



United Nations  
Educational, Scientific and  
Cultural Organization

UNESCO  
and

# Research for Health



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Left: Diana Ticleanu, a young Romanian television producer, covering a story on HIV and AIDS within a UNESCO-supported project run by the Office of Eurovision Regional News Exchange for South East Europe (ERNO). See page 9.

*Photo: ERNO*

## Introduction

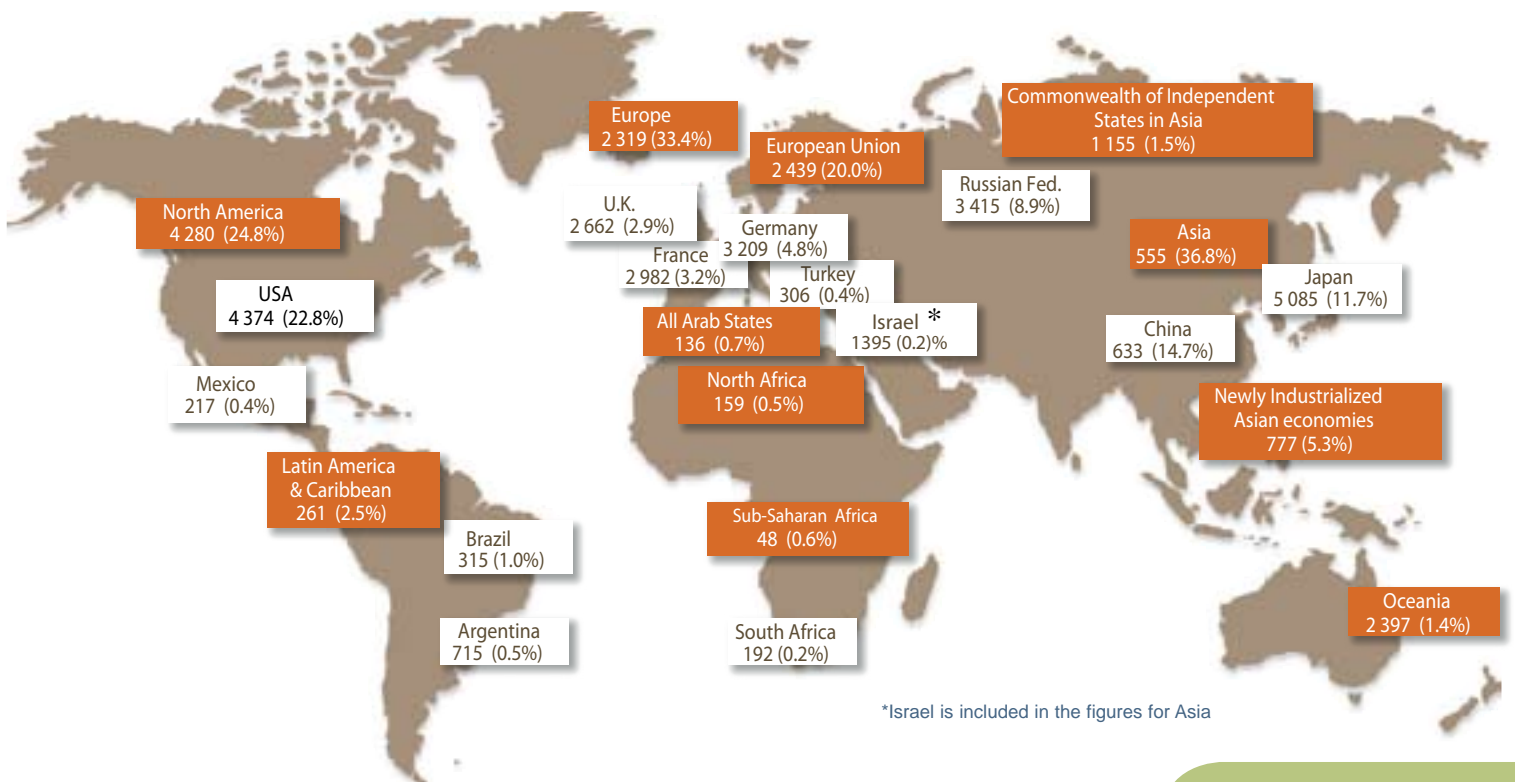
By definition, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has an interdisciplinary mandate. The Organization consequently adopts a multi-pronged approach to problem-solving when implementing projects with governments and partner NGOs, associations, networks and specialized centres.

As a founding co-sponsor of UNAIDS, for example, UNESCO brings an interdisciplinary approach to promoting universal access to HIV prevention programmes, treatment, care and support. UNESCO strives to educate the public and reduce stigmatization of those living with HIV and AIDS; it reaches out to children and university students through formal education and builds public awareness via media information campaigns and cultural media like dance and theatre. Other projects tackle the physical vulnerability of immune-deficient AIDS patients to waterborne diseases by improving sanitation and the quality of drinking water. UNESCO also supports efforts to strengthen centres in Africa which bring research and education under the same roof.

In 2007, UNESCO decided to structure the informal partnerships which bind specialists working on related programmes within the agency by creating 12 interdisciplinary platforms, in order to address the complex issues facing today's world in a more coherent and coordinated manner. These platforms create formal bridges between UNESCO's programmes in education, the sciences, culture and communication in such areas as HIV and AIDS, the strengthening of national research systems, coordination and monitoring of the UNESCO plan of action to benefit Africa, the priority region for UNESCO's work, climate change and so on.

The Global Ministerial Forum on Research for Health (Bamako, Mali, 17–19 November 2008) was organized by the Council on Health Research for Development, the Global Forum for Health Research, the Republic of Mali, UNESCO, the World Bank and WHO.

One of the innovations of the 2008 Forum was a focus on the key linkages between the health sector and research, science and technology, higher education and the global innovation system. The examples that follow of UNESCO projects which impact on health illustrate the broad approach advocated by the Forum for meeting the challenge of improving health for all.



## Priority: a research university in each country

Today, all nations need a critical mass of researchers who can follow and contribute to rapid advances in science, for they will need a sound knowledge base if they are to meet the United Nations' Millennium Development Goals and build equitable and prosperous societies.

It has become imperative for each country to develop its own knowledge base to make well-informed policy choices, especially when resources are limited. Major development actors, including the World Bank and the international donor community, now advocate the rethinking of higher education, science and research policies so as to empower the research communities in low- and middle-income countries, notably in Africa.

Countries lacking a sound knowledge base are now in a grave crisis, owing to a prolonged absence of political commitment to research policy, the lack of a clear vision, insufficient investment in the national knowledge base and a weak private sector, despite the latter's potential for generating and supporting research and development. The research function has become 'de-institutionalized', with the local research community seldom consulted as a source of expertise by national policy-makers. As a result, these countries face severe brain drain and an increasing knowledge gap with the rest of the world.

However, the tide is turning. Certain countries have begun reinvesting in their universities by promoting

and seeking research partnerships and by initiating innovative regional and international cooperation among researchers to retain national academics. There is growing support for the belief that research can directly assist the disadvantaged and provide solutions for development, notably in such crucial areas as health, agriculture, science, technology and innovation, to boost economic growth.

Among the success stories, one could cite Singapore, Chile, Jordan and South Africa. Their number is growing rapidly and the lessons learned from these success stories are being adapted to other contexts.

The UNESCO Forum on Higher Education, Research and Knowledge focuses on research systems worldwide and the role of universities in these. The Forum brings together researchers and both national and institutional decision-makers who are studying or shaping systems of higher education, research and knowledge.

It highlights successful strategies for reversing the knowledge gap to strengthen research capacities in low- and middle-income countries. The Forum also gathers ongoing research in this area by providing an arena for the exchange of good practice and by publishing research on systemic innovation.

