

CHURCHES TOGETHER IN CUMBRIA ENVIRONMENT GROUP

Biodiversity: Caring for a Diverse Creation

Abstract

‘Biodiversity’ is jargon for the total biological variety of life on Earth. It is a measure of the richness of God’s living creation and the result of several billion years of evolution. In the past there were at least five major ‘extinction events’ due to natural catastrophes, and it took millions of years for evolution to restore diversity. Today, human actions are causing a sixth extinction spasm which threatens not only to erode the global gene pool and reduce the resilience of global ecosystems, but also to endanger the human life support system. Stopping this process is an essential component of creation care, and a Christian obligation.

Theology

God’s love for all that he made and saw was good is affirmed in Scripture¹. “Ever since the creation of the world, his eternal power and divine nature, invisible though they are, have been understood and seen through the things he has made².” Respect for the natural world features strongly in the Franciscan tradition, which seeks to foster and understand the processes of life that form God’s creation. The command to humanity to ‘exercise dominion’ over the natural world³, rightly understood, is a call to exercise caring stewardship according to God’s covenant with every living creature⁴. Humans, as part of God’s creation, share a common origin with all other species and are linked to them and to the planet itself in an intricate web of life. God has made us, with him, responsible for shaping the future of the creation on Earth. Our task is to hand on to future generations a world where they may live in peace, surrounded by its rich and diverse beauty, caring for it as God’s children should⁵. Yet although we have developed a morality for humanity against homicide, suicide and genocide, we have not yet developed a parallel morality against the destruction of species other than our own, or the devastation of the Earth as a habitat for life.

Biodiversity and Evolution

Biodiversity or biological diversity is the full variety of life on Earth. It includes all species - bacteria, fungi, all kinds of plant and all kinds of animal, the human species among them. It includes all the ecosystems which these species compose. Species and ecosystems occur within the biosphere - the narrow zone between the upper atmosphere and the lower limits of existence in the abyssal seas and the deepest caves.

Evolution is the continuing process by which all life forms have been created. It is driven by continuing genetic change, so that offspring differ from one another and from their

¹ Genesis 1,v 31.

² Romans, 1, v20

³ Genesis 1, v26

⁴ Genesis, 9,vv 9,10

⁵ The three preceding sentences come from ‘God, Nature and Climate Change’, a statement by the Christian Churches of Cumbria.

parents, and by natural selection which favours the survival of those best suited to their environment. As Darwin wrote, creation is always leading towards perfection. As a result 98% of all the species that have lived on earth are now extinct, being replaced by others more suited to today's conditions. The more diverse life is the more certainty that there will be species able to survive natural disasters and evolve into a variety of new forms afterwards.

The geological record shows that the Earth suffered at least five episodes of mass extinction, around 440, 365, 290, 210 and 65 million years ago. In the greatest of these events, possibly due to climate change caused by a massive outpouring of carbon dioxide in a huge series of volcanic eruptions, 95% of all life was lost. Many scientists believe that the most recent event, in the late Cretaceous period, was caused by a small asteroid hitting the Earth at the Yucatan Peninsula. The dust thrown into the upper air shut out the sunlight, creating a cold twilight that lasted for many months, if not years and caused the extinction of over 60% of species including large marine and terrestrial dinosaurs.

A common characteristic of all these mass extinctions is that it took millions of years for evolution to restore the Earth's biodiversity. Following the late Cretaceous episode birds (descendants of one branch of the dinosaurs) and mammals (also descended from reptiles) became dominant and have remained so. About 100,000 years ago there were probably more species on Earth than ever before. Even today, it is estimated that there are 13-14 million species of which scientists have only identified about 1.75 million. The insects are the most numerous group, and the greatest diversity on land is found in tropical rainforests and in the sea in coral reef ecosystems, but there is great diversity even in commonplace habitats like soil where thousands of species may occur in the small compass of a few cubic metres.

The rise of humanity

Some people have named the epoch in which we live the Anthropocene – the age of humanity. *Homo sapiens* is now the dominant species on Earth. Like all other species we depend on the natural processes of the planet, but we have diverted nearly 40% of primary production by green plants on land to our use and that of our livestock – or have destroyed it by pollution, desertification and land use changes. This transformation, based on human skill and insight, is one expression of our natural quest for greater security and a higher quality of life. It has been the basis for the vast escalation in human numbers over recent centuries. Where the transformation has been done well, it has created beautiful and sustainable habitats – such as 'England's green and pleasant land'.

However, the transformation has not always been done well. The destruction of tropical rain forests and the expansion of deserts are also consequences of human dominance. The space available for other life forms has been reduced, and the result is a new 'extinction event'. It is estimated that human activity is now extinguishing at least ten thousand species annually – which is a thousand times, or even ten thousand times the natural rate of loss. Projections suggest that a quarter of all species may disappear within the next two or three decades. As our impact widens, the resilience of nature is reduced.

The current extinction spasm.

