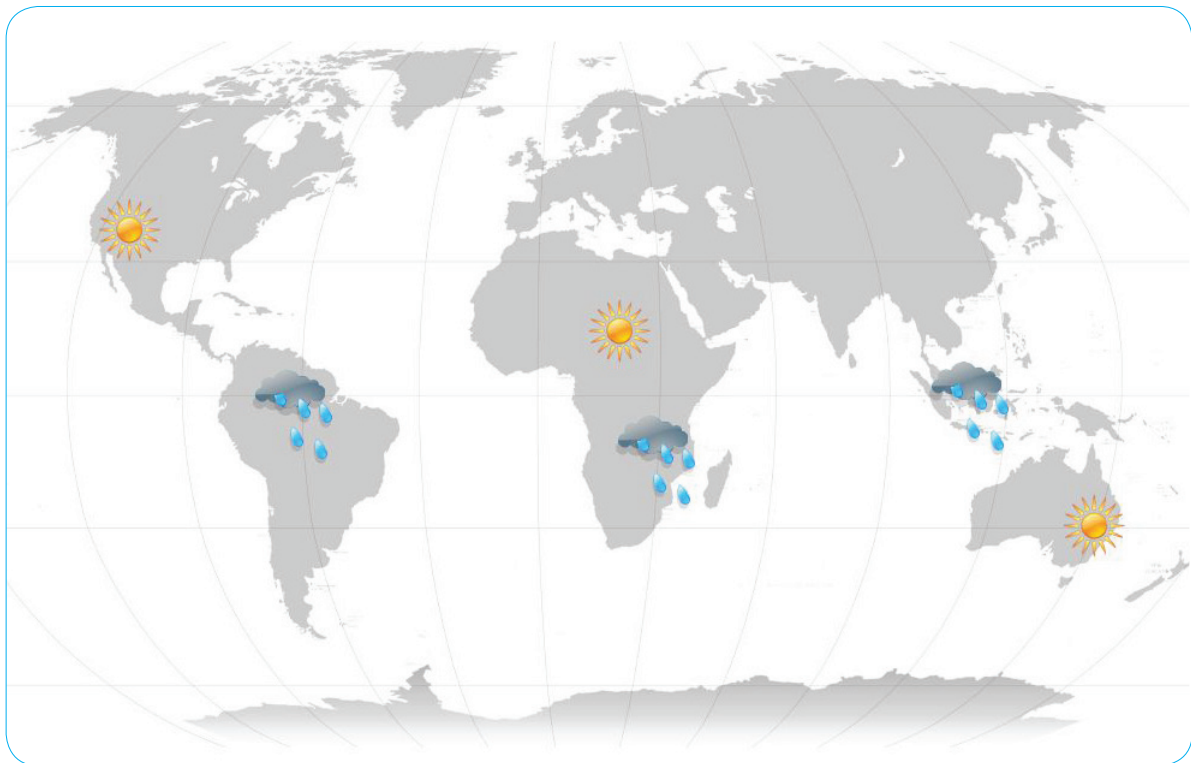




Sheet 6: Biodiversity and food

A / Description of the animation

Biodiversity is essential for feeding human beings and animals. As a result, if climate change affects certain geographical areas, certain impacts are to be expected on the people, animals and plants that live in the region. The effects of these climate changes vary a great deal from one area to another. While drought is a problem affecting Lake Chad, rising water and salt levels are an issue of concern for the Tuvalu Islands. Elsewhere, flora and fauna are seeing their habitats grow scarce, while people living in developing countries are facing the hardest consequences of climate change.



Sheet 6:

Biodiversity and food

B / Let's take a closer look...

By the 2080s, the total number of people to suffer from malnutrition across the world could increase from 50 to 580 million as a result of climate change.

1 / THE IMPACT OF CLIMATE CHANGE ON HUNGER AND POVERTY

Many developing countries depend directly on biodiversity to feed themselves and to survive. For these people, the exploitation of natural resources is a means for revenue, food, medicine, tools, fuel, fodder and building materials. As a result, these poor populations are those to be affected the most by the loss of biodiversity, including that which is lost due to climate change.