**For details, contact [a.olsson@unesco.org](mailto:a.olsson@unesco.org), or go to [www.unesco.org/education/researchforum](http://www.unesco.org/education/researchforum)**

## Map Researchers in the world, 2002

By percentage share of world total and expenditure per researcher (PPP US\$)

Source: Adapted from UNESCO Science Report 2005. Table 2, page 6. Data supplied by UNESCO Institute for Statistics:  
[www.unesco.org/science/psd/publications/sc\\_rp\\_05.shtml](http://www.unesco.org/science/psd/publications/sc_rp_05.shtml)

*"Countries lacking a sound knowledge base are now in a grave crisis."*



Above: The Govinpuri slums in south Delhi (India) are home to 150 000 migrants from drought-hit villages in Rajasthan. The goal of UNESCO's MOST programme is to bridge the gap between social science and policy.

*Photo: UNESCO/Brendan O'Malley*

***“There is a disturbing lack of communication between the guardians and potential beneficiaries of these stockpiles of knowledge.”***

## Dismantling stockpiles of knowledge

Despite growing stockpiles of knowledge in our ever-globalizing and wired society, there is a disturbing lack of communication between the guardians of these stockpiles and the potential beneficiaries of this knowledge. This disjunct threatens to erode some of the world's universal values of justice, freedom, human dignity and sustainable development. Unapplied knowledge which could have benefited disadvantaged communities and irrelevant knowledge which wastes precious financial resources are both preventable situations.

The goal of UNESCO's Management of Social Transformations (MOST) programme is to bridge the gap between social science and policy, making policy concerns relevant for social scientists and vice versa. The programme fosters new forms of translation centred around innovative ways of sharing and using knowledge.

Current projects include the MOST Policy Research Tool. This provides no-fee, online access to policy-relevant comparative information, enabling users to obtain customized replies to transdisciplinary questions by drawing on select content from original documents. The tool aims to cover a wide range of areas related to social transformations, with material originating from within UNESCO, from sister UN agencies and governmental research councils, and from other sources.

Within UNESCO's anti-poverty strategy, MOST contributes to the Universities in Solidarity for the Health of the Disadvantaged (UNISOL) project spearheaded by the Tropical Institute of Community Health and Development in Africa, which has offices in Nairobi and Kisumu (Kenya). With the participation of academic partners from South and Eastern Africa in particular, UNISOL has developed a Community-based Health Information System to enhance comparative analysis between communities and improve planning and project development throughout Africa. In April 2006, this project was adopted by the Government of Kenya as the national model for health information systems.

MOST also contributes to the TropIKA.net knowledge hub, a new initiative designed to enhance the preparation of stakeholders for large health fora, as well as their contribution to these. Designed by the UNICEF–UNDP–World Bank–WHO Special Programme for Research and Training in Tropical Diseases, this hub was launched at the Ministerial Conference on Research for Health in the African Region in Algiers (Algeria) in June 2008 and was used again at the Global Ministerial Forum on Research for Health in Bamako (Mali) in November the same year.

***For details, go to: [www.unesco.org/shs/most](http://www.unesco.org/shs/most)***



Local women working at a rural *Arthrospira* mass production plant in India. Better known by its commercial name of Spirulina, *Arthrospira* is a highly nutritious cyanobacterium (or blue-green alga). An IBSP project is currently exploring the potential, and associated risks, of mass production of *Arthrospira*. The five countries involved in the project are Ethiopia, Germany, India, Kenya and Mexico, the Academy of Sciences for the Developing World (TWAS) being an institutional partner. Working groups formed in the partners' laboratories, which include students and young researchers, will be conducting molecular and toxin analyses on samples collected within the project. The accumulated data and know-how will then be exchanged between the partner institutions and the resultant knowledge disseminated to local authorities and communities.

*Photos courtesy of Lothar Krienitz*

## Narrowing the research gap in the life sciences

The ongoing explosion in knowledge in the life sciences continues to offer vast opportunities to tackle hunger, food security, disease, environmental degradation and climate change. UNESCO is particularly concerned that advances in knowledge and its applications should be of benefit to all. Developing countries need a critical mass of well-trained scientists who can advise governments about priorities for national research and about the use of technologies arising from research in the life sciences.

Within the United Nations system, UNESCO has a unique mandate for the basic sciences. Over the years, the Organization has trained roughly half a million researchers and university teachers, the majority of them scientists from developing countries. It has also established and/or promoted many regional and international science centres of excellence and networks, as well as a number of scientific NGOs like the International Brain Research Organization. Examples of centres are the European Organization for Nuclear Research (CERN) in Geneva (Switzerland), the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste (see page 6), the International Institute for Molecular and Cell Biology in Warsaw (Poland) and, most recently, the Synchrotron-light

for Experimental Science and Applications in the Middle East Centre (SESAME) in Allan (Jordan). Two examples of networks are the International Biosciences Networks and that for Microbial Resource Centres.

In 2003, UNESCO's Member States decided to strengthen national capacities in the basic sciences and science education via the launch of the International Basic Sciences Programme (IBSP). The central goal of the IBSP is to develop endogenous national and regional research capacities in frontier areas of basic sciences via international cooperation. Each year, proposals for IBSP projects are assessed by the IBSP Scientific Board. One example of a recently approved project in the biological sciences is that for *Arthrospira* (see photos).

The foci for the IBSP biology programme in 2008–2009 are cell and molecular biology, neurosciences, microbiology and biotechnology, with an emphasis on biomedical and agricultural applications. In 2008, for example, four training workshops were held in Senegal, Morocco, Egypt and Kenya, within a partnership to Build Brain Sciences in Africa involving the IBSP and the International Brain Research Organization.

**For details, contact: [j.hasler@unesco.org](mailto:j.hasler@unesco.org) or [l.hoareau@unesco.org](mailto:l.hoareau@unesco.org) or go to [www.unesco.org/science/bes](http://www.unesco.org/science/bes)**



Right: Cloning of cattle and other farm animals raises many bioethical concerns. Days after both the European Food and Safety Agency and US Food and Drug Administration declared that meat and milk from clones of cattle, pigs and goats were as safe to eat as food from conventionally bred animals, in January 2008, the European Group on Ethics in Science and New Technology, the European Commission's advisory group, expressed 'doubts as to whether cloning animals for food supply is ethically justified.' In September 2008, the European Parliament voted to ban cloning animals for food and advocated an embargo on the import of cloned animals, their offspring and any cloned food products. Among the concerns cited were the high morbidity and mortality rates of cloned animals, which compromises animal welfare and is thus contrary to European law, and the lack of genetic variability, making a herd vulnerable to disease. Experts estimate that products derived from cloned animals could be on the market in some countries by 2010.

Photo: Misato Le Mignon/  
UNESCO



## Assisting national bioethics committees

The increasing complexity of bioethical issues – ranging from the manipulation of human genetic data to biopiracy, embryonic stem cell research, animal cloning and the genetic engineering of plants to produce vaccines and pharmaceutical products – is inciting a growing number of countries to set up national bioethics committees (NBC). These committees advise policy-makers on how to translate the universal norms articulated in international instruments into national legislation and regulations, in order to make a real impact on national science policy and practices in the biological sciences.

In 2005, UNESCO's Member States adopted the *Universal Declaration on Bioethics and Human Rights*, Article 19 of which calls for the establishment of independent, multidisciplinary and pluralist NBCs. UNESCO subsequently launched the Assisting Bioethics Committees (ABC) project to help Member States build governance in bioethics through NBCs.

Through the ABC project, UNESCO experts study the existing ethics governance infrastructure in countries which have expressed interest in setting

up an NBC. Once an NBC has been established, a memorandum of understanding is signed between the new committee and UNESCO setting out various forms of cooperation, including training and other assistance in capacity-building.

UNESCO has already undertaken exploratory technical missions to assess the need for setting up and assisting NBCs in many African countries, including Cape Verde, Gabon, Ghana, Madagascar, Malawi, Mauritius and Togo. Chad, the Republic of Guinea, Mali and Nigeria have also expressed interest in the ABC project.

