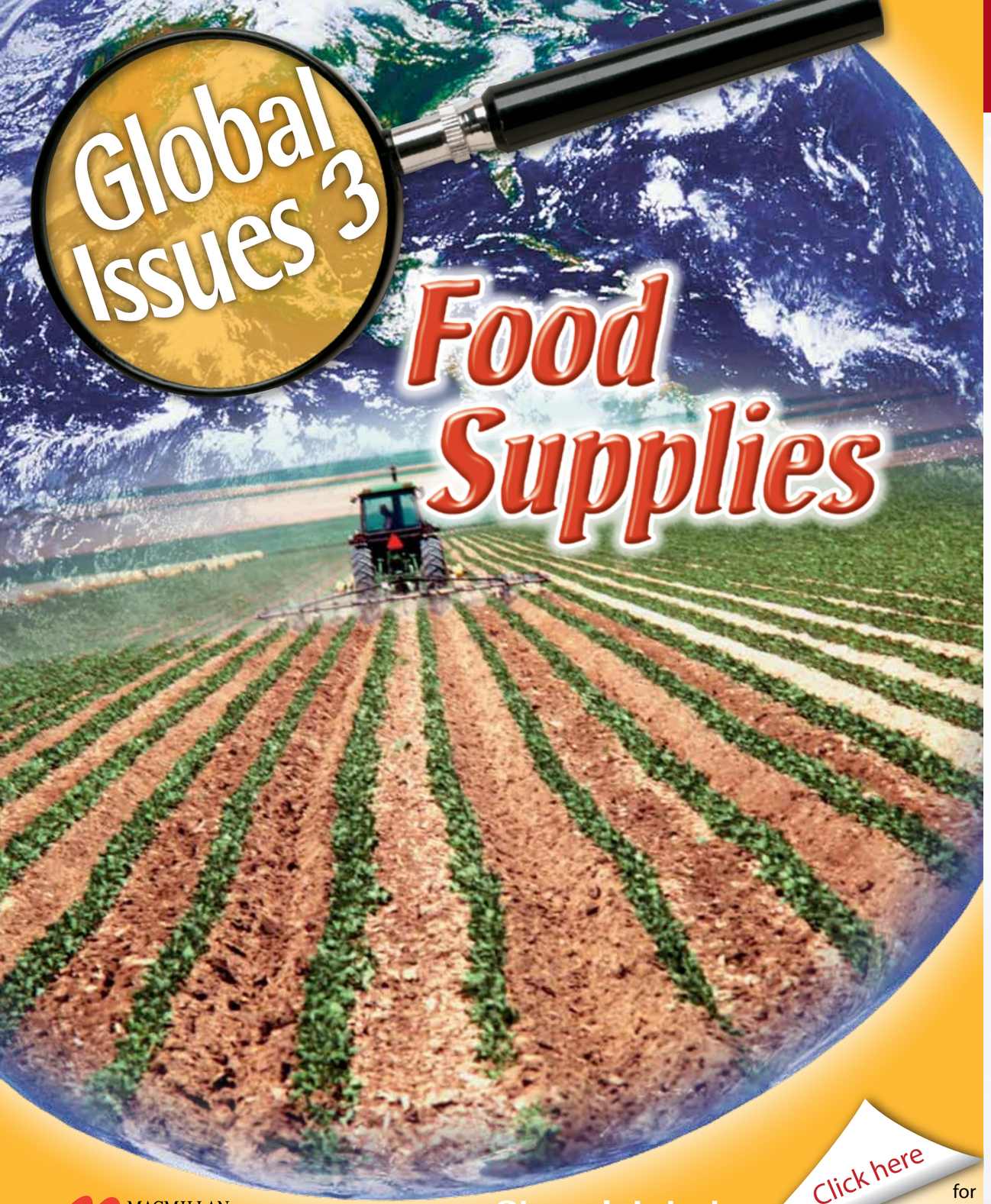

Cheryl Jakab

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Menu

Contents

ISSUES

To read the second part of each issue, click on the page number to go to the next page.

Glossary words

When a word is printed in **bold**, click on it to find its meaning.

Facing global issues

Hi there! This is Earth speaking. Will you spare a moment to listen to me? I have some very important things to discuss.

We must face up to some urgent environmental problems! All living things depend on my environment, but the way you humans are living at the moment, I will not be able to keep looking after you.

The issues I am worried about are:

- large ecological footprints
- damage to natural heritage sites
- widespread pollution in the environment
- the release of **greenhouse gases** into the **atmosphere**
- poor management of wastes
- environmental damage caused by food production.

My challenge to you is to find a **sustainable** way of living. Read on to find out what people around the world are doing to try to help.

Fast fact

Concerned people in local, national and international groups are trying to understand how our way of life causes environmental problems. This important work helps us learn how to live more sustainably now and in the future.

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What's the issue?

Increasing demand for food

The world demand for food is increasing as the human population increases. However, the amount of food produced in many areas is decreasing due to environmental damage.

Increasing population and food production

The human population increased from around 1.5 billion to more than 6 billion between 1900 and 2000. During this time, food production increased to keep up with the demand of the growing population.

