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Biodiversity

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Biodiversity – Living Nature

Humanity has rarely faced a challenge as significant as ensuring the survival of our species through the sustainable use of the living world of which we are a part. Ever since humans mastered fire, invented tools, and discovered agriculture, nature has been viewed as a source of strength and growth on which we depend.

Today we call nature “biodiversity”, the complex web of life on earth. Human beings, animals, plants and micro-organisms are all part of this web of life. However we are currently witnessing a steady loss of biodiversity. Climate change, the exploitation of natural resources and pollution are just some of the factors that place biodiversity at risk.

How can we construct our future in such a way as to maximise human well-being in the long term? Certainly it must involve establishing a sustainable and mutually beneficial relationship between human requirements and the capacity of the living world to fulfil them.

Sometimes damage is caused because our knowledge is imperfect, and leads to a use of nature that cannot be sustained. Sometimes, however, our knowledge may be sufficient to permit a reasoned response but other considerations make such a response impossible. Since human well-being is so closely tied to our relationships with the living world, the interests of individuals, groups and societies with respect to nature often clash. As a result, conflicts frequently arise due to opposing values, beliefs and behaviours related to nature, or from an imbalance between costs and benefits of our relationship with – or exploitation of – nature.

Research Priorities

The understanding, conservation, and sustainable use of biodiversity are fundamental for societies today and for the well-being of future generations. Since nature and society are interlinked, research on biodiversity and on our dependency on what nature provides (sometimes referred to as ecosystem services) requires a simultaneous assessment of social, economic and ecological issues. This in turn frequently requires innovative trans-disciplinary approaches.

The EU’s Seventh Research Programme (FP7) supports research on a broad range of biodiversity including marine, forestry and freshwater. It aims to strengthen research on biodiversity cooperation in Europe and worldwide. It tries to create knowledge networks to help policy makers and economic operators.

FP7 funds projects which explore and assess the dynamics of ecosystems and changes in biodiversity with greater accuracy. Overall actions to slow or stop the loss of biodiversity are not all equally effective. Improved understanding of the reasons for relative success or failure must be part of any adaptive management. Therefore research on how biodiversity is governed and how policy it is formulated is also a key element. Research at present focuses on **integrating information, understanding trade-offs** and **securing conservation measures**.



Integrating information

Approximately 50% of freshwater supplies are used for human consumption. As the population grows, demand will inevitably increase. Scientists and ecosystem managers have collected vast amounts of data on freshwater biodiversity but what is lacking is comprehensive information on the status, trends and pressures affecting freshwater biodiversity.

The existing data from freshwater studies are widely dispersed, gathered in locally-managed databases, many of which are not publicly available. In summary, the pieces of the global freshwater biodiversity puzzle are scattered, and it is difficult even to find them.



Connecting local communities to the ecosystem: TESS

*European citizens make countless local environmental decisions every day, from planting a new crop to building a shopping centre. However, local land managers often lack the support of computer models to predict how these decisions will impact biodiversity. In turn, national officials need local data to understand the broader health of European ecosystems. The project **TESS**, examines ways to exchange biodiversity data between local communities and central governments so that ecosystems can be managed and sustainably used to support local populations. The project developed a web portal www.naturalliance.eu available in 20 languages that offers best practice examples and support tools, such as free mapping software for anyone to map areas and species in their local environment.*

The EU funded project **BioFresh** is working on a portal that will provide the user with access to an integrated set of data on freshwater biodiversity. This access will allow scientists all over the world to answer questions that could have been answered before only with extreme difficulty – because the data were too scattered. This new availability of information might for example be used to establish or improve plans for conservation; or for a better understanding of the services provided by aquatic ecosystems; or for detecting the spread of invasive species, among many other practical applications.

The project is working to improve the availability of data and to increase the capacity of managers throughout Europe to protect and manage freshwater biodiversity. To do this, it seeks out databases that have remained hidden from view, in particular databases that might fill gaps in geographic or thematic knowledge. And it is not only interested in biological or ecological data. One of the main drivers of biodiversity loss and ecosystem change is humans' activities and their consequences. It makes sense, therefore, to include socio-economic and other relevant data.

