women, who have the highest levels of exposure. In the Indian cities of Delhi and Agra, for example, drinking water comes from rivers heavily polluted by DDT and other pesticides.

Woman collects garbage in Mali dump. Women face a variety of health risks from toxic chemicals in the air, water and earth.

Erik Just, Denmark

Degraded environments mean that women must spend more time and effort to find fuel or produce food, but their other responsibilities, for meeting household needs and ensuring family health, do not diminish. Gendered divisions of labour have so far resisted real change. In many countries, women already work 12 hours or more a day in and out of the home; in Africa and Asia, women work an average of 13 hours more each week than do men.

Powerlessness and Its Impact

At the same time, women have little power over the conditions of their lives. Decision makers often overlook this reality, even though women's use and management of local environmental resources is fundamental to household and community well-being. Agricultural extension services are heavily biased towards men. Education and outreach efforts in support of sustainable farming and land management methods often pass them by.

National law or local customs often effectively deny women the right to secure title or inherit land, which means they have no collateral on which to raise credit. Poverty, precarious land tenure and lack of expert support discourage women from investing in newer technologies or long-term strategies such as crop rotation, fallow periods, sustainable levels of cultivation or reforestation. On the contrary, these factors encourage fast-growing cash crops such as cotton, which quickly exhaust the land, and woodland clearance for short-term income.

Such pressures on limited land resources deplete nutrients and degrade soils. Land degradation reduces yields, leading to a spiral of more intensive use, further degradation and still lower yields. Farmers may seek new land, but often find it only in frontier or marginal areas, especially if they are women and cannot close a sale or negotiate a loan.

In the worst-affected countries, HIV/AIDS has increased poverty and decreased choices, forcing people to fall back on natural resources to meet basic needs. In South Africa, large numbers of poor people, particularly women, are trying to produce food and fuel on marginal lands, increasing the pressure on fragile ecosystems.

Unsustainable land use can often be traced to denial of technical and financial resources. Given the opportunity, women may well have a predisposition to practice sustainable agriculture and maintain overall land quality – precisely because of their strong reliance on natural resources. A World Bank study in Ghana found that women's plots had a lower rate of decline in soil fertility than men's – even in the same household.

In India, women are leading rural movements to promote sustainable farming practices and resist large-scale agricultural operations that rely on intensive chemical fertilizers and pesticides. And in the United Kingdom, where farming is male-dominated, half of all organic farmers are women – 10 times the proportion in the farming industry overall.

Women who lack rights to own and manage natural resources often lack rights in other aspects of their lives, reinforcing gender inequalities. Like millions of women throughout the world, women in the strongly patriarchal rural communities of south-east Madagascar have no access to the resources that bring status – property, cattle and farmland. As a result, they have little part in community or household decisions. This includes decisions about reproduction (fertility is high), marriage (early marriage is common) and education for themselves and their children (education rates for boys are low and for girls lower still).

In the past, large families were common in rural communities: children were important to agricultural productivity (especially on large land tracts), often joining their mothers (and at times fathers) in fields or household gardens, tending domestic animals and assisting with household resource needs – fetching water, and foraging for fuelwood and edible and medicinal plants. Rural women married young and had many pregnancies.

One legacy of high fertility, lower infant mortality and a limited supply of land is fragmentation. As they passed from one generation of sons to another, plots were divided again and again. Eventually the plots were simply not big enough to provide enough food for family or market. Pressures to increase yields have intensified, and men have left in search of non-farm employment. Without them, women's family burdens and responsibilities have increased, though urban

relatives often send money to improve the remaining land, as well as for housing, education and health care.

Urbanization offers a series of risks and opportunities to women. Urban growth and poverty produces new environmental threats that increase health risks. Again, those most exposed are women and their children.

On the other hand, pregnancy and childbirth are generally safer in urban areas, where health care is more likely to be accessible. City life also offers women a broader range of choices for education, employment and marriage, but it also carries heightened risk of sexual violence, abuse and exploitation. For poor women, urbanization means less physical labour to find fuel, food and water, but they often lose direct control over quality or quantity. For the very poor, these basic resources are more expensive – in absolute as well as relative terms – than for better-off groups. In environmental terms, what urbanization offers the poor with one hand, it takes away with the other. The very poor in urban areas, for example those who live on and off garbage dumps, are arguably the most deprived on the planet, in human as well as economic terms.

As women join the migration from rural to urban areas, they are vulnerable to economic and sexual exploitation – sweatshop labour, trafficking, abuse or violence; factory workers face possible exposure to chemicals, dust or other forms of pollution.

Along with the risks, however, go new economic opportunities. Freedom from the social and gender hierarchies of rural communities may also open up chances to go to school, college or university, to acquire marketable skills and to choose whether, when and whom to marry. Urban women are more likely to be able to decide when, if and how many children to bear, both because of changing gender relations and because they have easier access to reproductive health information and services.

