The Millennium Ecosystem Assessment and its relevance for Germany

Executive Summary
of the study by the UFZ Centre for Environmental Research Leipzig-Halle in the Helmholtz Assocation

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This study provides a summary analysis of the concepts and results of the Millennium Ecosystem Assesment (MA) and their relevance for Germany. Part I of the study introduces the MA-concept and the Assessment's main global findings. Part II reviews the MA results for specific topics, addressing, in particular, their relevance for Germany. Reported ecosystem statuses and trends and associated policy response options outlined in the MA, are considered and discussed in the context of existing policy measures within Germany. Finally Part III discusses integrated, cross-sectoral response options and draws conclusions and recommendations informed by a German perspective.

The MA is the currently largest study on status and trends of the ecosystems of the world. It was initiated by the United Nations in 2001 and compiles the expertise of the over 1350 scientists from 95 countries, and was developed over four years in a continuous review-process. The MA is explicitly designed as a tool for policy advice and builds on existing knowledge, rather than new analyses. It addresses the status and trends of the planet's ecosystems and their services over the last 50 years and discusses possible future developments by elaborating a range of possible scenarios running over the next 50 years. On this basis the MA develops and discusses response options for future policy design in a variety of different fields.

The MA focuses in its analysis on the services that ecosystems provide for human well-being. Thus the MA puts the field of environmental protection and nature conservation into a new context and assigns a high relevance for humankind to the conservation of biological diversity on all levels. Ecosystem services are defined by the MA as goods and services that are provided by ecosystems to humans, such as food and fibre, clean drinking water, and the regulation of climate and abatement of natural hazards. Within this concept, the trade-offs between different ecosystem services – e.g. provision of food versus provision of drinking water and the conservation of biodiversity – are at the centre of the discussion. Additionally it becomes obvious that the severity of gains and losses of ecosystem services appear to be differentiated by scale (global, national, local).

Main Findings from the MA
(source: MA General Synthesis Report 2005, p.1)

1.) Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber, and fuel. This has resulted in a substantial and largely irreversible loss in the diversity of life on Earth.

2.) The changes that have been made to ecosystems have contributed to substantial net gains in human well-being and economic development, but these gains have been achieved at growing costs in the form of the degradation of many ecosystem services, increased risks of nonlinear changes, and the exacerbation of poverty for some groups of people. These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems.

3.) The degradation of ecosystem services could grow significantly worse during the first half of this century and is a barrier to achieving the Millennium Development Goals.

4.) The challenge of reversing the degradation of ecosystems while meeting increasing demands for their services can be partially met under some scenarios that the MA has considered, but these involve significant changes in policies, institutions, and practices that are not currently under way. Many options exist to conserve or enhance specific ecosystem services in ways that reduce negative trade-offs or that provide positive synergies with other ecosystem services.

The MA outlines numerous response options. In addition to presenting central messages on status and trends for the ecosystems and their services, the MA also considers 74 policy response options and related instruments relating to the most important fields of ecosystem services and with regard to the sustainable use and conservation of biodiversity. Legal and institutional instruments, as well as economic, technological and cognitive approaches are discussed.

In contrast to the general degradation of ecosystems and their services at the global scale (as stated by the MA), the situation in Germany appears less dramatic. Nevertheless, principles and measures are still urgently needed in German environmental policy, that can safeguard the future provision of ecosystem services: in particular measures addressing the ubiquitous emissions of CO_2, nitrates and other pollutants.
The loss of ecosystem services in Germany can be anticipated to be less dramatic in many service areas as opposed to the global scale, e.g. in food production or provision of drinking water. This is based on the higher stability of central European ecosystems against changes, but also on existing measures in

environmental and nature protection, which already address some major issues outlined in the MA. For some ecosystem services, threats might nevertheless be more pronounced in Germany than in other regions, e.g. the danger of groundwater pollution and the deposition of pollutants into freshwater ecosystems. Additionally, complexes of different services are heavily affected by changes and by a lack of integrated measures, e.g. freshwater-wetland systems and their role for water provision, maintenance of biological diversity and flood regulation under changing climate regimes.
Specific challenges can also be seen in ubiquitous environmental stresses, especially the heavy nutrient loading in all ecosystem components (from agriculture and transport), and the mitigation and adaptation pressures of climate change, which is expected to be a main driver of future changes. The conservation of biological diversity needs to be addressed as central issue across different policy fields, acknowledging its integrative role for ecosystem service protection.

Additionally the consequences of resource use in Germany on ecosystem services in other parts of the world should be a major topic in the future. In provisioning (e.g., shrimp and soy bean production) or regulating services (e.g., climate regulation), the satisfaction of needs in Germany depends more and more on ecosystem services from other regions of the world. The consequences of such activities and their feedbacks must be considered more directly in the future.

There is an urgent need for stronger development and implementation of integrated measures across policy fields and governmental levels. Habitat change, nutrient emissions and climate change are the major direct drivers of the changes in ecosystems. Indirect drivers (e.g., economic and technological developments and population growth) are the foundation of these pressures. In particular, agriculture, transport, energy production and infrastructure development play major roles in this context within central Europe. Thus, the development of integrated measures must be stressed in order to bring the preservation of ecosystem services into clearer focus. The increased role of interactions between different services and the increased danger of accelerated changes in these systems must be included in future actions.

Knowledge about ecosystem services and their role for human well-being has to be increased. Existing knowledge regarding status and trends in the world's ecosystems and their services, their role for societies, and their interplay with direct and indirect drivers of change is incomplete, because its integrative examination is still under development. Further, ambitious and applied research efforts are thus needed to increase the knowledge base for policy development. These should be combined with a better collection of data on ecosystem services, produced through monitoring measures, in order to safeguard the provision of ecosystem services for human well-being into the future.

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