Many countries in Latin America and the Caribbean have similarly recognized the importance of a robust national ethics infrastructure to address frequently emerging ethical issues in health and life sciences. UNESCO is currently assisting several of them in setting up an NBC.

**For details, contact: [h.tenhave@unesco.org](mailto:h.tenhave@unesco.org)**

**See also a survey of national ethics councils by the German National Ethics Council in 2005: [www.ethikrat.org/\\_english/publications/Fuchs\\_International\\_Ethics\\_Councils.pdf](http://www.ethikrat.org/_english/publications/Fuchs_International_Ethics_Councils.pdf)**

Left: Tomato harvest. Genetic engineering (GE) of crops has emerged as a major agricultural technology over the past decade. Herbicide tolerance and insect resistance dominate the market, although GE crops come in other categories, such as pest and disease resistance, tolerance of abiotic stress – like drought – yield, nutrition and vaccines. Bioethical concerns include keeping pharmaceutical and industrial crops separate from crops for food and avoiding the unintentional spread of genetically modified (GM) traits. One school of thought considers that pre-market testing for environmental risks of GM crops to non-target organisms should follow the protocols for chemicals, such as pesticides. Photo: Dominique Roger/UNESCO





Left: Assistant Professor Narry Kim (on the left) has elucidated the formation of a new class of RNA molecules, microRNAs, which function as an on/off switch for gene expression. Much about the influence of microRNA remains unknown but V. Narry Kim has shown that microRNAs play important regulatory roles in fundamental cellular processes. They control several developmental pathways that are critical to life, including the earliest formation of blood and organs, cell proliferation and eventually cell death. Her pioneering studies have laid the groundwork for the development of RNA interference technologies, with promising potential for biotechnology and wmedical adaptations.

*Photo: Micheline Pelletier/L'Oréal*

## Health dominates awards for women in science

The result of a unique partnership now into its second decade, the L'ORÉAL–UNESCO Awards for Women in Science recognize the contribution to scientific progress of outstanding researchers around the world and encourage young women to follow in their footsteps.

The annual awards consist of five prizes worth US\$100,000 each, which recognize five outstanding women scientists from as many continents. The awards target women working in the life sciences and material sciences in alternate years. With the 2008 edition in life sciences, a total of 52 women scientists from 26 countries have been recognized for their contribution to improving human well-being.

In 2008, health was a common focus for all five laureates, who were acknowledged as follows:

Professor Lihadh Al-Gazali from the United Arab Emirates University (Laureate for Africa & the Arab States), for characterizing new hereditary diseases; Professor Ada Yonath from the Weizmann Institute for Science in Israel (Laureate for Europe), for having determined the structure of ribosomes and the way in which antibiotics disrupt these; Assistant Professor V. Narry Kim from Seoul National University (Laureate for Asia), for elucidating several key steps in the formation of a new class of gene-regulating RNA molecules; Professor Ana Belen Elgoyhen from the Institute for Genetic Engineering

and Molecular Biology (CONICET) in Argentina (Laureate for Latin America, for her contribution to the understanding of the molecular basis of hearing; and Professor Elizabeth Blackburn from the University of California in the USA (Laureate for North America), for her discovery of the nature and maintenance of chromosome ends and their roles in cancer and aging.

The programme also recognizes and supports young pre- and post-doctoral students through the L'ORÉAL–UNESCO International Fellowships for Women in Science. Worth up to US\$40,000 each, these two-year fellowships allow 15 young women around the world to pursue their research in the life sciences beyond their country of origin. In addition, since 2001, more than 200 doctoral students in over 20 countries have received L'ORÉAL National Fellowships, supported by the National Commissions for UNESCO.

More than 500 women researchers worldwide have benefited from the L'ORÉAL–UNESCO International For Women in Science programme since its inception in 1998.

**For details, contact: [r.clair@unesco.org](mailto:r.clair@unesco.org) or go to: [www.forwomeninscience.com](http://www.forwomeninscience.com)**

Below: Professor Ana Belen Elgoyhen and a colleague in the laboratory.

*Photo: Micheline Pelletier/L'Oréal*





Above: Hospital ward in France.

Photo: John Mohr/UNESCO

*“People tend to be unaware of progress in health research until chronic ill-health strikes them or a loved one.”*

Below: A magnetic resonance body scanner.

Photo courtesy of S. Tabakov

## Informing the public about progress in health research

There are some diseases which can be avoided by good hygiene and sanitation, effective vaccines and other precautions but, sooner or later, most of us will fall prey to a chronic illness, be it cancer, heart disease, diabetes, a disorder of the central nervous system like Alzheimer’s or Parkinson’s disease, or wasting bone diseases like osteoporosis or arthritis. Yet people tend to be unaware of progress in health research until chronic ill-health strikes them or a loved one.

Over the past five years, UNESCO has been disseminating information on progress in research and therapeutic innovations via an open forum, to keep the public informed and demonstrate how scientific research and development can contribute to the well-being of humanity and development efforts.

The annual UNESCO Scientific Fora are organized jointly with the weekly French news magazine, *Paris Match*, and since 2008, have been broadcast live over the Internet.

Each year, the four-hour scientific forum offers leading surgeons and scientists an opportunity to summarize, in layman’s terms, the latest scientific knowledge on particular diseases and broader health issues. A panel of specialists answers questions put to them by a moderator before an audience made up of members of the general public. Diagrams and short documentaries are also projected and commented upon by the specialists present. The fora take place at UNESCO headquarters in Paris, in an auditorium with seating for 2000.

The first scientific forum on 10 March 2003 tackled research on breast cancer, on the occasion of World Women’s Day. The second forum on 1 December 2003, which fell on World Aids Day, drew attention to the prevention and pathology of AIDS among women. The third and fourth fora were concerned with new weapons for fighting arthritis and osteoporosis (22 September 2005) and with progress in scientific research against cancer (18 January 2007).

The fifth UNESCO Scientific Forum (16 September 2008) focused on the topic of Longevity and Quality of Life: the Latest Advances for Staying Young Longer. A summary of the debate will appear in the January 2009 issue of UNESCO’s quarterly journal, *A World of Science*. Distributed free of charge in 193 countries, it may also be consulted freely online in English, French, Malay, Russian and Spanish.

**For details: [r.clair@unesco.org](mailto:r.clair@unesco.org); on the longevity forum in 2008, go to: [www.longevity.com/accueil](http://www.longevity.com/accueil)**

**See also: A World of Science at: [www.unesco.org/science](http://www.unesco.org/science)**



## The college on medical physics

The College on Medical Physics has been run by UNESCO’s Abdus Salam International Centre for Theoretical Physics (ICTP) for more than 20 years. The centre runs many conferences and workshops on the application of physics in medicine but it is the College on Medical Physics which is its major programme in this area.

The annual College on Medical Physics brings together medical physicists and related scientists for intense training on the effective and safe applications of modern medical imaging technology. This training addresses a very specific



## Investing in school health is not a luxury

Ensuring that children are healthy and able to learn is an essential component of an effective education system. Good health increases enrolment and reduces absenteeism. It also brings more of the poorest and most disadvantaged children to school, many of whom are girls. School health policies ensure a safe and secure physical and psychosocial environment. Such policies may address abuse; discrimination and harassment (see for example Learning for all about AIDS, page 8); drug, alcohol and tobacco use; violence and bullying. In addition, school health enables the provision of health education and school-based health services.

Focusing Resources on Effective School Health (FRESH) is an inter-agency framework for strengthening school health, hygiene and education. This partnership includes UNESCO, WHO, UNICEF, the World Bank, Education International, the Education Development Center, the Partnership for Child Development and Save the Children USA. FRESH focuses on four core areas: school health policies; water, sanitation and the environment; skills-based health education; and a school-based health and nutrition service.