To be effective managers of household and other resources, both rural and urban women need a range of options: choices over family size and spacing; health care, including reproductive health; education; and partnership with men. There are many examples of programmes to empower women that reinforce both their management of resources and their reproductive health. Extension programmes can typically provide aspects of reproductive health care together with information and assistance for resources management.

Involving Women in Environmental and Health Decisions

Sustainable development demands recognition and value for the multitude of ways in which women's lives intertwine with environmental realities. Women's right to own and inherit land should be enforced; individual and communal security of land tenure should be guaranteed; women should have access to credit, and to

agricultural extension and resource management services, and they should be included in decisions about the services' organization and content.

Women's involvement must extend to information, education and services for reproductive health and rights. Choice about fertility is a step towards equality: women thus empowered can intervene in other decisions in the household and the community, for example, education and health care for girl children; the use of common resources and the development of economic opportunities. Women's involvement in health and environmental decisions works to the benefit of individuals, society and the environment itself.

In fact, as a growing body of experience shows, reproductive health and environmental services can work very profitably together, if they are designed to meet communities' own priorities. Integration eliminates the need to duplicate outreach, and responds to women's interrelated needs.

Trust is key in such efforts: in one Latin American project, a female staff member of an environmental organization who developed considerable rapport with local village residents was inundated with requests for reproductive health information and care. At the same time, a government health worker without similar rapport received few such requests. Not surprisingly, studies have also found that the most critical element of the success of integrated reproductive health and environmental services is the active engagement of women.

Shifting environmental conditions can begin new and more intense gender conflicts, but can also bring opportunities for women and men to negotiate gender equality.

For example, in Newfoundland, Canada, the collapse of North Atlantic fish stocks has brought mass unemployment to communities that once relied almost wholly on fish. Before the crisis, men did the fishing and women worked in fish processing plants. But with men and women both at home during the day, domestic conflict increased. Women wanted more help in the house, but also felt invaded; men often felt emasculated by their demands. Alcohol use and conflict with men outside the home also increased. Young women began to see husbands and boyfriends as undesirable, the number of female-headed households rose, and levels of migration for both women and men, especially those with more education, increased significantly.

A more positive response to a changed environment can be seen among salt miners in Bilma, Niger. For hundreds of years, large numbers of men crisscrossed the Sahara for months at a time, transporting and trading salt for fruit, grain and gold. In recent years, the value of salt has fallen and lorries have taken over much of the trade from camels, forcing most men into a more sedentary existence. In response, men and women have created new forms of partnership. Many women now work alongside their husbands scooping salt from pits – something not possible a generation ago. In those days, when a father died his daughters could not maintain his pits; boys or men

were required. But today, when a woman marries she can join her new husband in the mine. Several couples also mine together, and the salt miners even include unmarried women.

Environmental change imposes new stresses and choices on women's and men's lives. Evolution in gender roles induced by environmental change can mean better communication and shared decision-making; but negotiating new roles and responsibilities can be a painful process. It is important to maximize social flexibility and the resources women and men can bring to negotiations with each other and with the natural world.

Forging New Relationships

Successful negotiation between women and men will be helped by having access to information and education, and to agricultural and reproductive health services. The support of laws and policies on women's rights and equality and on the sustainable use and protection of natural resources are also essential. With such support women and men can create a virtuous circle of sustainability and equity. Without it they are trapped in a vicious spiral of continuing environmental degradation, poverty, high fertility and limited opportunity, leading to environmental and social collapse.

Girl in Mali watches while the women cook. Support for women's rights can break the cycle of poverty, powerlessness and environmental degradation.

Erik Just, Denmark

Women's groups are organizing to integrate women fully into the political process, so they can take their full part in making policy decisions affecting their lives, including policies on: the use of land and water resources for agriculture; power, drinking water and energy supply; health and education services; and economic opportunities. In many countries, they are succeeding.

A successful outcome will depend on forging new relationships between women and the environment, and between women and the world at large. Wangari Maathai[1] is a Kenyan environmentalist and

[1] Wangari Maathai won the 2004 Nobel Peace Prize.

founder of the Green Belt Movement, which works with women in 20 countries to plant trees. As she suggests, such social and ecological transformations are well under way: "*Implicit in the action of planting trees,*" she says, "*is a civic education, a strategy to empower people and to give them a sense of taking their destiny into their own hands, removing their fear so they can stand up for their environmental rights. So that they [women] can control the direction of their own lives.*"

Reading 12: An aquaculture project in Western Samoa

From Women in Natural Resource Management, Commonwealth Secretariat, 1996

The setting

Lotofaga (population 2,000) is a village on the Southern coast of Upolu, the smaller of Western Samoa's two main islands. The semi-subsistence economy village is cheerful and well maintained. It has a long coastal frontage fringed by a reef.