The increase in food production has had a huge impact on Earth's environments. Many areas that produced good crops in the past are now **degraded**. **Over-fishing** has damaged important fisheries. Water and oil shortages and **climate change** are further impacting on food production.

Fast fact

In 2009, it was estimated that nearly a billion people in the world were undernourished.

Food shortages

Today, food shortages are becoming widespread in many regions of the world. Many people live without a secure supply of food.

In some countries, food shortages have caused large protests.

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Food supply issues around the globe

The most urgent food supply issues around the globe include:

- the damage done to the environment by food production (see issue 1)
- decreasing **soil fertility** and increasing **erosion** (see issue 2)
- decreasing numbers of fish and other sea life due to over-fishing (see issue 3)
- the effect that climate change has on food supply (see issue 4)
- the impacts of transporting food (see issue 5).

ISSUE 5

Britain
Food is being transported over increasing distances, adding to greenhouse gas **emissions**. See pages 24–27.

ISSUE 3

Mediterranean Sea
Uncontrolled fishing is endangering sharks. See pages 16–19.

Fast fact
About one-third of the ice-free land on Earth is used to produce food for people. Of this land, about one-third is used for grazing animals.

ISSUE 2

West Asia and North Africa
Increasing soil degradation is reducing the productivity of farmland. See pages 12–15.

ISSUE 1

Australia
Livestock are damaging natural environments. See pages 8–11.

ISSUE 4

Sub-Saharan Africa
Staple crops are under threat from climate change. See pages 20–23.

ARCTIC OCEAN
Arctic Circle
NORTH AMERICA
Britain
EUROPE
ASIA
Mediterranean Sea
West Asia
North Africa
Sub-Saharan Africa
AFRICA
INDIAN OCEAN
AUSTRALIA

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Environmental costs of food

Producing the amount of food needed by the world's population has begun to damage the environment.

Taking over more land

About one-third of the land on Earth is now used to produce food for people. This means that very little natural environment is left for other living things, and that area continues to decrease. The limited available land restricts the amount of food that can be produced.

Animals in feedlots

Increasingly, animals that are used to produce food are kept in **feedlots**. Animals in feedlots are fed on grains and vegetable crops rather than on grazing land. This has a greater impact on the environment than grazing. It also affects food production. A single cow can eat about 10 kilograms of corn each day. This uses up corn that could be eaten by humans.

Animals raised in feedlots are less healthy than animals that graze on pasture.

Fast fact

In 2006, livestock provided about one-third of the world's protein foods and used about one-third of the world's productive land.

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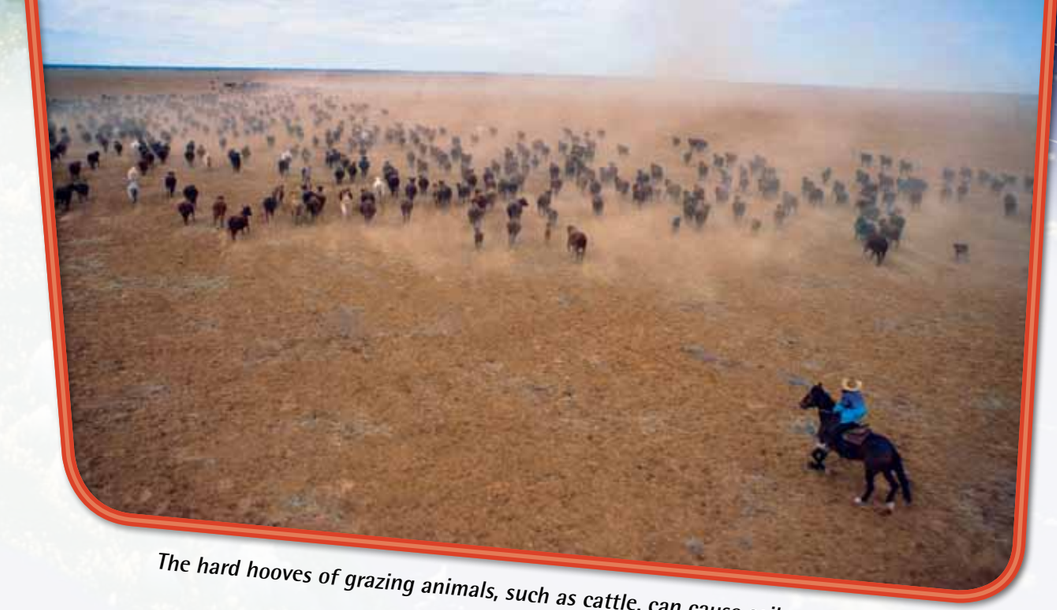

The hard hooves of grazing animals, such as cattle, can cause soil erosion.

CASE STUDY

Grazing and the Australian environment

Meat from grazing animals, such as cattle and sheep, is a good source of food. However, producing it can be very hard on the environment.

Damage to the environment

The Australian environment is easily damaged by sheep and cattle. Native Australian grasses are damaged by the animals' hard hooves. Sheep also eat the grasses down to a much lower point than native animals. This kills the plants and adds to soil erosion, as the plant roots no longer hold the soil in place.

