

In Depth - The Importance of Biodiversity

Food

We rely heavily upon plants and animals for our food although only a small proportion is used on a large scale. Of the 10-50,000 plants thought to be edible, only about 150 are used as human food. As economies have become more global, humans have concentrated on fewer species; today about 90% of the world's food comes from 15



Combine harvester (Robert Scarth)

species and of those two-thirds comes from only three – wheat, corn and rice. An important reason for conserving biodiversity is the wild plant gene pool, needed to augment the narrow genetic base of these established food crops and provide disease resistance, improved productivity and different environmental tolerances. Similarly, although many kinds of animal are utilised as food, most consumption is focused on a few species. This means there is a vast untapped potential for increasing the range of food products available for human consumption.

Medication

Many drugs are derived from biological sources, particularly plants used in traditional medicine. For example, Peruvian Indians used an extract of the bark of the Cinchona tree to cure malaria. This led to the discovery of quinine as an anti-malarial treatment. Other examples include aspirin which is derived from willow and the heart drug, digitalis, which comes from foxgloves. Relatively few plants have been thoroughly investigated so there are many potential sources of new drugs.



The heart drug digitalis is derived from foxgloves (Kurt Stueber)

Raw materials

Many industrial materials come from biological resources. These include building materials like wood and stone, fibres like cotton and wool, dyes such as indigo (from a plant) and cochineal (from a beetle), rubber and oil. There is enormous untapped potential for sustainably using materials from a wider diversity of organisms.



Rubber tapping in Indonesia (Royal Tropical Institute)

Vital services

Biodiversity provides many services that we take for granted. It plays a part in regulating the chemistry of our atmosphere, through plants using carbon dioxide and producing oxygen, and our water supply. Plants absorb water through their roots and release it through evaporation from their leaves. Sewage is broken down by microbes at our water treatment plants. Vegetation in water catchments regulates and stabilises water run-off and acts as a buffer against extreme events, such as flooding. Biodiversity is also directly involved in recycling nutrients and providing fertile soils. Worms and soil microbes breakdown dead plant and animal matter releasing nutrients back into the soil – the basis of composting. Trees and other vegetation protect the soil from salinisation and leaching of nutrients, prevent landslides and safeguard coastlines and riverbanks from siltation. Bees and other animals pollinate various plants, many of which are of commercial value, for example, approximately one third of the food we eat relies on pollination by bees and they are thought to have an annual commercial value in the UK of about £200 million.



Bees are responsible for pollinating many food plants

Loss of biodiversity is already having a significant economic cost. The Economics of Ecosystems and Biodiversity (TEEB) – an EU commissioned study – has already shown that forest decline alone is costing between US \$2 trillion and \$5 trillion annually – about 7% of global GDP. It works on the principle that as forests decline, nature stops providing services which it used to provide, essentially for free. So the human economy has to provide them instead or we have to do without. Either way there is a financial cost¹.

Income

Biodiversity supports jobs and incomes in conservation management, attracting visitors and new market options for farmers and landowners, all helping to sustain local economies. This can be particularly important in some rural areas where there are limited alternative employment opportunities. A study for the Department of Environment Food and Rural Affairs (DEFRA) established that activities that contribute to the management of the natural environment or depend on a high quality environment support 299,000 full time equivalent jobs in England and a gross value added of £7.6 billion annually². A similar study for the Countryside Council for Wales identified 117,000 full time equivalent jobs – roughly 12% of total employment in Wales – supported through the management, use and appreciation of the natural environment annually³.

Much of our tourism is dependent on a rich biodiversity as it is the beauty of the landscape and its associated wildlife that draws many visitors. A visitor survey carried out by the National Trust for the whole of Wales showed that well over half of all holiday trips to Wales are motivated by the environment and that it is also an attraction for many others coming on business or to visit relatives.

Pleasure

Wildlife is worth conserving simply because of the pleasure it gives us. It, and the landscapes it is part of, is beautiful, spectacular and intriguing. Many people enjoy walking, cycling or horse riding in the countryside, others like bird watching and many more watch natural history programmes on television. Biodiversity has provided inspiration for myriad artists, such as musicians, painters, sculptors, writers, poets and photographers as well as biologists, naturalists and explorers.



Caption: enjoying the Denbighshire countryside

Health and well-being

The natural environment has long been recognised as an important factor in boosting people's health and well-being. It encourages people to get outside, exercise and relax and inspires spiritual well-being in many people. A study published in *The Lancet* in early 2009 has also shown that green spaces can cut the health gap between rich and poor. In general, people living in poorer areas are more likely to be unhealthy and die earlier, due to a range of reasons relating to income and social deprivation. However, researchers from two Scottish universities found that living near parks, woodland or other open spaces helped reduce these inequalities, regardless of social class⁴.

Combating climate change

Whilst biodiversity is affected by climate change it also plays a role in mitigating the effects of it. Marine algae, woodlands and soils (particularly peatlands) all act as effective carbon sinks, removing harmful CO₂ from the atmosphere. It can also reduce the effects of increased flooding and dissipate wave energy – events that may well increase with a changing climate.

Future options

We do not know what all of our needs will be in the future, or what the human race will value as important in hundreds of years time. We have barely begun to discover the medicinal qualities of the plants on Earth and may not yet be aware of all the life supporting services biodiversity provides us with. One of the main reasons for preserving biological diversity is so that we, and all the other species on the planet, can adapt to unforeseen changing circumstances. By allowing species to become extinct and destroying ecosystems we are cutting off options that we do not yet know exist or are needed.

1 – Sukhdev, P. (Study Leader) (2008) *The Economics of Ecosystems & Biodiversity: An Interim Report*. European Communities 2008. Welzel & Hardt, Wesseling, Germany.

2 – GHK Consulting & GFA – Race (2004) *Revealing the Value of the Natural Environment in England*. Report for Defra.

3 – Bilsborough & Hill (2003) *Valuing our Environment: The Economic Impact of the Environment of Wales*. Technical Summary. CCW.

4 – Mitchell, R. & Popham, F. (2008) *Effect of Exposure to Natural Environment on Health Inequalities: An Observational Population Study*. *The Lancet* **372**: 1655 – 1660.