The Faa Samoa system of Chiefly rule

The village, which is typical of Samoan life, lives in extended family groups under this system: the family Chief (*matai*) has control over family lands and allocates them for the benefit of family members. In return the family members work to maintain the prestige of the family title. All natural resources belong to the whole village under the control of the Village Council of Chiefs (*fono*).

Faa Samoa gives fierce autonomy to the village, which expects to work for its own needs in health, education and infrastructure rather than relying on the government.

All families are represented on the *fono* and the 100-strong Women's Committee (WCOM). WCOM's first responsibility was village health, but in recent years it has become the main provider of continuing education and a focus for development, such as poultry projects and a village tourist hospitality scheme. Women are expected to join WCOM on leaving school and share in the financial and status rewards of projects.

Cash, water and modern development

Village families could no longer satisfy needs using only their own land and labour resources. They needed cash for school fees, seeds, fertilisers, medicines, soap and toothpaste. Yet there were few ways of earning cash in Lotofaga. The market is too far away and cars too few for cash-cropping to be practical on a small scale.

Since the building of the coastal highway, families had shifted from the coastal site to the roadside in order to benefit from transport and piped water. Despite the fact that the water supply is sporadic and of a poor quality, such families came to depend on it instead of the abundant freshwater springs on the coastal site – which ended up polluted and unprotected. The poor quality of water led to skin disease among children in the village.

The project: prawn farming

Concern about fish stock depletion had been growing for many years. Tinned fish was judged to be a poor replacement. The idea grew for an aquaculture project, and it was popular both for the potential cash and the chance to eat fresh fish. The committee knew there was demand for fish in neighbouring villages as well as at the more distant market. A WCOM member was sent to the Fisheries Department, which was helpful and promised to support the project if WCOM decided to pursue it. Reservations were expressed about the taste of freshwater fish. People preferred prawns to tilapia. There were also concerns that the project would take away fresh water. WCOM approached an aid agency for funding, which agreed to the project. The aid officer underlined the educational benefits, learning about nutrition and new technology, and suggested that education in new recipes was also important so that people would acquire a taste for freshwater fish.

The planning group for the project comprised the WCOM executive, an aid agency officer and fisheries officers. The project was planned as a two-year learning programme incorporating a practical and an educational component; all written materials would be in Samoan. Workshops were planned, one for each stage.

1 Location and preparation of the site

2 The prawn project

3 The addition of seawater mullet

4 Freshwater/seawater dilemma

5 A status report on the project.

WCOM controlled the project but men assisted with some of the heavier work.

Location and preparation of the site

All available water supplies were plotted and their use discussed. People realised that many springs had been forgotten and some were polluted. One of the first steps WCOM took was to fence one of the best springs and designate it solely for drinking and household use.

WCOM identified a large pool suitable for aquaculture, about 150 by 10 yards and one yard deep, fed by two springs. Because it was lower than sea level, a sandbar had prevented it draining into the sea, but seawater washed into the pool at high tides. During the rainy season the rising pool would flood out to sea and cleanse itself.

The pool was full of rubbish and was unkempt. The family that owned the pool and land around was quick to agree that the project was in the village interest and donated the pool.

It took seven months to clear and clean the pool while fisheries extension officers tested it for oxygen content, salinity, temperature

and the phyloplankton that prawns require. Then a sandbag dam was placed at the mouth to prevent seawater entering. The women realised that this site was ideal for washing and bathing: women would no longer have to walk up to the feeder springs to do so. As long as locally produced soaps were used, there was no danger to the prawns. A bathing area pool was excavated. It was superior to the previous location and people soon preferred it to the piped water supplies.

The prawn project

The first batch of prawns arrived, but needed to be kept in holding tanks at the Fisheries Department for two months. On release, they would be ready for harvesting after six months. Further breeding stock batches were to arrive from Fiji every three months.

Two workshops were held with attendances of 35 to 50. They emphasised these instructions:

- continue to swim in the pool
- continue to wash in the user area, but use only bar soap
- do not throw rubbish into the pool
- do not spray Grammoxene near the pool
- follow the directions of the pool manager.

All duties were shared among WCOM members, but a pool manager had been appointed to ensure that routine tasks were undertaken.

The addition of seawater mullet

After the prawns were established the extension officer suggested that the pool might also support seawater mullet. Prawns were costly, many were lost and it had been discovered that they were not breeding stock, which it was illegal to import – whereas young mullet could be caught in the adjacent mangroves and their taste was preferred to that of prawns. Over a six-month period 3,500 mullet were caught and released into the pool. The women were taught to judge their quality by simple manual tests.