Fast fact

Rabbits were introduced into Australia from Europe in 1858. They have damaged **rangelands** by digging burrows and eating plants that help prevent soil erosion.

Early grazing and overgrazing

Early grazing and overgrazing are also causing problems. Early grazing occurs when animals are grazed on grasses that are very young and easily damaged. Overgrazing occurs when too many animals are grazed on an area of land.

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Towards a sustainable future: Protecting farmland and wilderness

The extent of human activity needs to be controlled in order to keep some areas of land as protected wilderness.

Improved farming practices

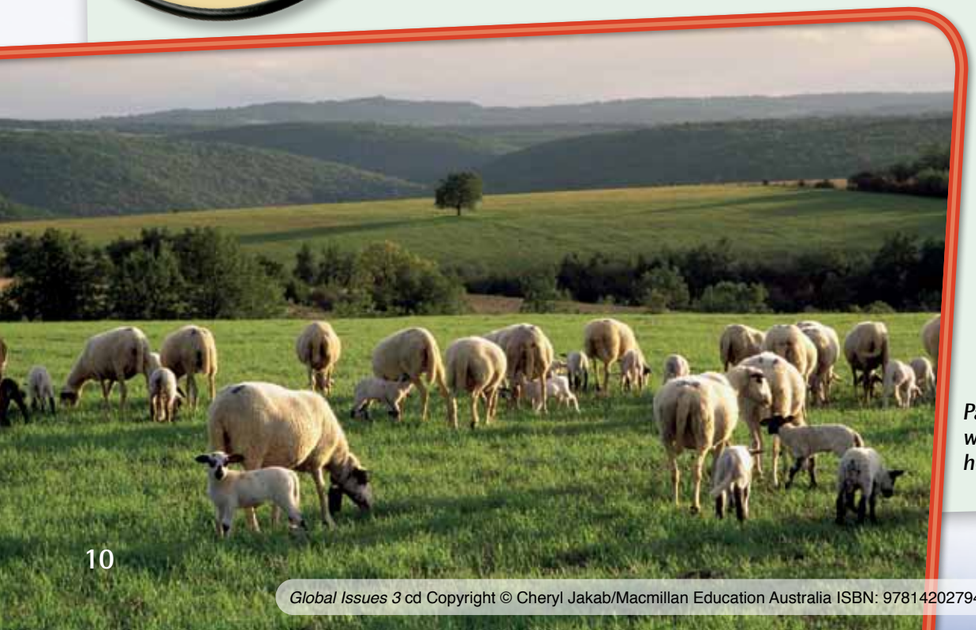
New approaches are being developed to improve farming practices. For example, some farmers are now paid to protect soils and watercourses on their lands. Planting trees achieves all of these aims in many areas.

Fast fact

Mixed farms support a variety of crops and animals. Animals such as goats, sheep and cows can form part of a sustainable system. These animals eat weeds and supply droppings as a natural **fertiliser** for crops.

Sustainable meat production

Meat production needs to be more sustainable to reduce the impacts on the environment. The world's rangelands are already grazed at or beyond their limits. One way to ensure sustainable meat production is to reduce the amount of meat we eat. This would reduce the numbers of grazing animals required.



Pasture that is grazed within its limits can remain healthy and productive.

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Fast fact

Eating mainly vegetable foods can help prevent obesity, heart disease, cancer and many other diseases. It is also better for the environment.

Choosing to eat more vegetables and less meat is better for the environment and you.

CASE STUDY

Plant-based diets

Plant-based diets consist mostly of plant food with less meat. If everyone ate plant-based diets, much less land would be needed for grazing animals.

Food and wilderness

As the Earth's population expands, both adequate food and intact wilderness are needed. Changing food production from animal foods to plant-based foods has many advantages. For example, it reduces the impacts on rangeland environments. Plant-based diets can also be healthier than those based on large servings of meat.

Changing habits

Getting people to change eating habits is not easy. However, education can help people make informed choices. People need to understand how meat-eating threatens **food security** and wilderness areas. People who continue to eat meat can make choices that are better for the environment. This includes limiting the amount of meat they eat and rejecting meat from animals raised in feedlots.

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Decreasing land for crops

Around the world, the amount of land available for growing crops is decreasing. Many food-growing areas that were productive in the past are now degraded or unusable. This is creating a food supply crisis.

Soil degradation

Soil degradation is one of the major reasons for the food supply crisis. Increased use of machinery, artificial fertilisers and irrigation has increased the amount of food produced in many areas. However, in many places it has damaged soils in the process.