Human impact on nature is a consequence both of the growth in our numbers and the ever-increasing consumption of natural resources in our quest for a higher standard of living⁶. The world human population has risen from 1.5 billion in 1900 to 6.6 billion in 2006, and United Nations projections are of a rise to over 9 billion before stability is reached around the end of the century. Today humanity is destroying other species in four main ways:

- **Over-harvesting** of wild species, especially by marine fisheries (some of which are destroying coral reefs), and over-use of the soils so that the fertility declines, often through erosion or salt accumulation, and desertification results.
- **Habitat** destruction, especially through forest clearance, the drainage of wetlands, the intensification of agriculture and sprawling urbanization. Often this is an understandable consequence of the need of mounting populations for new land to cultivate, but many species have a highly restricted distribution and a specialised habitat and cannot move to new areas when their habitats are eliminated.
- **Translocation** of species by human action. When people move plants or animals to new environments they commonly invade, out-compete or prey on the native species leading to ecological transformations and extinctions. They may also bring diseases with them to which the native species have no resistance.
- **Pollution**, whether local (such as deoxygenation of streams by sewage or farm run off), regional (such as destruction of fish stocks by acid rain) or global (such as damage to stratospheric ozone by industrial chemicals and climate change resulting from rising atmospheric concentrations of carbon dioxide, methane and other greenhouse gases released by human agency). Climate change is now recognised as a severe threat to biodiversity world wide

All these, usually in combination, have led to huge changes in biodiversity in many countries. Changes in habitat, and especially farming practice, underlie the decline of 28% of plant species, 70% of butterfly species and 54% of bird species in the UK. Losses of tropical forests are projected to eliminate between 2% and 25% of various plant and animal groups over the next 25 years. The species being lost have intrinsic worth as part of God's creation, and some may also have direct value to humanity. Wild plants are the source of many medicines and if they are destroyed before their worth can be assessed, all humanity loses. Wild relatives of crop plants are also being lost, and some of these contain genes which breeders could use to improve cultivated varieties.

The solutions

Because many losses of biodiversity are the side-effect of actions that seek to meet pressing human needs, solutions have to balance the interests of people and the needs of nature, and those of present and future generations. In the long term, stabilisation of human numbers and the achievement of sustainable rates of natural resource use are imperative. Many ecologists consider that the optimum world human population is

⁶ See CTiC Environment Group papers on Human Population in Harmony with the Environment and The Modern Economy: Growth and Sustainability.

around 3 billion and that it will be impossible to end poverty and give everyone a decent, sustainable, quality of life unless numbers are stabilised and then reduced. However, competitiveness is a deeply-rooted human attribute and it will not be easy to determine which communities should become smaller. And as long as economics champions endless growth it will be hard to get people to equate sustainability with stability.

The pressures on global biodiversity result from actions that are human nature, but there is also clear evidence that informed ethical behaviour is a human attribute. We need to articulate and establish a new environmental ethic - to 'respect and care for the community of life' – as a guide to a sustainable world in which a decent quality of human life is achieved whilst the natural environment is salvaged and restored.

The good news is that progress is already being made in many places and nations. Religious people and humanists alike are taking on the conservation ethic. Practical steps have already been articulated. The key actions to conserve biodiversity have been set out: they include:

- Surveys and research, mapping Earth's biodiversity and improving understanding of evolutionary history and ecological processes;
- Halting the wasteful destruction of the world's forests, especially in key tropical countries, and restore degraded habitats;
- Ensuring that where wild resources are harvested, this is done sustainably and to the benefit of local communities;
- Developing new systems of sustainable agriculture, forestry and fishery;
- Establishing a comprehensive system of protected areas, in the sea as well as on land;
- Conserving key species in gene banks, botanic gardens, zoos and reserves;
- Taking urgent action to minimise climate change and its effects;
- Implementing the World Conservation Strategies of 1980 and 1991 and making effective use of the UN Convention on Biological Diversity adopted in 1992.

There are now many conservation organisations with global influence. IUCN: The World Conservation Union brings together Governments, Government Agencies and Non Governmental Organisations and is closely linked to WWF, the World Wide Fund for Nature and UNEP, the United Nations Environment Programme, established in 1972. These three organisations have produced two World Conservation Strategies. . The Convention on Biological Diversity, signed by 154 nations at Rio Janeiro in 1992 provides a global action framework.

At national level, most governments now have Environment Departments and conservation programmes. Many, including the UK, have developed Biodiversity Action Plans and these also exist at county level. In Cumbria, a special effort is being made to create a 'living landscape' with a network of habitats that look after our life-support systems and give wildlife the space to move around. Bodies like the Nature Conservancy and Conservation International in the USA and RSPB in UK are actively deploying funds for sustainable development, species survival and the creation of protected areas. High-

profile threatened species such as tigers, giant pandas and Californian condors are supported by special programmes, often with captive breeding to back up protection in the wild. In Cumbria, red squirrel sanctuaries are being established and water voles bred in captivity are being re-introduced to suitable habitats.

Conclusion

In the past, many people have taken the view that human needs must come first and all other life forms are subordinate to people. This anthropocentric attitude, which is often justified by a mis-reading of scripture, leads to over-exploitation and mass extinction. It is at variance with the Christian duty of responsible stewardship.

Others have accepted that human rights and the rights of nature need to be sustained, side by side. While this is correct, it can obscure the fact that humanity depends on the natural world for its very survival. For example, the fertility of the soil depends on myriad micro-organisms within it, while green plants maintain the oxygen in the air and are at the base of all food chains including our own. We need to adopt a holistic approach, or we will not value our own life support systems properly. And if we are to enable the world's poor to achieve a decent and sustainable standard of living, current over-consumption in the developed world will need to be curbed, scientific knowledge must be shared, and equitable trading patterns for natural resources developed.

Science and Christian belief alike teach that human beings are part of nature, even if a very special one. The whole of his creation must be precious to God who saw that it was good from the beginning. Humans have a responsibility to care for the natural world, as priests and stewards of creation, making sure that in satisfying our needs we do not corrupt natural systems or threaten the lives of future generations. We need to call for a world where natural resources are used wisely and natural processes and biodiversity are sustained. We need to accept that this will demand some hard choices in terms of human action, including human reproduction. It will also mean applying the ethic of care to the new powers that biological science will certainly place at our disposal – including power to shape the course of human genetic evolution and to greatly prolong the life of at least some human individuals. But doing nothing is not an option. The challenges are immense but must be faced with prayer, insight and commitment to the God of love and his beautiful creation.

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