The **RUBICODE** Project

Rationalising Biodiversity Conservation in Dynamic Ecosystems

Newsletter N°6, September 2009

Ecosystem Services and Biodiversity Conservation: Knowledge gaps and roadmap for future research

Introduction

Scientific and public interest in ecosystem services has increased greatly since the Millennium Ecosystem Assessment (MA) demonstrated the importance of ecosystem services for human well-being and the threats facing biodiversity and the services it provides. However, despite the popularity of the ecosystem service approach in the academic world, it has rarely been implemented in decision support systems for biodiversity conservation and needs to be developed into a more practical and transparent framework in order to be useful for decision-makers. One key step in achieving this knowledge transfer between the scientific and policy communities, and the development of effective conservation policies, is improvement of the evidence base.

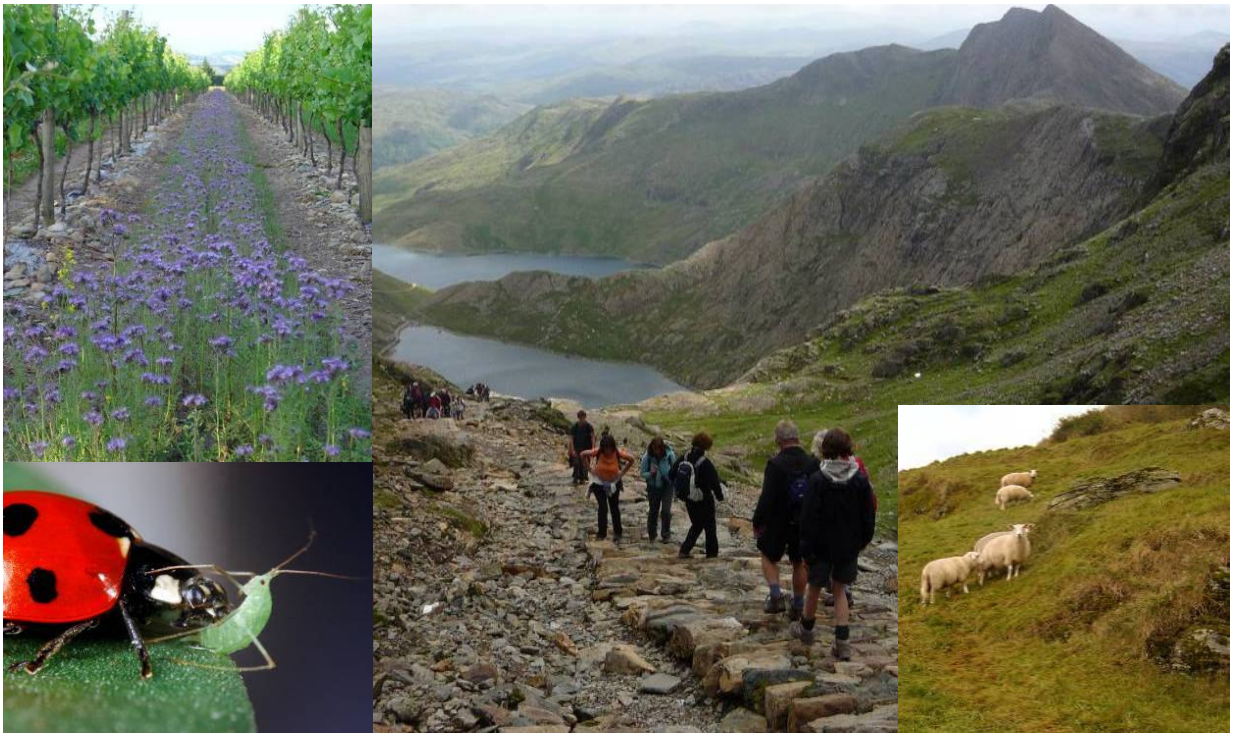
The roadmap

Following discussions with a wide range of scientists and stakeholders during workshops and conferences, a roadmap for future research was developed during the RUBICODE project. The aim of this roadmap is to build on the framework provided by the Millennium Ecosystem Assessment and increase current scientific efforts to understand and maintain ecosystem services for human well-being. Areas for future research identified in the roadmap are listed below:

- Although it is now widely recognised that ecosystems services play a key role in the conservation and sustainable use of natural resources, much remains to be understood in terms of how ecosystem services are provided and the factors influencing the provision of ecosystem services. Research is particularly needed regarding the quantification of the role of biodiversity, including uncharismatic and speciose groups of organisms such as invertebrates, lower plants and fungi, in ecosystem function and service provision. In addition, research is needed to develop methodologies and tools for ecosystem service assessment, such as the development of trait-based approaches to ecosystem service assessment and the development of improved methods for the integrated assessment of multiple ecosystem services at different spatial and temporal scales.