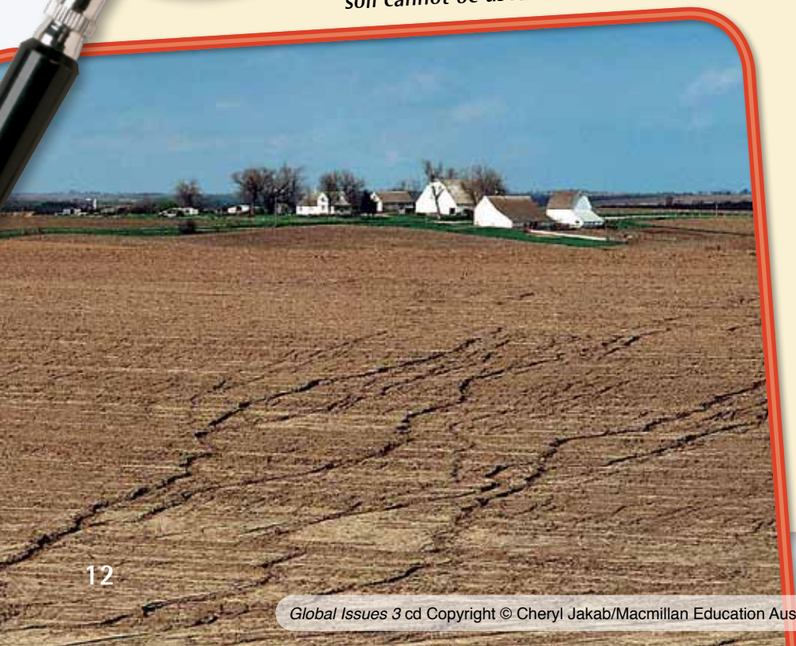
Fast fact

China's grain production decreased by 45 million tonnes between 1998 and 2004. In 2004 China imported 8 million tonnes of grains. In 2008 this increased to nearly 10 million tonnes.

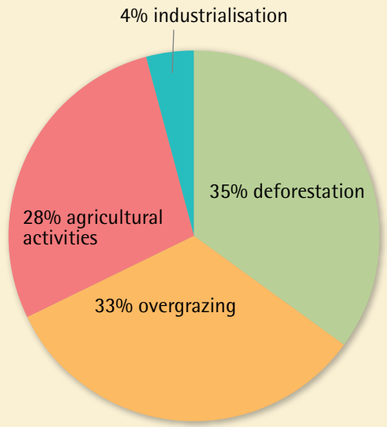
Limits to land

The amount of land available for agriculture has reached its limits. More than half of the cropland in the United States is now used to produce animal feed. An increasing amount is being used to grow **biofuel crops**. This further reduces food crop production.

Many croplands with severely damaged soil cannot be used for farming.



The main causes of soil degradation



The main causes of soil degradation are deforestation and overgrazing.

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Irrigation is needed to provide water for crops in many parts of West Asia and North Africa.

CASE STUDY

Damage due to irrigation

The region of West Asia and North Africa is the single largest dryland area in the world. In dryland areas, rainfall is low. There are few permanent rivers. Much of the West Asia and North Africa region has shallow and infertile soils.

By the 1990s, about 35 per cent of the cropland in the region was **intensively cropped** using irrigation. This has severely degraded the poor soils.

Effects of irrigation

Large-scale irrigation has increased crop production in many areas. However, irrigation and poorly managed drainage also cause problems, such as declining water quality, depleted **aquifers** and increasing **salinity**. Intensive cropping has taken nutrients from the soil, leading to soil degradation. Loss of soil fertility is now widespread.

Fast fact

The region of West Asia and North Africa cannot produce enough food for its population. It must import food for its people to survive.

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Towards a sustainable future: Restoring the land

Restoring the land requires better-managed farming to improve soil.

Improving soils

Lightly degraded soils can be improved by using **crop rotation**. Farmers can also reduce practices that disturb the soil, such as ploughing. Moderately damaged land requires complete changes in farming practices. For example:

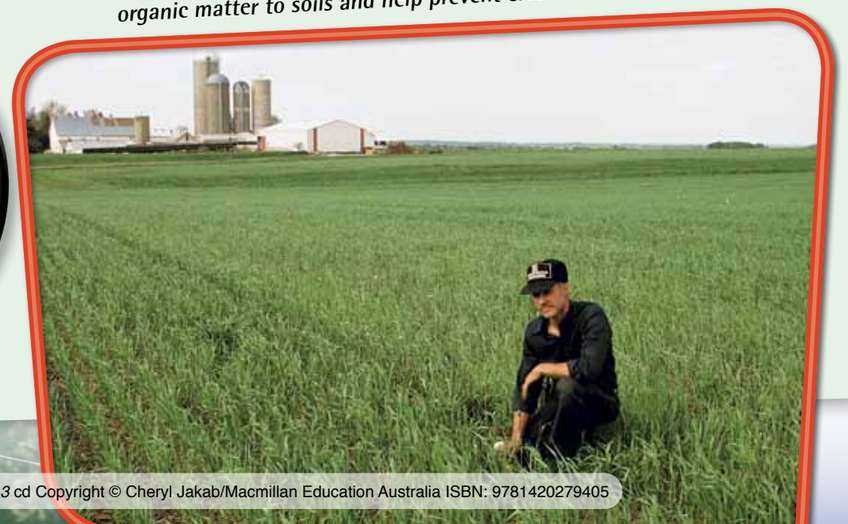
- Planting crops early means soils are left bare for less time. This helps prevent erosion.
- Planting crops across slopes decreases erosion caused by water run-off.
- Planting hedges or trees decreases erosion by sheltering the soil from winds.