BioFresh is also about the future. One of its goals is to ensure that researchers will use these newly-linked data to predict changes in biodiversity under a range of management interventions, conservation policies, and climate change trajectories. BioFresh is building an unprecedented global information tool for all those who make decisions affecting freshwater biodiversity – and for all those who just want to know more about it.

Understanding trade-offs

Life on earth, biodiversity, is a web of interconnected ecosystems. Humans, animals and all other living organisms have a unique relationship with one another. Together they appropriate a significant proportion of planetary photosynthesis, half of the available fresh water, and a significant proportion of land. To understand and resolve conflict over rival potential uses of biodiversity it is necessary to assess the social, cultural, economic, and ecological functions, as well as their impacts.

Understanding biodiversity-related conflict and its causes is crucially important since dealing with conflict effectively is often – perhaps always – a key step in slowing the loss of biodiversity.

Since sustainable management practices frequently involve conflict resolution, it is easy to see that developing those practices require an approach that integrates social and natural sciences. While theory may help, success depends profoundly on knowledge that is based on experience.

One set of extremely diverging values involve human attitudes towards killing animals, particularly when those animals are killed not for food but for sport.

The EU funded project **HUNT** examines what influences value systems and how these value systems underpin attitudes to hunting; how these attitudes influence and determine individual and societal behaviour in hunting; and finally, how this hunting behaviour influences biodiversity.

To achieve this, HUNT investigated the meanings that various social groups attribute to hunting, sampling societies from a variety of places as diverse as Scotland and Ethiopia. It examined institutional arrangements and the economic importance of hunting, harvesting strategies and their sustainability as well as the impact on various aspects of biodiversity. While considering all these elements it also looked into conflicts surrounding hunting and developed ways to reconcile the stakeholders in the conflicts.

HUNT shed an important and useful light not only on ways to reconcile conflicts between people over hunting practices, but ways to handle conflicts in many aspects in the relationship between humans and the rest of nature.



Conflicting demands of land use and soil biodiversity

*Soil biodiversity is vital for our existence because it provides us with food and clean water. Yet most land is used for intensive food, feed and biofuel production, which reduces the quality of soil biodiversity. The project **Soil Service** tries to examine how economic drivers will change current and future use of soil ecosystems and how these drivers affect diversity and sustainability of agricultural soils. The project has shown that by taking measures to preserve soil biodiversity, ecosystem services such as control of greenhouse gases, retention of soil nutrients and resistance to pests are maintained. Encouraging sustainable farming techniques will ensure the permanence of carbon in soil. This is needed to ensure soil health as well as biodiversity. A healthy soil means that harvest yields will increase and farmers will profit.*

Securing conservation measures

Loss of biodiversity can occur as a result of climate change, intensive land use, conversion or destruction of habitats and by humans making it possible for non-native species to establish themselves and become nuisances.



The relative importance of these drivers of biodiversity change depends on the scale at which they are observed. For example, urbanisation on the margins of a settlement in the Arctic might be overwhelmingly significant for local biodiversity, while for climate change largely irrelevant. At the scale of the Arctic, however, urbanisation's impact on biodiversity pales into insignificance relative to the melting of the icecap.

Each of these factors acts at characteristic scales. Scale matters not just to ecology but also with respect to social and economic expectations and demands. It influences governance related to the living world, science and the design of experiments, and many other factors. In order to manage the living world effectively, we need to gain a better understanding of how scale influences nature and our interaction with it, and how processes interact across scales.



On the level: Scales

*The EU-funded **Scales** project looks at ways to develop this understanding in order to make better decisions possible. It seeks to investigate the extent to which policy and management can ever be independent of scale, and where scale is an important issue, find ways in which policy and management can be better adapted to accommodate scale.*

To do this it will work out how appropriate information can be made available at appropriate scales, and develop and evaluate methods for upscaling and downscaling this information where possible.

