



United Nations
Educational, Scientific and
Cultural Organization

Natural
Sciences
Sector

UNESCO science

for Sustainable Development

ECOLOGICAL SCIENCES

Ecological sciences for sustainable development

INTERNATIONAL COOPERATION FOR RESEARCH, MONITORING,
EDUCATION AND CAPACITY BUILDING FOR AN INTEGRATED
ECOLOGICAL APPROACH TO SUSTAINABILITY

Background and description

UNESCO's work in the ecological sciences aims to advance the goals of sustainable development by the:

- Collation and creation of knowledge and its use in the improvement of the sustainability of human-environment interactions and relationships;
- Promotion of innovation in linking ecological knowledge to policies for the conservation and sustainable use of biodiversity;
- Identification, testing and strengthening of principles and practices that concurrently improve human well-being, minimize biodiversity loss and mitigate and promote adaptation to the consequences of climate change.

The main vehicle for UNESCO's work in the ecological sciences is the flagship Man and the Biosphere Programme (MAB) which was launched in 1971 as an intergovernmental and interdisciplinary initiative. The biosphere reserve concept including its societal aspects was developed initially in 1974 and MAB's work over the years has refined the concept's relevance to sustainable development. The biosphere concept was substantially revised in 1995 with the adoption by the UNESCO General Conference of the Seville Strategy and the Statutory Framework of the World Network of Biosphere Reserves.

UNESCO's work in the ecological sciences is advanced through building extensive networks and partnerships within the context of the WNBR, as well as MAB ecosystem themes with a variety of public and private institutions, to generate and promote exchange of information and knowledge and to contribute to international efforts in environmental assessment and monitoring.

Capacity building, training and education initiatives in the environmental sciences both in the formal educational systems and for the general public are actively promoted.

The WNBR is a unique asset both for UNESCO and the wider UN system to experiment, monitor and assess how humans can address and resolve the growing number of environmental and development challenges including climate change, biodiversity loss and green development.



MAIN PROGRAMMES AND ACTIVITIES

1. Man and the Biosphere Programme (MAB)

The MAB programme, an intergovernmental interdisciplinary scientific programme with distinct governing bodies, aims through the use of scientific as well as traditional knowledge of indigenous and local communities, to promote sustainable development and human well-being. Key elements include the conservation of biological diversity, economic and social improvement in human well-being and respect for cultural values. Sub-programmes and activities focus on specific ecosystems: mountains, drylands, tropical forests, urban systems, wetlands and island and coastal ecosystems. Interdisciplinary and cross-sectoral collaboration, research and capacity-building are promoted. To address today's global challenges including climate change, biodiversity loss and rapid urbanization, the Madrid Action Plan (MAP) was adopted by the International Coordinating Council of the MAB Programme and the Third World Congress on Biosphere Reserves in 2008 setting out the MAB programme agenda from 2008 to 2013. The MAB Programme anchors its interdisciplinary work at the local level, through the sites included in the World Network of Biosphere Reserves (WNBR).

2. The World Network of Biosphere Reserves (WNBR)

Through the WNBR – around 550 sites in 107 countries – biosphere reserves share their experience

and ideas nationally, regionally and internationally. They are sites, under national authority, recognized under UNESCO's MAB Programme, which innovate and demonstrate approaches to conservation and sustainable development. Biosphere reserves aim to bear witness to, and to find local solutions to global environmental challenges. They are learning sites for sustainable development – complex land/seascape areas with a mosaic of natural and human-influenced ecosystems where application of sustainable development principles builds on collaboration between scientists, decision-makers, resource management practitioners, local communities and other stakeholders. Each biosphere reserve presents specific ecological, socio-economic, cultural and political contexts to articulate research and capacity-building agendas and strengthen learning and practice of sustainable development alternatives through multi-stakeholder dialogue and participatory decision-making.

3. Networks and Partnerships for Sustainability

Building international, regional, sub-regional and ecosystem-specific networking is a key feature of the MAB programme. Mechanisms include the establishment of transboundary and twinned biosphere reserves, MAB National Committees, and regional and subregional networks to exchange information and experience. Ecosystem specific networks on mountains, coastal zones and small islands, and MAB research, capacity-building and educational projects in marine ecosystems, forests, drylands, urban areas, wetlands and agro-ecosystems provide, for example, valuable insights into sustainable development models and climate change mitigation and adaptation possibilities. South-South cooperation brings together institutions in the Amazon, Congo Basin and Southeast Asia regions to build capacity for sustainable development in the humid tropics.

Partnerships with public institutions, in particular with other UN organizations and programmes, and the private sector are also

promoted to harness the ecological sciences for the benefit of society and for biodiversity. Significant contributions are made to global multi-author assessment reports on the environment such as the Millennium Ecosystem Assessment (MEA), and the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD).

4. Education, Training and Capacity building

The MAB programme contributes to global efforts for education and capacity building, particularly within the framework of the UN Decade of Education for Sustainable Development (2005-2014). Activities include the MAB Young Scientists Award Scheme, the UNESCO Chairs and UNITWIN networks relating to sustainable development, the Regional School on Integrated Management of Tropical Forests and Territories (ERAIFT as the French acronym of the School is known) and the production of educational material in the environmental sciences, such as the *Education Kit on Combating Desertification*. To specifically target policy-makers, a series of policy briefs on environmental issues is being produced in collaboration with SCOPE and UNEP.

5. Biosphere reserves take action on climate change

The MAB programme is committed to building and maintaining the climate-change knowledge base through science, assessment, monitoring and early warning and promotes innovative mitigation and adaptation strategies to climate change challenges including through education and remote sensing applications. Biosphere reserves can demonstrate site-specific adaptation strategies, and can provide experimental land/seascape spaces for a mosaic of carbon sequestration, renewable energy, biodiversity conservation and tourism-driven economic and social opportunities for local communities. Capacity can be built for low-carbon economies by a mix of technology- and

labour-based social enterprises providing a context where the political, cultural and ethical dimensions of changing lifestyles can be explored.

6. Biodiversity-from science to policy via culture and education

Activities aim to contribute to local, national and international efforts to reduce the current rate of biodiversity loss through interdisciplinary approaches combining science, culture, education, and communication to support multilateral environmental agreements, including the Convention on Biological Diversity. Advancing knowledge, setting standards and ethical frameworks, explaining links between cultural and biological diversity and building capacity for efficient biodiversity governance are the key elements.

MAB promotes capacity-building in, and international cooperation on, biodiversity research, monitoring and assessment; builds bridges between natural and social sciences; brings biodiversity science into policy-making; and applies new and traditional knowledge to biodiversity management. Development of more sustainable consumption and production patterns are fostered.

UNESCO is a key partner with the Secretariat of the Convention on Biological Diversity (CBD) in the implementation of the International Year of Biodiversity (2010) which aims to increase awareness of the importance of biodiversity for human well-being, halt the current trends in biodiversity loss, celebrate success stories, and integrate biodiversity issues into responses to climate change, sustainable resource management, poverty reduction and the promotion of cultural diversity.

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