Organic matter in soil

One of the main components of fertile soil is **organic matter**. Organic matter can be put back into overworked soils by:

- leaving straw or other plant material on the ground after harvest
- including grasses and **cover crops** in crop rotations
- applying animal manure, **compost** or **sewage** sludge.

Cover crops like this one in the United States can add organic matter to soils and help prevent erosion.



Fast fact

Using crop rotation can increase the amount of food produced on farms. This is because different plants add and remove different nutrients from soils.

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Velvet beans can be used as food, as well as for improving soils.

CASE STUDY

Velvet bean cover crops in Benin

The velvet bean is one of the most popular cover crops used today. Thousands of farmers in Benin, West Africa, use velvet bean crops to control weeds and improve soil fertility.

Bean crops increase fertility by adding nutrients to the soil. These nutrients can be used by other crops as they grow. The higher crop yields allow farmers to sell surplus bags of maize each harvest.

Cover crops

Cover crops are grown after food or commercial crops have been harvested. They hold the soil together and add nutrients. Velvet beans are a good cover crop, as they require very little extra labour. They also help control weeds by pushing out the weed plants.

Fast fact

Velvet bean seeds were first made available to farmers in Benin by the aid agency Sasakawa Africa Association.

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Impacts of over-fishing

Over-fishing has had severe impacts on rivers and ocean systems across the globe.

Increasing fish harvests

Fish harvests in 1950 were about 20 million tonnes worldwide. By 1989 that figure had increased to about 90 million tonnes. Since the 1990s fish harvests have slowed, just keeping up with our population growth.

Current fishing levels and techniques are putting a strain on all marine **ecosystems**. This includes deep-sea fishing that dredges the ocean floor, damaging the ocean habitat.

Bycatch

When commercial fishers catch animals that are not their desired catch, they call those animals bycatch. These unwanted animals are thrown back overboard dead, dying or injured. Using huge, drifting nets to capture ocean fish has been made illegal because these nets collect large numbers of bycatch.

Many sharks are killed when they are caught as bycatch or for the shark-fin industry.

Fast fact

Tens of millions of sharks are killed for their fins every year. Many shark fishers cut the fins off the shark and then throw the shark overboard to die.

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More than 40 per cent of sharks in the Mediterranean are threatened by uncontrolled fishing, including hammerhead sharks.

CASE STUDY

Sharks in danger

Today, many sharks are in danger in the Mediterranean Sea. This is due to uncontrolled fishing. Even critically endangered shark **species** can be caught in Mediterranean waters without controls.

Targeted catch and bycatch

Sharks are now deliberately targeted and caught for food as well as being caught accidentally as bycatch. This has led to over-fishing of sharks. Sharks are particularly vulnerable to over-fishing as they grow and reproduce slowly.

Fast fact

Some species of sharks in the North Atlantic Ocean have decreased as much as 99 per cent in the past 30 years.

Effects on the ecosystem

The disappearance of sharks can have negative effects on the whole marine ecosystem. Sharks eat many species of fish. Removing sharks disrupts the **food web** by allowing the numbers of these fish to rise. This can lead to the disappearance of some species and increased numbers of others as the balance of the ecosystem changes.

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Towards a sustainable future: Sustainable fishing

Sustainable fishing methods help prevent over-fishing. These methods include fish farming and targeted fishing, which does not trap unwanted species as bycatch.

Fish farming

Fish farms raise fish commercially, so that the natural populations are not depleted. Fish farming is a sustainable fishing method. However, it must be managed carefully, as it can lead to disease if done within oceans. It is better to keep farmed fish away from wild fish.

Targeted fishing

Targeted fishing means harvesting seafood and fish in ways that reduce bycatch and do less damage to other sea creatures. Targeted fishing techniques include using pots and traps, hook-and-line fishing and diving. Fishers can also use nets that are designed to target specific schools of fish.

Fish farming is a sustainable fishing method that now supplies almost half the fish we eat.

Fast fact

Deep-sea sharks are targeted for a substance in their livers called squalene, or shark liver oil. This substance is used as an ingredient in cosmetics, including lip gloss.

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The Oceana Ranger is one of the ships Oceana uses to visit and document marine environments.

CASE STUDY

Campaigning for fisheries and oceans

Today, many activists are campaigning to restore fisheries and protect ecosystems in the world's oceans.

Fishery observers

Many activists are calling for fishery observer programs. This involves independent scientists travelling on fishing boats to record what is caught and discarded. This would help researchers calculate the numbers of different species that are taken.

Better management of fisheries

The international conservation group Oceana is campaigning for better management of oceans and shark fisheries. They are encouraging governments to address shark bycatch problems and reduce demand for shark products. International cooperation is needed when animals travel over large areas of habitat, as sharks and whales do. These animals move through oceans belonging to many countries, so their protection needs to be based on international agreements.

Fast fact

Many people across the world think whale harvesting should be completely banned. They see it as unnecessary and cruel.