Project List

BESAFE – Biodiversity and Ecosystem Services: Arguments for our future Environment
www.besafe-project.net

BIODIVERSA2 – Cooperation and shared strategies for biodiversity research programmes in Europe
www.biodiversa.org

BioFresh – Biodiversity of Freshwater Ecosystems: Status, Trends, Pressures and Conservation Priorities
www.freshwaterbiodiversity.eu/index.php/index.html

BIOMOT – MOTivational strength of ecosystem services and alternative ways to express the value of BIOdiversity
www.biomotivation.eu

CAREX – Coordination Action for Research Activities on Life in Extreme Environments
www.carex-eu.org

CONGRESS – Conservation Genetic Resources for Effective Species Survival
www.congressgenetics.eu

EBONE – European Biodiversity Observation Network; a project to design and test a biodiversity observation system integrated in time and space
www.ebone.wur.nl/UK

EcoFINDERS – Ecological Function and Biodiversity Indicators in European Soils
<http://ecofinders.dmu.dk/>

EELIAD – European Eels in the Atlantic: Assessment of Their Decline
www.eeliad.com

FORCE – Future of Reefs in a Changing Environment: An ecosystem approach to managing Caribbean coral reefs in the face of climate change
<http://www.force-project.eu/>

ForResTTraC – Forest ecosystem genomics Research: supportTing Transatlantic Cooperation
www.foresttrac.eu

FunDivEUROPE – Functional significance of forest biodiversity in Europe

ECOADAPT
www.ecoadapt.eu

GREENSEAS – Development of global plankton data base and model system for eco-climate early warning
www.greenseas.eu

HUNT – Hunting for Sustainability
<http://fp7hunt.net/>

KNEU – Developing a knowledge network for European expertise on biodiversity and ecosystem services to inform policy making economic sectors
www.biodiversityknowledge.eu

LIFEWATCH – E-Science European Infrastructure for Biodiversity and Ecosystem Research
<http://lifewatch.unisalento.it/web/guest/home>

LiveDiverse – Sustainable Livelihoods and Biodiversity in Riparian Areas in Developing Countries
www.livediverse.eu

MEECE – Marine Ecosystem Evolution in a Changing Environment
www.meece.eu

MICROB3 – Marine Microbial Biodiversity, Bioinformatics and Biotechnology
www.microb3.eu

ODEMM – Options for Delivering Ecosystem-Based Marine Management
www.liv.ac.uk/odemmm

PALMS – Palm harvest impacts in tropical forests
www.fp7-palms.org

PESI – A Pan-European Species-directories Infrastructure
www.eu-nomen.eu/portal

POLICYMIX – Assessing the role of economic instruments in policy mixes for ecosystem services and biodiversity conservation
<http://policymix.nina.no>

ROBIN – Role Of Biodiversity In climate change mitigation
<http://robinproject.info/home>

SALSEA-MERGE – Advancing understanding of Atlantic Salmon at Sea: Merging Genetics and Ecology to resolve Stock-specific Migration and Distribution patterns
www.nasco.int/sas/salseamerge.htm

SCALES – Securing the Conservation of biodiversity across Administrative Levels and spatial, temporal, and Ecological Scales
www.scales-project.net

SOILSERVICE – Conflicting demands of land use, soil biodiversity and the sustainable delivery of ecosystem goods and services in Europe
www4.lu.se/o.o.i.s/26761

SPIRAL – Science Policy Interface for Biodiversity: research, action and learning
www.spiral-project.eu

STEP – Status and Trends of European Pollinators
www.step-project.net

TESS – Transactional Environmental Support System
www.tess-project.eu

VECTORS – Vectors of Change in Oceans and Seas Marine Life, Impact on Economic Sectors
www.marine-vectors.eu

Humanity has rarely faced a challenge as significant as ensuring the survival of our species through the sustainable use of the living world of which we are a part. Ever since humans mastered fire, invented tools, and discovered agriculture, nature has been viewed as a source of strength and growth on which we depend. The EU's Seventh Framework Programme supports research and innovation based solutions at transnational and international level.

Research and Innovation policy

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