Within the framework of FRESH and the UN Decade on Education for Sustainable Development, young

people from Algeria, Bahrain, Jordan, Lebanon, Libya, Mauritania, Morocco, Oman, Sudan, Tunisia and Yemen gathered in Tunis (Tunisia) from 21 to 23 August 2007 for the Regional Youth Forum on Health Awareness and Community Development. The young people came up with a rich selection of project ideas to address health-related problems and community development issues.

**For details contact: [e.yankah@unesco.org](mailto:e.yankah@unesco.org), [beirut@unesco.org](mailto:beirut@unesco.org), [r.wong@unesco.org](mailto:r.wong@unesco.org), or go to: [www.unesco.org/education/fresh](http://www.unesco.org/education/fresh)**

## Literacy is the best remedy

'Literacy is the best remedy'. This was the theme in 2008 of International Literacy Day, celebrated every year on 8 September. As UNESCO Director-General Koïchiro Matsuura recalled, 'literacy is a powerful yet too often overlooked remedy to health threats, with the potential to promote better nutrition, disease prevention and treatment'.

The winners of the 2008 UNESCO International Literacy Prizes offer inspiring examples of how literacy can make a powerful impact on health. The Brazilian programme *Alphabetizando com saude*, for example, demonstrates a successful collaboration

between municipal health and education authorities in the city of Curitiba. The Ethiopian Literacy Plus programme targets rural women in an area plagued by malaria. Operation Upgrade's Kwanibela Project in South Africa offers an innovative approach to integrating HIV and AIDS information into literacy programmes. As for the Reflect and HIV programme in Zambia, organized by the People's Action Forum, it is a remarkable example of local outreach by developing cultural activities in the mother tongue.

**For details of the prize winners, contact: [m.simeti@unesco.org](mailto:m.simeti@unesco.org), or go to [www.unesco.org/education/literacy](http://www.unesco.org/education/literacy)**

need in global healthcare as modern medical imaging technology becomes more prevalent in developing countries. Proper use of the technology can ensure that it is used for maximum benefit, such as for the early detection of cancer when it is most curable.

The objective of the College on Medical Physics is to develop a global network of medical scientists and educators who can enrich the many local programmes with their knowledge and the extensive educational resources they receive through the college.

In September 2008, the College on Medical Physics took place on the ICTP campus in Trieste (Italy), providing training and resources for 80 participants from 45 developing countries.

In 2007, the ICTP organized a Regional College on Medical Physics in Mumbai (India) which drew 65 participants from throughout India and five other countries from the region.

The ICTP also played an important role in organizing the World Conference on Physics and Sustainable Development in Durban (South Africa) in 2005, within the International Year of Physics coordinated by UNESCO and the European Physics Society. One of the four major areas identified by the conference for its plan of action was Physics and Health.

**For details, contact Prof. Luciano Bertocchi: [bertocch@ictp.it](mailto:bertocch@ictp.it), or go to: [www.ictp.it](http://www.ictp.it)**



Above: Young girls enjoy a gym class in Somalia.

Photo: UNAIDS/L. Taylor

Below: Biology class in Cuba

Photo: W. Torres/UNESCO





Above: A training session organized by UNESCO in 2006 on how to use theatre in HIV prevention.

Photo: Helena Drobna/UNESCO

Below: Pupils from a high school in Maseru in a sex education class. They are commenting on some of the AIDS prevention material produced by UN agencies and local NGOs with the Government of Lesotho. The poster reads 'Prevent AIDS, use a condom – free at government clinics and hospitals'.

Photo: UNAIDS/G. Pirozzi



## Why culture matters

Culture has a vital relationship to health, providing the foundation on which behaviour is defined, expressed and maintained. Within the context of HIV and AIDS, culture significantly influences both the ways in which the virus is transmitted and the effectiveness of strategies devised in response. In many societies, women may lack the power to refuse unwanted sex or to insist on condom use. In Africa, the values of the extended family and community significantly influence an individual's sexual behaviour.

Understanding what motivates peoples' behaviour, knowing how to address these motivations appropriately and taking into consideration peoples' cultures when developing programmes addressing HIV and AIDS are essential to changing behaviour patterns and attitudes towards the epidemic.

Thus, there can be no 'one shoe fits all' approach. Working from this understanding, UNESCO's Culture, HIV and AIDS project supports the development of policies and programmes based on a thorough analysis of the cultural and social specificities of the communities concerned. The project has two main thrusts.

The first is the promotion of socio-cultural approaches to HIV and AIDS prevention, treatment, support and care. The programme has conducted research in the southern Caucasus, for example, where it compiled some of the first comprehensive data collections,

assessed institutional capacity and identified socio-cultural factors influencing the transmission and prevention of HIV in Armenia, Azerbaijan and Georgia.

The second thrust is the promotion of the arts and creativity. The programme has developed four manuals for the use of theatre in HIV and AIDS education, for example, each tailored to a specific region.

**Visit a portal for youth to facilitate the use of the arts in HIV and AIDS education: [www.yahanet.org](http://www.yahanet.org)**  
**For details, contact: [j.lawler@unesco.org](mailto:j.lawler@unesco.org)**

## Learning for all about AIDS

The growing number of children and young people affected by, and infected with, HIV poses new challenges to the education sector, particularly in terms of ensuring equal educational opportunities and access to education for HIV-positive learners.

Led by UNESCO with the collaboration of UNAIDS cosponsors and other key stakeholders, the Global Initiative on Education and HIV & AIDS – EDUCAIDS for short – promotes, develops and supports the education sector in developing comprehensive responses to HIV and AIDS. EDUCAIDS is one of three core UNESCO initiatives to achieve Education for All by 2015.

In Vietnam, for example, UNESCO and its partners have developed guidelines for the implementation of recent legislation on HIV and AIDS in the education sector. This legislation seeks to address stigma and discrimination experienced by people infected or otherwise affected by HIV and AIDS. It also seeks to protect the rights of people living with HIV and AIDS, including by ensuring confidentiality and equal access to jobs and healthcare. UNESCO is also reviewing and piloting curricula on reproductive health and HIV education for 24 secondary schools and four teacher

training colleges and universities in three provinces of Vietnam. This reform is expected to inform the development of regional standards for sex education.

In Lesotho, UNESCO has developed HIV and AIDS prevention packs for specific age groups of children, in tandem with teachers and the national curriculum team. In 2008–2009, school principals and teachers are being trained in how to use these new materials, in order to ensure effective, sustained implementation. In April 2008, UNESCO organized a consultation with 20 key stakeholders in Lesotho, including the Ministry of Education, the National Association of People living with HIV, teachers unions and UN agencies. The meetings recommended expanding effective HIV and AIDS education for pre-service teacher trainers, including the production of a teacher training manual.

**For details, contact: [j.buchanan@unesco.org](mailto:j.buchanan@unesco.org)**  
**or go to: [www.unesco.org/en/aids](http://www.unesco.org/en/aids)**

**Read the full country snapshots:**  
**Vietnam: <http://unesdoc.unesco.org/images/0016/001626/162629E.pdf>**

**Lesotho: <http://unesdoc.unesco.org/images/0015/001538/153883E.pdf>**

# A global network of young TV producers on HIV and AIDS

*Femdom Empowers Women* is a documentary about the use of female contraceptives. Scripted at a workshop for young television producers from the Pacific in Suva (Fiji) and hosted by UNESCO and the Regional Media Centre of the Secretariat of the Pacific Community in 2006, the documentary informs women how the female condom can prevent the transmission of HIV and AIDS. It explains that female condoms are also important for the prevention of other sexually transmitted diseases, particularly where rape and cultural practices contribute to the sexual exploitation of women.

The workshop in Suva is one of many organized within a UNESCO activity launched in 2002 to improve the professional competence of young television producers reporting on HIV and AIDS and ensure the production and dissemination of quality images and credible information to the general public. To date, the Global Network of Young TV Producers on HIV and AIDS has supported the training of 212 young television producers who have transmitted 107 broadcast items in 74 countries.