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Climate change and food

Climate change is predicted to decrease food crop and animal product yields worldwide.

Droughts and climate change

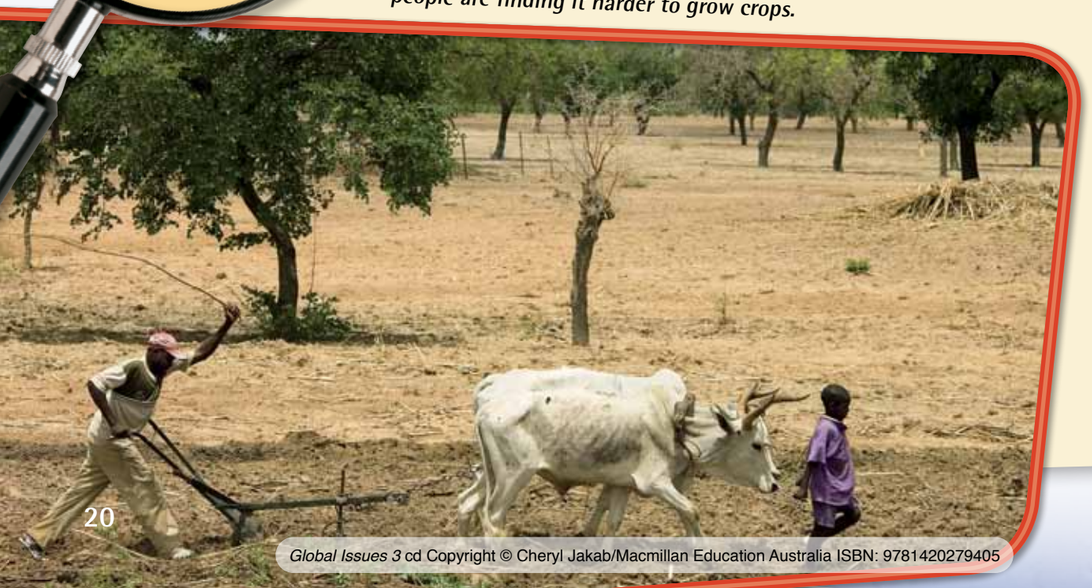
Many droughts are devastating crops across Africa, Central America, Australia and South-East Asia. Scientists believe these droughts are caused by new climate patterns. In South Asia climate change is expected to reduce almost every major crop by 5 to 10 per cent.

Less grain for export

The reduced crops mean that China and India are now exporting less grain. These countries need to make sure their own people have enough to eat. China is also importing grain. The United States and Europe also have smaller stockpiles of grain now than in the recent past. This adds to the problem of reduced crops.

Fast fact
More than three billion people live on two dollars a day or less. They spend up to 70 per cent of their income on food. This means that small rises in food prices can quickly become life-threatening.

Drought has contributed to food shortages in Africa, as people are finding it harder to grow crops.



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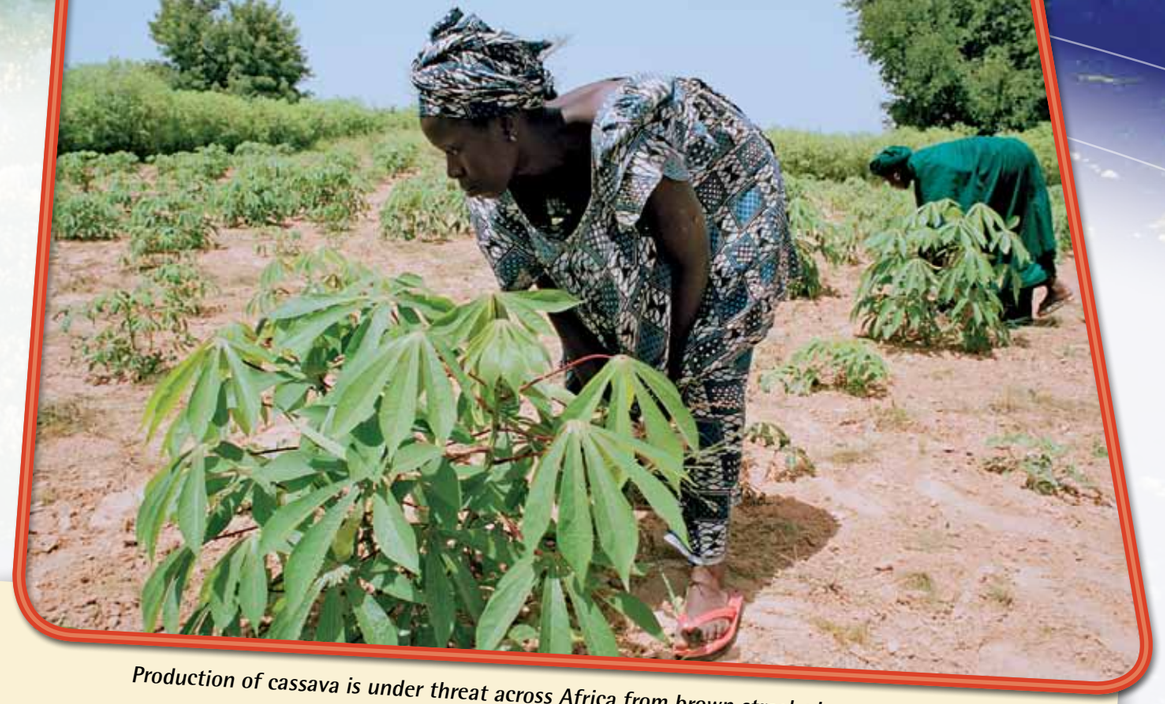

Production of cassava is under threat across Africa from brown streak virus.