In rural areas of Zimbabwe, for example, natural products provide about 37% of a household's total income. In arid areas of India, this figure rises to 57% of the total household income.

2 / FISHING FIRST

Fish stocks which are suitable for fishing depend, amongst other things, on the preservation of ecosystems such as wetlands, mangroves and coral reefs. These environments provide habitats for a variety of species, as well as services and a means of subsistence for the people. Unfortunately, these areas will be affected by the negative climate change effects caused, for example, by rising acid levels in the seawater, the disruption of river currents or the incursion of saltwater into lagoons and estuaries. Combined with winds and storms, the latter two of these extreme occurrences could come to depress productivity in southern Africa by 60%.

Mangroves are tropical trees that grow propped up on aerial roots along the coast. Mangrove is also the name of the habitat formed by these trees. In Vietnam, the planting of 12,000 hectares of mangroves has cost 1.1 million dollars but, in return, has enabled 7,750 families to benefit from the restoration of the mangroves. Selling animals that live in this special ecosystem, such as crabs, prawns and molluscs, has boosted the amount of protein in people's diet and has providing them with an income.

Sheet 6:

Biodiversity and food



Planting these new mangroves also resulted in:

- a savings of 7.8 million dollars which would have otherwise been spent on the maintenance of embankments
- protecting the people from typhoon Wukong in 2000, whereas the neighbouring provinces faced massive damage and loss of life

3 / A DISRUPTED AGRICULTURE

Scientists are predicting major disruptions in the water cycle, due to climate change. The availability of water is, of course, a basic requirement for agriculture: a lack of water makes soil become arid and thus more difficult to cultivate. A rise in temperature of 2°C could reduce rice production between 5 and 12% in China and by 10% in Bangladesh, where wheat harvests could also plummet 30% between now and 2050 .

Whereas Africa is the continent least responsible for climate change (in other words where emissions of greenhouse gases are the lowest), it is the continent to face the most serious consequences. A few examples:

- Between now and 2080, wheat production may well have disappeared entirely;
- Between now and 2050, soy harvests in Egypt

- could drop 30%, while corn production is set to fall “significantly” in southern Africa;
- In Kenya, plantations of mangoes, cashew nuts and coconuts could be subject to a 500 million dollar loss if sea levels were to rise by one metre;
- Plantations of coconuts and palm oil on the coast of Benin and Côte d’Ivoire and shallot crops in Ghana are threatened for the same reason;
- In Guinea, 30% of the rice fields will be threatened by flooding between now and 2050;
- Between now and 2100, this could represent a 90% overall reduction in Africa’s current income from farming.

In addition to its direct impact on the people and their economy, this environmental deterioration is having an even broader effect. The United Nations considers the unprecedented environmental deterioration that exists in Darfur to be one of the main sources of conflict that is ravaging the area. A scientific study confirms this correlation: “Even though farming production is not becoming a problem in developed societies, the reduction of other resources such as freshwater, the availability of farming land, sources of energy and raw materials, could well trigger more armed conflict”. This study sends a warning out to our political leaders, stressing that, in the future, climate change could very well come to evolve into a strategic issue. This explains what prompted the Swedish committee to award the Nobel Peace Prize to the IPCC and Al Gore.

Sheet 6:

Biodiversity and food

C / Group activity to be carried out in class:

A LITTLE GARDENING!

Aims

- To identify the needs of growing crops
- To observe an experiment relating to erosion, flooding and drought
- To imagine the impacts that these occurrences have on crops

Equipment

- 4 terracotta flower pots
- Soil
- Watercress seeds
- Atlases

Timing : 50 minutes in total

Process

Preparation - 5 minutes

- Divide the class into 4 groups and distribute the equipment

Step 1 :

planting: 20 minutes

- Ask each group to fill its flower pot 3/4 high with soil, sow the watercress seeds by sprinkling them on top of the soil and then cover them with 0.5 cm more soil. Place the flower pots in the light close to a window and number them. Water regularly until the cress sprouts 3 leaves.