A typical workshop uses a peer-review approach to assess the quality of existing television productions and discuss the shortcomings, propose improved production concepts and scripts, gather new footage and ultimately produce a new short film. These new productions are then



available for free distribution and exchange among participating and other interested television broadcasters and media training institutions.

The Global Network of Young TV Producers on HIV and AIDS involves the participation of broadcasting organizations in Africa, Asia, the Pacific, Latin America, the Caribbean and Europe. The network has also supported the creation of directories, local language manuals and seed funding to support the productions of talented young television producers.

**For details, go to:**  
[www.unesco.org/webworld/en/hivaids-tv](http://www.unesco.org/webworld/en/hivaids-tv)  
**or contact:** [v.jennings@unesco.org](mailto:v.jennings@unesco.org)

Above: Sangeeta, Fane and Tara learning how to use a high definition camera during a workshop supported by UNESCO at the Secretariat of the Pacific Community's Regional Media Centre in Suva (Fiji) in 2006.

*Photo: Aren Baa/Regional Media Centre*

# In support of women: countering HIV and female genital mutilation

Today, the feminization of HIV and AIDS has gone from theory to reality. In sub-Saharan Africa, where the epidemic is worst, women make up an estimated 57% of adults living with HIV and three-quarters of young people living with HIV on the continent are young women aged 15–24. While this trend is most notable in sub-Saharan Africa, it touches all regions: for example, in 2004, it is estimated that AIDS was the leading cause of death among African American women in the USA aged 25–34 years old.

With the upcoming publication of *The Fourth Wave: an Assault on Women: Gender, Culture and HIV in the 21st Century*, UNESCO plans to further research on this under-recognized issue. Written in collaboration with the Social Science Research Council, this volume brings together cutting-edge scholarship to ask how and why the response to the HIV epidemic is failing women. It will explore how biomedical research priorities, a disproportionate focus on children affected by HIV/AIDS, the shift towards female-controlled methods of protection during intercourse and celebrity aid may in fact be deflecting attention from broader forms of social and gendered violence that concern both women and men. It will also explore evidence that the current ways we measure risk and outcome may not be able to capture these processes.

In its efforts to empower women and promote gender equality, UNESCO is also committed to eliminating all forms of violence against women and girls, including certain harmful traditional practices like female genital mutilation.

In December 2007, UNESCO underscored this commitment when Director-General Koïchiro Matsuura joined the heads of nine other United Nations agencies and programmes (OHCHR, UNAIDS, UNDP, UNECA, UNFPA, UNHCR, UNICEF, UNIFEM, WHO) in signing the Interagency Statement on Eliminating Female Genital Mutilation, drafted by the participating agencies. The Statement reflects UNESCO's position on the central role local communities and education play in eliminating this violent practice. It also reflects the importance UNESCO attributes to the historic *Maputo Protocol* and the African Union's *Solemn Declaration of Equality between Men and Women in Africa*.

UNESCO has since followed up on its commitment to the ideals expressed in this Statement by organizing and participating in awareness-raising events. In March 2008 for example, as part of the celebration of International Women's Day, UNESCO hosted the world premiere screening of a documentary on female genital mutilation by the Franco-Gabonese Association Kerciné, produced with support from WHO.

**For details, go to:** [www.unesco.org/women](http://www.unesco.org/women)

Below: Mother and daughter in Senegal.

*Photo: UNESCO/Inez Forbes*



## Safe water and sanitation can give those living with AIDS a better life

Approximately 1.1 billion people in developing countries have inadequate access to wholesome supplies of water and 2.6 billion people lack basic sanitation. The lack of access to clean, safe water is the leading cause of death and disease in developing countries, especially for individuals with compromised immune systems like those living with HIV and AIDS. Their low immunity makes them particularly susceptible to opportunistic diseases, skin infections and respiratory infections. For millions of people in Africa, access to sufficient supplies of clean water is a matter of life and death. The situation is greatly aggravated by the impact of HIV and AIDS and poverty on individual households, which bear the brunt of caring for the sick.

The situation in Africa will only start to improve when serious global and national steps are taken to address the water and sanitation situation. This includes the development of healthcare infrastructure to deal with HIV and AIDS. Concerted development and implementation of the appropriate strategies, in parallel with cooperation among global institutions, national governments, communities and individuals, is crucial for achieving the Millennium Development Goals of reducing by half the proportion of those with inadequate access to safe water and sanitation by 2015.

It was in this context that UNESCO's International Hydrological Programme (IHP) organized a workshop in November 2007, in collaboration with the South African Council for Scientific and Industrial Research (CSIR) and the African Water Issues Research Unit at the University of Pretoria. The aim was to examine ways to improve sanitation and promote hygiene to alleviate poverty and thereby reduce the spread of disease.

One means identified for helping people living with AIDS in particular was the use of advocacy to increase knowledge of, and support for, large-scale efforts to improve sanitation and extend water coverage in

water-scarce areas without greatly increasing water demand. Breastfeeding came under the spotlight, for instance, as a way for HIV-positive women to protect their infants from water-borne diseases in the first six months of life – except in cases where replacement feeding is acceptable, affordable, sustainable and safe, an option necessitating an adequate supply of potable water. The risk associated with alternative feeds like milk formula is very high, especially where water facilities are poor and infants are exposed to diarrhoeal diseases. In South Africa for instance, diarrhoea is the third-biggest cause of death in children under the age of five.

The IHP–CSIR workshop was held in Pretoria (South Africa), with the involvement of representatives from the countries of the Southern Africa Development Community. In following up the workshop, the IHP is shifting its focus towards governance and the development of core capacity in the southern African region in the field of groundwater management. The aim is to generate adaptive solutions in tandem with the CSIR which are not only technically feasible but also socially acceptable and politically stable.

**For details, contact [f.rizzo@unesco.org](mailto:f.rizzo@unesco.org)**



Above: A truck discharges wastewater into an overloaded compost and landfill station, where it will receive no further treatment.

Photo: Cristina Gonzalez/  
UNESCO-IHE

Below: The First Lady of Cameroon, Chantal Biya, cutting the ribbon at the opening ceremony of the newly constructed sub-regional AIDS centre near Yaoundé in February 2006. Next to her stands Luc Montagnier.

Photo: UNESCO

## Scientific discovery at the vanguard of efforts against

**The response to HIV and AIDS is driven by scientific discovery, research and knowledge of the virus. No interdisciplinary approach to tackling HIV and AIDS would therefore be complete without the promotion and support of basic research and the dissemination of scientific information in immunology and virology. UNESCO thus has a vital role to play in this respect, in cooperation with experts and other organizations.**

One major partner in the effort to combat HIV and AIDS is the World Foundation for AIDS Research and Prevention. The Foundation was established under the auspices of UNESCO in 1993 and is led by Professor Luc Montagnier, who was awarded the Nobel Prize for Medicine in 2008,



# Cities switch to safe sanitation

In Accra, the capital of Ghana, fewer than 5% of households are connected to the city sewage network and just 18% of the city's 2 million inhabitants has access to basic sanitation. Accra's open drains are intended to serve as storm drains but have instead become receptacles for solid, liquid and human waste, exacerbating health problems and large-scale pollution of the environment. Cases of cholera (*Vibrio cholerae*) and other diarrhoeal diseases are not uncommon.

The government has put together a multistakeholder platform to improve living conditions in Accra. Among the platform's ambitious goals to 2030: to provide every inhabitant with an uninterrupted water supply, recycle 50–80% of waste, reduce the incidence of water-borne diseases by 70% and provide sanitation facilities that are 100% safe. One of the projects contributing to Accra's plan to 2030 is the Sustainable Water for Tomorrow's Cities (SWITCH) project coordinated by the UNESCO-IHE Institute for Water Education in Delft (Netherlands) and funded by the European Commission.

Accra's vegetable plots rely on wastewater from streams and drains for year-round cultivation of vegetables. In the city of Accra, SWITCH is testing improved irrigation practices, including drip irrigation, sedimentation ponds and the filtration of solids, to make food safer for consumption and minimize water and fertilizer use.