CASE STUDY

Cassava crops in sub-Saharan Africa

Cassava is the main **food staple** of many of Africa's poorest people. However, a disease of cassava plants in Tanzania is now spreading to other parts of sub-Saharan Africa.

Providing food during climate change

Cassava is a root vegetable that can grow in poor soil. It also survives droughts better than most crops. This means it can provide food in times of climate change. However, cassava crops are now being damaged by the brown streak virus.

Cassava brown streak virus

The cassava brown streak virus is a disaster for Africa. The disease does not show on the plant as the crop grows. It is only when the farmer comes to harvest that they find there is no crop under the ground. Between 2002 and 2007, cassava production was reduced by up to 80 per cent.

Fast fact
More than five million children a year die of hunger. That is about one child every five seconds.

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Towards a sustainable future: Adapting food production to climate change

Strategies for adapting food production to climate change will vary across the world. They will depend on people's needs, cultures, population and climates. Strategies being developed include:

- growing a wider range of food crops rather than relying on one crop that might fail
- storing seed in case of disasters
- developing crops that resist damage from insects and rice plants that grow on dry land rather than in water
- increasing the eating of insects as an alternative to other animal products
- encouraging heirloom seed-saving networks that preserve less common varieties of seeds.

Sustainable Food and Agriculture Project

The organisation Friends of the Earth is running the Sustainable Food and Agriculture Project. The project includes preserving small mixed farms that provide food for their local area. This can reduce reliance on imported goods.

Fast fact
By 2030, southern Africa could lose more than 30 per cent of its main food crop, maize, due to climate change.

Small-scale mixed farms can add to local food supplies.

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Fast fact
A disease called potato blight killed about half the potato crop in Ireland in the 1840s. It caused up to a million deaths in the Great Potato Famine.

The cold temperatures in Norway will help preserve the seeds in The Global Seed Vault by keeping them frozen.

CASE STUDY

Norway's seed store

On the Norwegian island of Spitsbergen a seed store has been created to prevent extinction of food plant species.

Global Seed Vault

The Global Seed Vault will store seeds of up to 3 million crop varieties. In case of a global catastrophe, such as climate change, these seeds could allow humans to regrow crops. They also help to maintain crop diversity.

Crop diversity

Crop diversity reduces the impact of plant diseases. Most large farms today plant only one type of crop, such as wheat, rice or corn. If some plants become diseased, the infection can easily spread to the whole crop. However, other varieties of the crop may not be affected by the same disease. Saving seed from different varieties helps prevent the extinction of food crops.

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Food miles

The idea of food miles was developed to highlight the impact of food transport on the environment. Exhaust from transport vehicles is adding to greenhouse gas emissions.

Energy for food transport

Food miles describe the energy required for food transport. Food that has been transported long distances can look the same as a local product. However, it can have very different impacts on the environment. For example, trucks used to transport food often burn fossil fuels, resulting in increased greenhouse gas emissions.

Food in developed countries

Most people in **developed countries** have access to almost every food product they can imagine. Much of this food is transported great distances. High prices are paid for out-of-season foods, such as cherries in winter. However, out-of-season foods must be transported from other parts of the world. This adds a large number of food miles.

Fast fact
The average American meal travels about 1500 food miles to get from 'farm to plate'.

The total environmental impact of food includes the energy required for transport.

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Many foods, such as fruits, are transported long distances to reach shops in Britain.

CASE STUDY

Transporting food

In Britain, the amount of food transported by road has increased by 23 per cent in 20 years. On average, the distance the food is transported has increased by 65 per cent.

Changes in food supply

The increase in transport is linked to changes in Britain's food supply. The main change has been an increase in international trade. This allows big supermarkets to provide out-of-season and exotic foods all year round. However, these foods are transported over long distances.

British farmers today could produce 62 per cent of the country's food. However, much of the food they produce is exported. This means even more food is imported. Eighty per cent of the food sold in London is imported from overseas, including apples from New Zealand and meat from Brazil.

Fast fact
Today, each British person makes about 221 trips each year for shopping. These trips have an average length of 6.4 kilometres. They also add to food miles.

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Towards a sustainable future: Increasing local production

Increasing the amount of food grown locally can reduce food miles. It can also help improve food security in cities and towns.

Urban agriculture

Urban agriculture involves growing food in cities and towns. This reduces food miles and reduces people's reliance on distant sources for food. Around 15 per cent of the world's food is now grown in urban areas.

Farming in the city also brings other benefits. These could include making use of the abundant supply of fertiliser in the form of sewage.

