



Exploring future biodiversity in a changing climate

New research describes how biodiversity might be affected in four 'future worlds' that are based on the Intergovernmental Panel on Climate Change (IPCC) special report on emissions scenarios (SRES)¹. In the report the future of the planet is explored through four scenarios of human development, a key aspect of which is change in land-use. The new study suggests a reduction in biodiversity, even if environmentally-friendly approaches to development are adopted.

A healthy environment is indicated by the variety of plants and animals living there. This biodiversity is fundamental to maintain ecosystems and human well-being. The main cause of loss of biodiversity is a change in natural habitats due to intensive agriculture, industry, urbanisation, overexploitation of natural resources, pollution and global climate change. The EU's 2001 strategy for sustainable development² aims to prevent biodiversity loss and restore habitats by 2010.

EU-funded research³ explored the likely impact of changing human activities on biodiversity. The study focused on four taxonomic groups (plants, birds, mammals and herptiles⁴) and sought to model the effects of different land use and climate change scenarios on biodiversity. The four scenarios were characterised by:

- fossil fuels use, rapid economic growth and introduction of efficient technologies (called global economic-A1F1)
- an emphasis on local traditions, high population growth and low concern for economic development (called regional economic-A2)
- global solutions for environmental and social sustainability, increased use of 'clean technologies' such as wind and solar power (called global economic-B1)
- local, rather than global solutions to economic, social and environmental sustainability (called regional environmental-B2)

In all four scenarios, decreasing the amount of land use for crops would reduce the impacts on biodiversity. Increases in urbanisation (due to population growth and economic change) were similar for each scenario, but the distribution of urban development would be very different. Surprisingly, low-impact development (B2) was found to have the greatest increase in urban pressure on biodiversity at local levels, due to the development of numerous small human settlements. Conversely, in the A1F1 scenario, greater climate change related impacts on biodiversity would be expected. However, the prediction of less urbanisation of the countryside would reduce the impact on biodiversity in these areas.

Integration of predicted land-use and human activity is a new approach to modelling future effects of climate change on biodiversity. This approach could help policy-makers devise strategies to conserve habitats and species. The next stage is to refine the models to include responses of specific species to climate and land-use change and to provide tailored solutions for each region across Europe within the wider context of global development.

1. <http://www.ipcc.ch/pdf/special-reports/spm/sres-en.pdf> a description of possible scenarios of human development up to 2050.
2. The strategy for sustainable development <http://ec.europa.eu/environment/eussd/> is part of the EC's drive to protect Biodiversity <http://www.eea.europa.eu/themes/biodiversity/policy-context>
3. Research funded by the European Commission's 6th Framework Programme for Assessing Large-Scale Environmental Risks with tested methods and MACIS: Minimisation of and adaptation to climate change: Impacts on biodiversity.
4. Herptiles is a term for Reptiles and Amphibians.

Source: Araujo, M.B., Nogues-Bravo, D., Reginster, I. *et al.* (2008). Exposure of European biodiversity to changes in human-induced pressures. *Environmental Science and Policy* 11: 38-45.

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