Another line of research is the testing of eco-toilets in Accra. Separating urine and faeces in the toilet and avoiding mixing them with water prevents water sources from being contaminated with pathogens and undesirable nutrients. Eco-toilets have come through the tests with flying colours. If they also prove to be economical, greater numbers could be installed in Accra to reduce the pressure on the sewage system and the cost of wastewater treatment.

SWITCH is also testing natural systems for wastewater treatment to complement the existing

biological treatment plant, which may be modern but can only handle only about 8–10% of Accra's inner city wastewater from domestic and industrial sources. Some 80% of wastewater is consequently discharged untreated into open drains, wetlands and natural channels where it finds its way to the sea. Ongoing research at the Kpeshie Lagoon – a natural catchment west of the city limits – shows that the lagoon may be able to purify grey water used in the home (i.e. except toilets). In wetlands, the right combination of soil and plants can transform or remove pollutants or micro-organisms through biological or chemical processes. Wetlands can be less expensive to build than other water treatment options and the operating and maintenance costs are low.

In Accra, the UNESCO-IHE Institute for Water Education is working with Wageningen University, also based in the Netherlands, Kwame Nkrumah University of Science and Technology and the International Water Management Institute in Ghana.

The other cities targeted by SWITCH are Belo Horizonte (Brazil), Beijing (China), Chong Qing (China), Alexandria (Egypt), Hamburg (Germany) Tel Aviv (Israel), Lodz (Poland), Zaragoza (Spain), and Birmingham (UK).

**For details, contact: [c.howe@unesco-ihe.org](mailto:c.howe@unesco-ihe.org) or [k.vairavamoorthy@unesco-ihe.org](mailto:k.vairavamoorthy@unesco-ihe.org) or go to: [www.switchurbanwater.eu](http://www.switchurbanwater.eu)**



Above: This is the oldest neighbourhood in Accra. Home to 200 000 people, Thisie has no piped water supply and only public toilets.

*Photo: Cristina Gonzalez/ UNESCO-IHE*



Above: Boys playing football in an open drain in Accra.

*Photo: Cristina Gonzalez/ UNESCO-IHE*

## HIV and AIDS

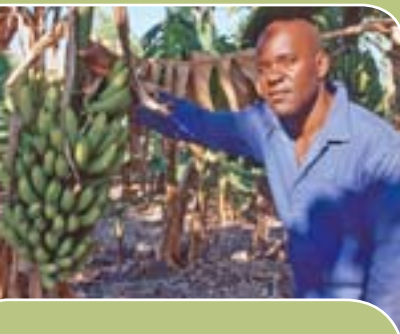
together with Françoise Barré-Sinoussi, for their discovery of the human immunodeficiency virus (HIV) and its link to disease, in 1983.

The Foundation's primary objective is to set up a worldwide network of research and education centres to stimulate international cooperation and facilitate the transfer of knowledge. The Foundation is the implementing partner for UNESCO's Families First Africa Project funded by the Italian government and carried out together with the Institute of Human Virology

(Baltimore, USA) and the University of Rome Tor Vergata (Italy).

Families First Africa is strengthening the HIV and AIDS programmes of Côte d'Ivoire, Burkina Faso and Cameroon (see photo) by supporting research and education centres in these countries.

**For details, contact: Prof. Luc Montagnier via [c.restif@unesco.org](mailto:c.restif@unesco.org), or Julia Hasler in the Division of Basic Sciences and Engineering: [j.hasler@unesco.org](mailto:j.hasler@unesco.org)**



Above: Banana plantation in Mozambique.

Photo: Sergio Santimano/  
UNESCO

*“A virtual dynamic library equivalent to 600 printed volumes.”*

Photo: Peter Coles/UNESCO



## A virtual library on health and development

The online *Encyclopedia of Life Support Systems* covers all the systems which support life on Earth, the way they are maintained and the threats hanging over them. A virtual dynamic library equivalent to 600 printed volumes, the encyclopedia contains contributions from thousands of scholars in over 100 countries. It focuses on all aspects of sustainable development, from ecological issues to food engineering and human security.

The encyclopedia is regularly updated. There are now more than 3000 articles on health-related subjects. In relation to agriculture, topics include economic development and nutrition, the influence of organic and conventional farming systems on nutrition, the impact of insecticides on health and international policies to control plant and animal diseases.

On the subject of the environmental impact on health, articles cover the effect on health of an ecological imbalance, nuclear energy and fossil fuels, air pollutants, the urban environment, environmental change and vector-borne diseases and so on.

Other articles cover developments in innovation for health. Examples are human genetics, genetic engineering, remote sensing and vector-borne diseases, vaccination in developing countries, prevention and control of communicable diseases and case studies for the treatment of illnesses (e.g. leukemias and other cancers, Ebola, bilharzia). One article examines the threat of gene therapy bioterrorism.

Other articles look at pharmacology and ethnopharmacology, including the use of plants as a source of anti-cancer agents, medicinal resources of forests, pharmaceuticals from algae, pain pharmacology and immunopharmacology.

In the policy arena, topics include health and demography, reproductive health, financing health research, public health aspects of on-site sanitation, mathematical models of public health policy and environmental quality standard-setting.

The encyclopedia was launched by UNESCO in 2002 and is sponsored by EOLSS Publishers in the UK. Internet-based, it is available free of charge to universities and other institutions of higher learning in least developed countries, subject to approval by the UNESCO–EOLSS Joint Committee. By 2008, over 100 universities had taken advantage of this opportunity.

For now, only exceptional articles from the encyclopedia have been published in print format, including one full theme on food engineering in 2005. The encyclopedia's full body of knowledge is being made available in the form of e-books in pdf format: about 145 e-books will be released initially in 2009, with the number gradually climbing to 600 volumes.

Efforts are also being made to translate the English-language encyclopedia, in collaboration with the Universal Networking Digital Language Foundation in Geneva, Switzerland. ACD containing 25 articles in English and their translation into Arabic, Chinese, French, Russian and Spanish, the five other official UN languages, is due to be launched in March 2009.

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## Why research for health can – and should – influence

**The first global report on the state of agriculture was released at UNESCO on 15 April 2008. Co-sponsored by FAO, the Global Environmental Facility, UNDP, UNEP, UNESCO, the World Bank and WHO, the *International Assessment of Agricultural Science and Technology for Development* has been written by 400 scientists and approved by 57 governments. The report takes an integrated approach to the subject by covering not only food production but also social justice, health, indigenous issues and the environment.**

The report observes that, despite the evident and complex links between health, nutrition and agriculture, on the one hand, and agricultural knowledge, science and

technology on the other, improving human health is generally not an explicit goal of agricultural policy. This is short-sighted, as agricultural policy has a major impact on human health. Research for health is thus essential for informed policy decisions.

If we take the example of undernutrition, we can see now that policies favouring cash crops over staple food crops have placed countries in a situation of great dependency on imports of a narrow range of cereals. Even Latin America, which produces one-third of the world's transgenic crops and is blessed with abundant freshwater and arable land, imports much of its food, creating dependence on international markets and disrupting local production. Some 10% of Latin Americans suffer from hunger or malnutrition.

# Climate change penetrates underground

When people think of global warming, they tend to imagine it as only happening above-ground. Yet, when combined with the urban heat island effect, global warming can penetrate more than 100 m below the surface. This makes global warming a groundwater issue – and potentially a health issue –, as the quality of groundwater can be altered geochemically and geomicrobially by higher subsurface temperatures. This risk has been identified by a case study in the framework of UNESCO's project on Groundwater Resources Assessment under the Pressures of Humanity and Climate Change (GRAPHIC).

The impact of climate change and human activities on groundwater around the world remains poorly understood, largely due to the invisibility of the resources and the difficulties in assessing it. To fill this knowledge gap, the GRAPHIC project has established regional networks in Latin America and the Caribbean, Asia and the Pacific, Africa, Europe and North America. The GRAPHIC Africa network is the most recent, having been launched in June 2008.