Farmer's markets

Locally run farmers' markets are providing local food for more and more people across the world. An estimated billion people in cities worldwide now grow plants to produce food or to sell locally.

Urban farming reduces the need for food transport and helps make cities more pleasant places.

Fast fact

Tim Lang, who developed the idea of food miles, is campaigning for food miles to be shown on all supermarket products. This would let people see how much energy was used to transport the food they buy.

A farmers' market can be a good place to buy foods grown within 100 miles of your home.

CASE STUDY

The 100 mile diet

Alisa Smith and James MacKinnon live in Vancouver, Canada. In 2005 they began buying all their food and drink from places within 100 miles (160 kilometres) of their home. They wanted to move away from the average North American diet. Ingredients in a typical North American meal are transported about 2400 kilometres on average.

Most of the food Smith and MacKinnon ate was grown without artificial fertiliser or pesticides. They prepared all their food themselves. They also preserved fresh food for winter so that they rarely had to buy groceries.

Interest in the 100 mile diet

Many people have started their own versions of the 100 mile diet. Usually people find they eat a wider variety of foods and also eat more fresh foods, particularly vegetables.

Fast fact

The ingredients for a typical British meal travelled 66 times fewer food miles when sourced locally.

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What can you do?

Think global, eat local

Fast fact

In 2008, Natural England supported the Year of Food and Farming in Education in the United Kingdom. This program aimed to give school children contact with farms and promote healthy living.

Buying and eating locally produced food helps local producers as well as the planet. You can make a difference. Whenever possible, look for food that is:

- locally grown
- fresh and in season.

Buy environmentally friendly products

Check food labels to see if the sources are environmentally friendly. For example, you can look for products that are certified as organic. This means the food has been grown without artificial fertiliser or pesticides.

You can also:

- check with your fish supplier to make sure the fish comes from a sustainable source
- reduce meat consumption by eating smaller serves less often
- choose products with the minimum packaging.

The information on food packaging can help you work out how far the food has been transported.

In-season local produce can be preserved and stored for later use.

Learn what is in season

When you eat locally, you eat food that is in season. Fresh fruit has more flavour than fruit that has been refrigerated and transported from far away. Locally produced winter foods, such as pumpkin or cauliflower soup, are good for your health and the environment.

Make use of foods you can grow in the different seasons in your area. You could make a chart of foods that people you know grow for themselves. This can include fruits and nuts grown on trees as well as herbs and vegetables grown in garden beds.

Preserve extra

When seasonal fruits and vegetables are harvested there is often more than you can eat. The surplus can be preserved for storage. If you do not have a garden of your own, local markets are a good source of seasonal produce.

Fast fact

Eating foods from farmers' markets and cooking with fresh produce can be a healthy way of eating. It also helps reduce food miles.

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Towards a sustainable future

Well, I hope you now see that if you take up my challenge your world will be a better place. There are many ways to work towards a sustainable future. Imagine it... a world with:

- a sustainable ecological footprint
- places of natural heritage value protected for the future
- no more environmental pollution
- less greenhouse gas in the air, reducing global warming
- zero waste and efficient use of resources
- a secure food supply for all.

This is what you can achieve if you work together with my natural systems.

We must work together to live sustainably. That will mean a better environment and a better life for all living things on Earth, now and in the future.

Websites

For further information on food supplies, visit the following websites.

- Cyberschoolbus United Nations: Feeding Minds Fighting Hunger www.feedingminds.org/
- Friends of the Earth www.foe.org.au/sustainable-food/
- The International Development Research Centre www.idrc.ca/en/ev-30610-201-1-DO_TOPIC.html
- Oceana www.oceana.org/europe/

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Glossary

aquifers
natural underground chambers that contain water

atmosphere
the layers of gases surrounding the Earth

biofuel crops
crops that are grown to be made into fuels

climate change
changes to the usual weather patterns in an area

compost
organic matter that has decomposed, leaving a rich source of nutrients

cover crops
crops grown to enrich soil and cover it to prevent erosion

crop rotation
growing different crops in an area each season

degraded
run down or reduced to a lower quality

developed countries
countries with industrial development, a strong economy and a high standard of living

ecosystems
all the living and non-living things in an area, and their connections with each other

emissions
substances released into the environment

erosion
the process of rock and soil being carried away by wind and water

feedlots
small areas where farm animals are kept and fed grains and vegetables

fertiliser
a substance added to soil that contains nutrients necessary for plant growth

food security
guarantee of food supply

food staple
the main food eaten by people in an area

food web
the pattern of connections between living things and their food sources

greenhouse gases
gases that help trap heat in Earth's atmosphere

intensively cropped
continuous use of land to produce food, which gradually removes nutrients from soil

organic matter
material from living things

over-fishing
taking too many fish from one area or species, leading to a decrease in numbers

rangelands
broad areas of land used by grazing animals; can be made up of grasslands, forests and scrublands

salinity
increased salt in soils

sewage
human waste

soil fertility
the amount of nutrients available in soils for plant growth

species
living things of the same type that can breed and reproduce

sustainable
does not use more resources than the Earth can regenerate

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