Step 2 :

for 2 weeks

- Ask group 1 to position its flower pot so that it is in full sunlight (the aim being to allow the soil to dry out)
- Ask group 2 to water its flower pot to such an extent every day that the soil is unable to absorb any more water (to simulate a flood)
- Ask group 3 to place a stone under one end of its flower pot so that it is sloping. Water every 2-3 days, pouring the water quickly and from a certain height as though it were a cloudburst (to simulate erosion caused by heavy rain)
- Ask group 4 to water the cress regularly so that the soil stays reasonably damp at all times (to simulate the conditions of a temperate climate).

Sheet 6:

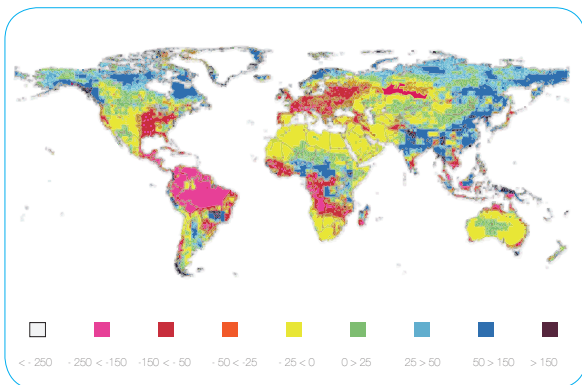
Biodiversity and food

Step 3 :

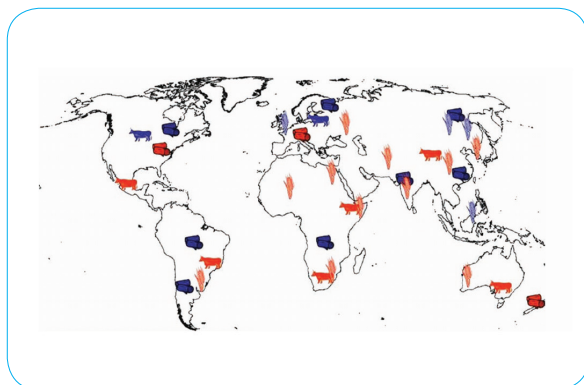
2 weeks later

30 minutes

- Ask each group to look at its crop and to describe the weather conditions that its watercress appears to be living under, then state a country where those conditions exist (use the atlas to help).
- Based on map A showing the possible evolution of run-off water between now and 2050, ask the pupils which regions of the world they would rather live in if they were farmers. Then show them map B forecasting farming results in 2050.
- Ask them whether they think all of Earth's inhabitants are equal in the face of climate change.



Map A shows the evolution of run-off water between now and 2050, compared with the average from 1961 to 1990. The warm colours represent the reduction in mm per year; the cold colours show where the amount of run-off water will rise.



Map B shows the evolution of cereal production, livestock and forestry productivity in 2050. The blue symbols indicate an increase and the red a decrease.

Sheet 6:

Biodiversity and food

D / Resources/ References

- The climate is us, WWF Belgium, 2008.
- This file can be downloaded in pdf format from:
http://www.wwf.be/_media/BookWWFProf_fr_889149.pdf
- Situation 2001 for climate change: Impacts, adaptation and vulnerability, Contribution from Working Group II to the Intergovernmental Panel On Climate Change 3rd Assessment Report, 2001. Available from:
<http://www.ipcc.ch/pub/un/giecgt2.pdf>
- Website about Tuvalu with photos and testimonials:
<http://www.alofatuvalu.tv/>
- Sudan - Post-conflict environmental assessment, United Nations Environment Programme, 2005. Available from:
http://sudanreport.unep.ch/UNEP_Sudan_synthesis_F.pdf
- Database of teaching tools provided by the IDée Network:
<http://www.reseau-idee.be/outils-pedagogiques/>

