

Executive Summary

The Millennium Ecosystem Assessment (MA) was called for by the United Nations Secretary-General Kofi Annan in 2000. Initiated in 2001, the objective of the MA was to assess the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems and their contribution to human well-being. The MA has involved the work of more than 1,360 experts worldwide. Their findings, contained in five technical volumes and six synthesis reports, provide a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide (such as clean water, food, forest products, flood control, and natural resources) and the options to restore, conserve or enhance the sustainable use of ecosystems.

The bottom line of the MA findings was that human actions are depleting Earth's natural capital, putting such strain on the environment that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted. At the same time, the assessment shows that with appropriate actions it is possible to reverse the degradation of many ecosystem services over the next 50 years, but the changes in policy and practice required are substantial and not currently underway.

The United Nations Environment Programme (UNEP), as part of the GEF procedures, initiated an independent valuation of the MA which was completed in September 2006. In addition, the United Kingdom's Environmental Audit Committee of the House of Commons undertook an evaluation of the MA and published its results in 2007. Both evaluations reported that the MA's technical objective of assessing the capacity of ecosystems to support human well-being proved both innovative and far-reaching. Thus, the MA emphasis on ecosystem services and their significance for human well-being is widely recognized as having made a major contribution to linking biodiversity conservation with poverty alleviation.

However, the evaluations also concluded that there was little evidence so far that the MA has had a significant direct impact on policy formulation and decision-making, especially in developing countries. In addition, in certain areas, the MA failed to provide the hoped for synthesis, since the scientific knowledge was lacking.

The key sponsors of the MA, including ICSU, UNESCO and UNU, identified a need for a coordinated approach in taking the MA findings forward to maximize its impact on the scientific and policy communities. A strategy was prepared by a MA Follow-up Advisory Group, which was intended to guide the follow-up activities undertaken by the organizations involved in the MA follow-up process in a coordinated and coherent manner to maximize its impact. As part of this strategy, ICSU, UNESCO and UNU offered to help strengthen the knowledge base for ecosystem change and human well-being by identifying those gaps in scientific understanding that has impacted negatively on the conduct of the MA. The sponsors hope that new scientific research will be stimulated so that when a new scientific assessment of biodiversity, ecosystem services and human well-being is conducted, a much firmer base can be provided through efforts to research the interface between biological and social systems.

The current report outlines the gaps in scientific knowledge identified by a group of experts appointed by the ICSU, UNESCO and UNU. The identified research gaps relate to how humans influence ecosystems and their services. This area of research has been carried out for quite some time, but it should be complemented by studies to further investigate the links between biodiversity and ecosystem services.

How changes in ecosystems and their services affect human well-being is a new area of research and much still needs to be done. This includes better methods for economic valuation of ecosystem services. It is also essential to better understand how various ecosystem services are linked and affect each other.

Poverty is central for the global community to address the UN Millennium Development Goals. Although we know that poverty can be exacerbated through changes in ecosystems and their services,

there is not sufficient understanding of what constitutes human well-being and poverty and how this is linked to ecosystem services.

It is important to improve the predictive capabilities, through for example modelling, to assess direct and indirect drivers of ecosystem change and to further elucidate non-linear and abrupt changes. The report also addresses how human actions can affect changes in a positive way including the need for adequate management through appropriate institutions and partnerships.

In order to conduct international, comparative research and assessments, there is a need for monitoring of key variable so that changes over time can be documented. The report addresses the data needs and stresses the importance of monitoring both natural and socio-economic variables. Although many international efforts, such as the Global Earth Observation System of Systems (GEOSS) exist, few efforts are underway to collect geo-referenced socio-economic data and a new set of variables describing ecosystem services must also be added to global monitoring systems.

It is important that mechanisms are developed to ensure that the science agenda can be developed in a participatory manner involving relevant stakeholders as well as ensuring that platforms for dialogue exist to ensure that scientific knowledge can inform decision- and policy-making.

The report proposes the development on a new 10-year research programme with a mission to foster coordinated research to understand the dynamic relationship between humans and ecosystems. There will be a regional focus with a few research sites, where multidisciplinary teams of scientists will undertake research guided by a common protocol within the context of the MA conceptual framework. At the global scale, focus will be on global drivers of change in ecosystem services and the implications of such change on multiple scales bridging the global and the local/regional scales. This work should be conducted in collaboration with other partners, such as the global change research programmes and the Earth System Science Partnership (ESSP). The UNESCO Man and the Biosphere Reserves and the International Long-Term Ecological Research sites could provide suitable research sites for the endeavour.

A red thread running through the report is the need for strengthened collaboration between natural and social scientists, involving also health and technological disciplines. Thus, the new initiative must ensure an outreach to the young generation of scientists to convince them of the importance of addressing the crucial issues identified by the MA.