During the same period nutrition workers gave cookery demonstrations. They also taught that a seine net should be used for harvesting so that only mature prawns above a certain size were caught.

Freshwater/seawater dilemma

The mullet did not flourish, because of low salinity in the pool. The fisheries extension officer proposed a pipe with a one-way valve to introduce seawater at a controlled rate. This raised a dilemma for the women: they were excited by the prospect of raising mullet, but had also appreciated clean, fresh water in which to wash and bathe their children.

At the end of a prolonged debate the village decided not to introduce seawater into the pool.

Status report on the project

WCOM harvested two batches of prawns. For future development two problems had to be solved:

1 An alternative freshwater fish was to be found. No-one wanted to eat the tilapia in the pool.

2 Prawn breeding ponds were to be set up in local spring inlets, since importing prawns would be too expensive in the long term.

Project evaluation

The village families enjoyed the addition of prawns to their diet.

- WCOM members acquired the knowledge and skills to develop the project and look after it systematically.
- WCOM and the village learned to care for the village's natural water supplies. As a result, health may improve.
- The villagers learned more of the need for communal responsibility over communal assets. Workshops enabled them to make informed choices about these assets.
- When considering the impact of change, they realised that modern methods, such as piped water, were not necessarily superior to traditional ways.

Why the project was successful

Three very important factors:

- WCOM worked together from planning right through to harvest and beyond.
- There was a constructive combination of skills and local responsibility between WCOM and the fisheries extension officers (giving technical expertise).
- Aid officials (expanding the project from development to an educational programme) – which took in all opinions.

The women learned the effects of environmental neglect through a practical problem. As a result their new attitudes to protecting water holes are likely to affect their other ideas about village life.

Comments on this case study

- Women gathered together to act when faced with depletion of resources.
- Official support and advice were crucial.
- The project had unexpected benefits for village life.

- Aquaculture is a difficult activity that requires good management – and the women were well able to organise supervision of the project alongside other daily concerns.
- The Western Samoa villages could not fully accept tilapia in their diet because of its taste, yet the fisheries officials viewed it as the most suitable species. Official patience and understanding are necessary ingredients of success.

Reading 13: The World Resources Institute model of sustainable development

From UNESCO-UNEP(1992–1993) 'Environmental Education Training Guide for Technical and Vocational Education Teachers' International Environmental Education Programme Series 31.

Economic objectives

- steadily reduce wasteful levels of consumption of energy and other natural resources, through improvements in efficiency and through changes in lifestyle
- change consumption patterns that needlessly threaten the bio-diversity of other countries
- provide leadership to support sustainable development in other countries
- reduce import barriers or protectionist pricing policies that limit the access that poor economies have to markets for their products
- use financial, technical and human resources to develop cleaner, less resource-intensive technologies
- give more equal access to resources to all people
- reduce the growing disparity of incomes and access to health care
- transfer money from military and state security expenditure to development needs
- commit resources towards continued improvement in living standards
- alleviate absolute poverty
- improve access to land, education and social services
- develop an efficient manufacturing sector to employ workers and produce goods for trade and consumption.

Human (social) objectives

- stabilise population
- slow migration to cities through rural development
- adopt policy measures and technologies to minimise the environmental consequences of urbanisation
- improve standards of literacy
- make primary health care more accessible
- improve social well-being, while protecting cultural diversity and investing in human capital

- invest in the health and education of women
- encourage participation in decision-making.

Environmental objectives

- use arable lands and water supplies more efficiently
- improve agricultural practices and technologies to increase yields
- avoid overuse of chemical fertilisers and pesticides
- conserve water by ending wasteful use and improving efficiency of water systems
- improve water quality and limit surface water withdrawals
- conserve bio-diversity by greatly slowing, and if possible halting, extinctions and habitat and ecosystem destruction
- prevent destabilisation of climate or destruction of the ozone layer by human actions
- protect natural resources, despite the need for food production and cooking fuels and the requirement to expand production to meet the needs of growing populations
- use irrigation carefully
- avoid expansion of agriculture on steep hillsides or marginal lands
- slow or halt the destruction of tropical forests, coral reef ecosystems, coastal mangrove forests, other wetlands, and other unique habitats, in order to conserve biological diversity.

Technological objectives

- shift to technologies that are cleaner and more efficient – that minimise consumption of energy and other natural resources, and do not pollute the air, water or land
- reduce carbon emissions to limit the global rate of increase of greenhouse gases and eventually stabilise the atmospheric concentrations of these gases
- over time, greatly curtail the use of fossil fuels, and find other sources of energy
- phase out the use of CFCs to prevent degradation of the Earth's protective ozone layer
- preserve traditional technologies that create few wastes or pollutants, that recycle wastes, and that work with or support natural systems
- rapidly adopt improved technologies as well as improved government regulation and enforcement.