



United Nations
Educational, Scientific and
Cultural Organization

Natural
Sciences
Sector

UNESCO science

for Sustainable
Development

BASIC AND ENGINEERING SCIENCES

*Knowledge in the Basic Sciences and its Applications
– the Key to Innovation and Sustainable Development*

INTERNATIONAL COOPERATION, RESEARCH, EDUCATION AND
CAPACITY BUILDING IN THE BASIC SCIENCES WITH A SPECIAL
EMPHASIS ON AFRICA AND GENDER ISSUES: APPLICATIONS TO
ENGINEERING, RENEWABLE ENERGY AND NATURAL DISASTER
PREVENTION

Background and description

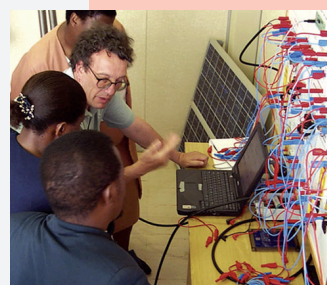
UNESCO is the only UN specialized agency with a clear mandate to build institutional and human capacity in the basic and engineering sciences, a prerequisite for social and economic development. In the basic sciences, UNESCO's activities focus principally on third-level, but also second-level education and on research in mathematics, physics, chemistry, biology, biotechnology and basic medical sciences. The Programme aims to advance, transfer, share and disseminate scientific knowledge and to transform this basic scientific know-how into useful applications.

Programmes prioritize Africa and gender equality and include applications to engineering, renewable energy, and natural disaster reduction, critical for science-based sustainable development and the achievement of the Millennium Development Goals (MDGs).

Activities backstop other issue-driven scientific and environmental programmes in the Natural Sciences Sector. The Programme is empowered through solid internal and external partnerships, among other, with the International Council of Science (ICSU) and its Scientific Unions, and with the World Federation of Engineering Organizations (WFEO).

The Programme was instrumental in creating, and is presently coordinating the activities of the UNESCO Intersectoral Platform on Science Education, a unique interdisciplinary platform uniting the natural and social and human sciences, education, culture and communication contributing to a multidisciplinary and innovative approach to science education.

A unique UNESCO-L'Oréal partnership *For Women in Science*, coordinated by the Basic and Engineering Sciences Programme, forms a core of UNESCO national and international activities to foster gender equality and equity in science.



MAIN PROGRAMMES AND ACTIVITIES

1. International Basic Sciences Programme (IBSP)

Since 2005, IBSP harnesses international cooperation for human and institutional capacity building in the basic sciences and science education. This includes scientific networking, transfer and sharing of scientific information and excellence in science through North-South and South-South cooperation. Its also aims to promote the creation and/or strengthening of centres of excellence, the provision of scientific expertise for, and advice to, policy- and decision-makers, and to increase public awareness of opportunities offered by the basic sciences for meeting societal goals.

Examples of UNESCO's IBSP activities:

SESAME – Synchrotron Light for Experimental Science and Applications in the Middle East

This is a synchrotron radiation facility promoting scientific cooperation and solidarity in the Middle East. It aims to harness synchrotron light for research in the physical, biological and chemical sciences including applications in health care, the environment and cultural heritage.

Global Microsciences Experiments project

This is an international, cost effective, environmentally-friendly project to develop science education and scientific thinking through practical experimentation at the primary and secondary school levels; mini-laboratories (microscience kits) with proposed

experiments on physics, chemistry and biology have been distributed, so far, in over 80 countries.

International Year of Chemistry 2011

To highlight the contribution of chemistry to multiple aspects of society, to celebrate the 100th anniversary of the Nobel Prize for chemistry awarded to Marie Curie and the foundation of the International Association of Chemical Societies and to encourage young people and women into careers in science and chemistry, the international community will celebrate the UN-declared International Year of Chemistry with a series of innovative activities.

UNESCO-l'Oréal partnership

For Women in Science-awards, national and international fellowships

A highly successful UNESCO-L'Oréal partnership to promote women in science -awards, international and national fellowships to harness the intellectual and creative potential of women for science and to encourage women in careers in science

Network of UNESCO Chairs 'Women, Science, Technology for Development'

A network of university Chairs to help build capacity of women in the field of science and technology with emphasis on sustainable water resource management

Biotechnology

Initiatives and activities in plant, marine and microbial biotechnology to disseminate knowledge, to strengthen research capacity, in particular through centres of excellence including Microbial Resource Centres (MIRCEN) and Biotechnology Education and Training Centres (BETCENS)

Programmes also facilitate access to peer-reviewed journals in least developed countries.

2. Science and Technology Education and Technical Capacity Building Programme

Fosters the quality of third-level science and technology education in developing countries and reinforces the linkages

between university education and other educational levels including:

- ▶ building capacity in the basic sciences within the framework of the IBSP;
- ▶ sharing information on science and technology curriculum innovation and development, good teaching methodologies and practices;
- ▶ dealing with interdisciplinary issues through the UNESCO Intersectoral Platform on Science Education;
- ▶ fostering science, technology, engineering and mathematics (STEM) education for development and poverty alleviation;
- ▶ establishing partnerships with such entities as the Nature Publishing Group on 'Nature Education', a free-of-charge internet-based facility which addresses the critical need for quality and affordable access to appealing learning resources in science education;
- ▶ participating in networks promoting science and mathematics education in Africa;
- ▶ elaborating a global survey of the state of science and mathematics education.

3. Engineering Programme

UNESCO's engineering sciences programme focuses on education and human and institutional capacity building, to enhance the application of engineering and technological innovation to poverty reduction, sustainable development and the Millennium Development Goals. Programme activities include advocacy and advisory services, information gathering, publications, curricula development and delivery, continuing education, distance and virtual learning and associated expert meetings, workshops and conferences. The programme also promotes institutional cooperation in partnership with governments, the private sector, and with professional bodies and NGOs, such as the World Federation of Engineering Organizations (WFEO). The Daimler-UNESCO Mondialogo Engineering

Award encourages student engineers from developing and developed countries to form teams to design engineering solutions and technologies to improve living conditions in developing countries.

4. Renewable Energy

Within the context of climate change, UNESCO's renewable energy programme focuses on capacity building, sharing knowledge and best practices on alternative and renewable energy sources, providing policy advice and technical assistance to Member States and supporting pilot initiatives. The development of renewable energy training platforms and regional summer schools on renewable energy sources target different audiences, including policy- and decision-makers, in particular, in developing countries.

5. Disaster reduction

UNESCO supports its Member States to access, and to reduce vulnerability to, natural hazards whether of atmospheric, geologic or hydrologic origin. By building capacity in the scientific, technical and educational fields contributing to the construction of a global culture of disaster preparedness and mitigation, natural disasters are not always inevitable even though presently increasing with unsustainable development, climate change and extremes of weather. UNESCO, an active partner in the International Strategy for Disaster Reduction (ISDR), promotes analysis, mapping and exchange of hazard and disaster data, coordinates the establishment of tsunami warning systems and networks which work to reduce loss through earthquakes. In particular, UNESCO works to protect educational buildings and cultural sites from natural disasters.

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