- What is also known is that despite the important role of biodiversity in providing essential ecosystem services, biodiversity is increasingly being threatened by fast-paced global change, mostly due to anthropogenic drivers such as land use change, pollution, and climate change. It is essential for continued human well-being to understand how various drivers are affecting ecosystem services and to develop tools to predict how these changes might affect the provision of ecosystem services in the future. Future research should therefore focus on identifying and quantifying the impact of direct and indirect socio-economic and environmental drivers on ecosystem services, and develop tools to design and evaluate policy options for ecosystem service management under uncertain futures. In particular, it is essential to develop an "early warning system" for biodiversity and identify thresholds in the relationships between biodiversity, ecosystem functioning, ecosystem services and human well-being to identify points beyond which the level of ecosystem service delivery changes dramatically and perhaps irreversibly.

- The valuation of ecosystem services is essential in terms of communicating the importance of these services and developing effective policy tools. Although methodologies for the valuation of ecosystem services exist, there is a real need for more research to develop an improved classification for ecosystem services and values that avoids double-counting or under-counting of services, and standardises reporting practices. Such a classification should include values of flows of ecosystem services and stocks of ecosystem assets and allows for the distinction between final and intermediate services. There is also a clear need to enhance the usefulness of value, price and cost estimates for ecosystem services by: (i) improving database coverage, quality, depth and access; (ii) filling key gaps in valuation evidence; (iii) investigating replication, validity and transfer of functional assumptions and values estimates; and (iv) developing agreed protocols for comparing and transferring value estimates.



- To incorporate effectively an ecosystem services approach into policy, it is essential that any research on ecosystem services be closely linked with the context in which it is embedded. To achieve this, it is essential to carry out research on the links between governance, public perceptions and attitudes, planning and communication. Research should in particular focus on understanding the role of the cultural, economic and policy contexts in ecosystem service assessment, particularly in the choice of: (i) metrics, valuation and appraisal methods; (ii) stakeholder involvement; (iii) required levels of precision; and (iv) policy instruments and decision support tools. Research on governance and institutional contexts should contribute to the development of tools, methods and decision-support systems to assist the multi-level governance of ecosystem services.

- Generally, a more holistic and integrated approach needs to be developed to integrate conservation into sectoral policy (e.g. agriculture, transport, industry, etc) and rural development outside existing protected area networks. To achieve this will require taking account of different scales of perception (e.g. human versus other organisms) in maintaining landscape heterogeneity and in monitoring and reacting to changes in service provision levels and ecosystem dynamics. Businesses also have an increasing interest in ecosystem service management. Tools and methods are needed to help engage business stakeholders, appraise business opportunities, analyse trade-offs between different management options, evaluate incentives for ecosystem service management, and explore externalities.

The roadmap developed within the RUBICODE project aims to identify the research requirements needed for the integration of an ecosystem services approach into policy and is intended to help research funding organisations, donors and research planning institutions to focus future research. Building this evidence base will require the development and continuation of institutional and trans-disciplinary cooperation and will lead to greater knowledge transfer between the scientific and policy communities, with the aim of developing and implementing effective conservation policy across Europe.

Other project activities

The RUBICODE project officially finished on 31 August 2009. Nine reviews related to ecosystem service assessment on concepts, drivers, indicators, functional traits, values, habitat management strategies and conservation policy are available to download on the "Outputs" page of the project website, together with other project outputs.

We are currently refining a colour brochure summarising the main outcomes from the project, which will be placed on the website in October. We are also preparing a special journal issue of *Biodiversity and Conservation*, which describes detailed results from the project in a series of ten peer-reviewed papers.

Further information on the work described in this newsletter can be obtained from Allan Watt (adw@ceh.ac.uk) or Christian Anton (Christian.Anton@ufz.de). The full report on the roadmap for future research is available on the project website.

Further information on the project in general can be obtained from the Project Co-ordinator: Paula Harrison (paharriso@aol.com).

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