In 2009, GRAPHIC will be publishing *Groundwater and Climate Change*, a compilation of case studies by researchers around the world participating in the project. One of these case studies has compared four Asian cities: Tokyo and Osaka in Japan, Seoul in the Republic of Korea and Bangkok in Thailand. Scientists analysed measurements done over the past 15 years of borehole temperatures below ground then averaged these temperatures within each of the four cities. By pinpointing the depth at which the borehole temperature deviated from the norm, the scientists were able to ascertain the point at which, in each city's history, urbanization had begun adding heat to the city. This is because heat is stored longer underground than at the surface and travels only slowly downward through subsurface layers.

Studies on the effect of heat from urban areas on subsurface temperature are still uncommon and subsurface temperature data have only rarely been used to time the onset of urbanization. This Asian study was the first attempt to evaluate these phenomena on a regional scale, although studies already exist for some individual European and Asian cities. Other cities to be included in the study are Taipei, Manila and Jakarta.

Other GRAPHIC projects are focusing on health-related issues linked to the contamination of groundwater by human and animal waste, chemicals, saltwater intrusion and so on. A GRAPHIC case study of the High Plains Aquifer in a semi-arid part of western USA, for instance, has revealed that agrichemicals such as fertilizers and pesticides have infiltrated the aquifer, causing widespread elevated nitrate and pesticide concentrations in groundwater. In the Netherlands, saltwater contamination of groundwater is a serious problem in a country where 25% of land lies below sea level.

**For details of GRAPHIC, contact:**  
[h.treidel@unesco.org](mailto:h.treidel@unesco.org) or [makoto@chikyu.ac.jp](mailto:makoto@chikyu.ac.jp)  
**Read the GRAPHIC Framework Document (2nd edition):** [www.unesco.org/water/ihp/graphic](http://www.unesco.org/water/ihp/graphic)



Downtown New York (USA). Some of the world's cities are trapping so much heat in their concrete footpaths, asphalt roads and brick buildings that the streets remain warm long after sunset. Add to this the hot air generated by air conditioning systems and refrigerators, as well as the emissions from vehicles, and you have the urban heat island effect, a phenomenon which is causing some of the world's cities to warm as much in a few decades as they have over an entire century. When people think of the repercussions for human health of higher temperatures, they tend to think of the increase in ozone levels or heat waves – but urban heat islands also penetrate underground to the city's groundwater supply.

Photo: UNESCO

## agricultural policy

On another continent, some 30% of Africans are chronically hungry. The sub-continent lacks micro-nutrient-rich foods, despite possessing an enormous potential for crop genetic resources. Ethiopia for example has 12 potentially valuable crop plants, including the vegetable okra (*Abelmoschus esculentus*) and the legume crop yeheb (*Cordeauxia edulis*).

UNESCO can help countries to diversify production styles and foodstuffs, and to foster research into crops that are resistant to environmental stresses like drought, in order to combat malnutrition and dependency on food imports, and preserve a rich genetic diversity.

Another public health problem explored by the report relates to the indiscriminate or inappropriate

use of fertilizers and pesticides. In most sub-Saharan countries, this misuse has damaged human health and the environment, even though pesticide use is extremely low in Africa: over 50 000 tonnes of obsolete stocks of chemicals have accumulated over the past four decades. Many of these chemicals and their containers are in poor condition and threaten to contaminate soil, water, food and air. The solution could be to combine basic training on how to use chemicals safely with the promotion of practices which reduce their use, such as the greater utilization of organic and mineral fertilizers and biopesticides, combined with more substantive solutions requiring changes to agricultural policies.

The report recommends that agricultural science place greater emphasis on safeguarding natural

resources and on 'agro-ecological' practices like natural fertilizers, biopesticides and traditional seeds, to protect both the environment and human health. UNESCO can guide countries in integrating traditional knowledge systems into agricultural practices and in using science, technology and good management practices to protect agrobiodiversity, the environment and human health.

**Read the Assessment:** [www.agassessment.org](http://www.agassessment.org)  
**For details, contact:** [s.arico@unesco.org](mailto:s.arico@unesco.org) or [g.calvo@unesco.org](mailto:g.calvo@unesco.org)

## Human health in water development

The massive Indira Gandhi Nahar Pariyojana project is changing the face of the Thar Desert in Rajasthan and will eventually irrigate 1.9 million ha of arable land. Halfway through the project development, the number of locally transmitted malaria cases has risen from a few thousand to 300 000 a year.

So begins a case study in the 2006 edition of the triennial *World Water Development Report* series. The series is a joint undertaking of 25 United Nations agencies comprising UN-Water, in partnership with governments and other stakeholders. The report is coordinated by the World Water Assessment Programme, the secretariat of which is hosted by UNESCO in Italy.

Each report presents a comprehensive picture of freshwater resources in all regions and most countries in the world as it tracks progress towards the water-related targets of the Millennium Development Goals (MDGs, see page 10). The reports examine a range of key issues that include the state of the resource, population growth and urbanization, changing ecosystems, food production, health, risk management, cooperation building in the trans-boundary context, industry and energy. Case studies look at typical water resource challenges and provide valuable insights into different facets of water crisis and management responses.

In the second report published in 2006, the chapter on Protecting and Promoting Human Health, from which the case study on India's Thar Desert is taken, updated the burden of water-related diseases, progress towards the MDG targets on water, sanitation and health, comparative risk assessment and governance. It was authored by WHO and UNICEF. Other chapters supervised or authored by leading specialized UN agencies looked at sanitation and other issues related to water and urbanization.

Each report concludes with a set of recommendations to encourage sustainable use, productivity and management of our increasingly scarce freshwater resources.

The reports target a wide audience, including all those interested or directly involved in the formulation and implementation of water-related policies, as well as managers, researchers, teachers, students and, of course, water users themselves.

The third *World Water Development Report* will be launched at the World Water Forum in Istanbul, Turkey, on 16 March 2009. It will be entitled *Water in a Changing World*.

**For details, contact: [o.unver@unesco.org](mailto:o.unver@unesco.org)**

**Read the reports online:  
[www.unesco.org/water/wwap](http://www.unesco.org/water/wwap)**



Above: Woman doing her ablutions in Rajasthan.

Photo: Georges Malempré/  
UNESCO

Scenes from the former port of Aralsk in Kazakhstan. A case study in *Water: a Shared Responsibility* (2006) traces the dramatic decline of the Aral Sea, after vast stretches of desert were put under cultivation to produce cotton across 7 million ha of irrigated agricultural land. Within half a century, the Aral Sea Basin had shrunk by 75%. The loss of water, combined with chemical pollution from agricultural run-off, caused the fishing industry to collapse, a loss of biodiversity and an increase in human pulmonary diseases and infant mortality. Since completion of a dam in 2005, the northern Aral Sea has been filling up, making it possible once more for people to fish there. Photos: Zhanat Kulenov/UNESCO





# Health rhymes with biodiversity

Since 2008, UNESCO has been collaborating on the Co-Operation on Health and Biodiversity (COHAB) Initiative, an international programme responding to the gaps in awareness and existing policies on issues linking biodiversity with human health and well-being. The initiative aims to establish an international, interdisciplinary collaborative framework to support existing activities on international development, biodiversity conservation and population health, and to support the United Nations' Millennium Development Goals.

COHAB focuses on poverty reduction; food security; nutrition and dietary health; emerging diseases; natural products and medicinal resources; disaster prevention relief and response; livelihood sustainability and; indigenous people's issues.

COHAB observes, for example, that the relationship between biodiversity loss and the emergence and spread of new and more virulent disease vectors is of great international significance. There is clear scientific evidence that outbreaks of many diseases, including SARS, Ebola, hanta viruses, malaria and the HIV pandemic, have resulted from the human impact on wildlife and ecosystems, including *inter alia* habitat disturbance, unsustainable trade in bushmeat and other country foods, and the wildlife trade. Urban sprawl, encroachment into wilderness areas and the pollution of oceans and inland waterways have also been linked with the spread of diseases of people and wildlife. The current international spread of the H5N1 strain of avian influenza and other zoonoses (diseases spread from animals to humans) may also be facilitated by these activities and it is possible that biodiversity loss and ecosystem disturbance could increase the risk of this and other diseases being transmitted to people and wildlife.

COHAB sets out to establish mechanisms by which policy-makers, researchers, practitioners and stakeholders can effectively communicate and work together, in order to understand, assess and resolve the issues linking biodiversity and human well-being. In particular, the initiative works to identify and overcome the conceptual barriers to cross-sectoral understanding and dialogue at government levels, and to build capacity for cooperation and harmonization within and between stakeholders in developed and developing regions.

In keeping with its interdisciplinary nature, UNESCO's main role within the COHAB Initiative is to ensure that cultural values of biodiversity, as well as cultural and social factors that are critical for communities' spiritual and psychological health and social welfare, are being taken into account and effectively addressed in policy and research into the links between biodiversity and human well-being.

COHAB involves a wide range of partners, including UNDP, IUCN, FAO, UNEP and the Convention on Biological Diversity.

**For details, contact: [a.persic@unesco.org](mailto:a.persic@unesco.org) or go to [www.cohabnet.org](http://www.cohabnet.org)**



Above: Barrier reef in Belize. Coral reefs and mangroves not only protect fish, an important source of protein, but also act as buffers against natural disasters.

Photo: UNESCO

Below: Woman selling medicinal plants at a market in Quito, Ecuador.

Photo: Alison Clayson/UNESCO

Impala in Pendjari Biosphere Reserve in Benin. High biodiversity buffers disease – vector-transmitted diseases in particular, since vectors tend to target humans when surrounding biodiversity is low. Photo: M. Bouamrane/UNESCO





Above: A seafood lunch in a Bangkok restaurant in Thailand. Until 1970, cases of paralytic shellfish poisoning had only been reported in the Northern Hemisphere but, by 1990, the epidemic had spread to Australia, Brunei, India, New Zealand, Papua New Guinea, the Philippines, Sabah, South Africa and Thailand.

Photo: G. Malempré/UNESCO

*“People [...] should be made aware that one probable outcome of allowing chemicals to seep into the environment will be an increase in harmful algal blooms.”*

## Policy choices for containing a global health epidemic

Three hundred species of marine phytoplankton can proliferate to such an extent that they discolour the surface of the water, producing an impressive red tide. The microscopic algae which compose these spectacular blooms are a delicacy appreciated by oysters, mussels, scallops, clams, shellfish and the larvae of crustaceans and finfish. In some situations, however, these algal blooms can turn into a nightmare, causing severe economic losses to aquaculture, fisheries and tourism, major environmental damage and a public health emergency.

About 80 microalgal species are capable of producing toxins potent enough to find their way through fish and shellfish into humans. For the victim of food poisoning, the consequences can be tragic. Paralytic shellfish toxins, for instance, are so potent that a quantity the size of a pinhead, which can easily accumulate in a 100-gram serving of shellfish, can be fatal to humans. A mild dose of poisoning causes numbness, a headache, dizziness, vomiting and diarrhoea. In extreme cases, it can cause death through respiratory failure within 24 hours of consumption of the contaminated shellfish. In 1987, 26 of the 187 Guatemalans hospitalized with paralytic shellfish poisoning died. The survivors suffered no lasting effects. Had they been exposed to amnesic shellfish poisoning, however, which has been reported in North America and Europe, Australia and New Zealand, neurological symptoms could have lasted for months or even years.

Unlike with marine algal blooms, the most common public health risk in freshwater does not arise from the accumulation of algal toxins in the digestive system of shellfish but rather from drinking water directly contaminated with teratogens – which cause malformations in embryos – and cyanobacteria toxins which, over time, may favour the development of tumors.

Harmful algal blooms are completely natural phenomena but, in the past two decades, they seem to have become more frequent, more intense and more widespread.

Steps can be taken to protect both public health and aquaculture. In countries which pride themselves on having disease- and pollution-free aquaculture, every effort should be made to quarantine sensitive areas against the unintentional introduction of non-indigenous harmful species.

Nor can any aquaculture industry afford not to monitor for an increasing number of harmful algal species in water and for an increasing number of algal toxins in seafood products. Most importantly, people responsible for deciding quotas for pollutant loadings of coastal waters, or for managing agriculture and deforestation, should be made aware that one probable outcome of allowing polluting chemicals to seep into the environment will be an increase in harmful algal blooms.

Studies examining such phenomena as El Niño, greenhouse effects and ozone depletion also need to consider the possible impact of global climate change on algal bloom events. UNESCO's Intergovernmental Oceanographic Commission (IOC) is doing just that, via its research programme on the Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB). The programme also runs training courses in the identification of harmful microalgae via its Science and Communication Centre on Harmful Algae at the University of Copenhagen, in cooperation with the University of Tokyo. Since 2006, it has been awarding certificates of proficiency to scientists and technicians from IOC Member States participating in these courses. As Henrik Enevoldsen from UNESCO explains, 'In New Zealand and elsewhere, these courses have become a reference for laboratories seeking approval to carry out regulatory monitoring of harmful microalgae.'

**For details, contact: [h.enevoldsen@unesco.org](mailto:h.enevoldsen@unesco.org) or go to: <http://ioc.unesco.org/hab>, or subscribe for free to Harmful Algal News: [v.bonnet@unesco.org](mailto:v.bonnet@unesco.org)**

**To order the Manual on Harmful Marine Microalgae (2004) and Real-time Coastal Observing Systems for Marine Ecosystem Dynamics and Harmful Algal Blooms (2008): [www.unesco.org/publishing](http://www.unesco.org/publishing)**

# UNESCO Chairs supporting medical research

The UNESCO Chairs programme was conceived as a way of advancing research, training and programme development in higher education by encouraging inter-university cooperation through the transfer of knowledge across borders. Seventeen years later, 650 UNESCO Chairs have been established within the programme.

*For the full list of Chairs, go to: [www.unesco.org/education/unitwin/chairs/TBChaires.pdf](http://www.unesco.org/education/unitwin/chairs/TBChaires.pdf);  
or contact: [h.tortian@unesco.org](mailto:h.tortian@unesco.org) and [c.pinan@unesco.org](mailto:c.pinan@unesco.org)*

Medical Chairs established by UNESCO			
Country	Name of UNESCO Chair	University	Date Established
Argentina	Biophysics and Molecular Neurology	Universidad Nacional del Sur, Bahía Blanca	1998
France	Training of Trainers in Pedagogy and Clinical and Epidemiological Research in Medical Sciences	Université François Rabelais, Tours	2007
Indonesia	Ear Health Education and Training	University of Indonesia, Jakarta	1999
Mexico	Bioethics and Clinical Medicine	Instituto Nacional de Enfermedades Respiratorias, Mexico City	2007
Mozambique	Tropical Medicine	Universidade Eduardo Mondlane, Maputo	1998
Mozambique	Cardiopediatrics	Universidade Edouardo Mondlane, Maputo	1999
Poland	Molecular Medicine	Polish Academy of Sciences, Warsaw	1998
Russian Federation	Healthy Life for Sustainable Development	Moscow State Dentistry Medical University	2003
Spain	Tropical Medicine	Universidad de Granada	1991
Spain	Telemedicine	Universidad de la Laguna, Tenerife	1999
Switzerland	Telemedicine for Interdisciplinary Distance Teaching	Université de Genève	2005
Thailand	The Rational Use of Drugs (Interdisciplinary)	Chulalongkorn University, Bangkok	1992
Ukraine	Cryobiology	Institute of Cryobiology, Kharkov	1998

