

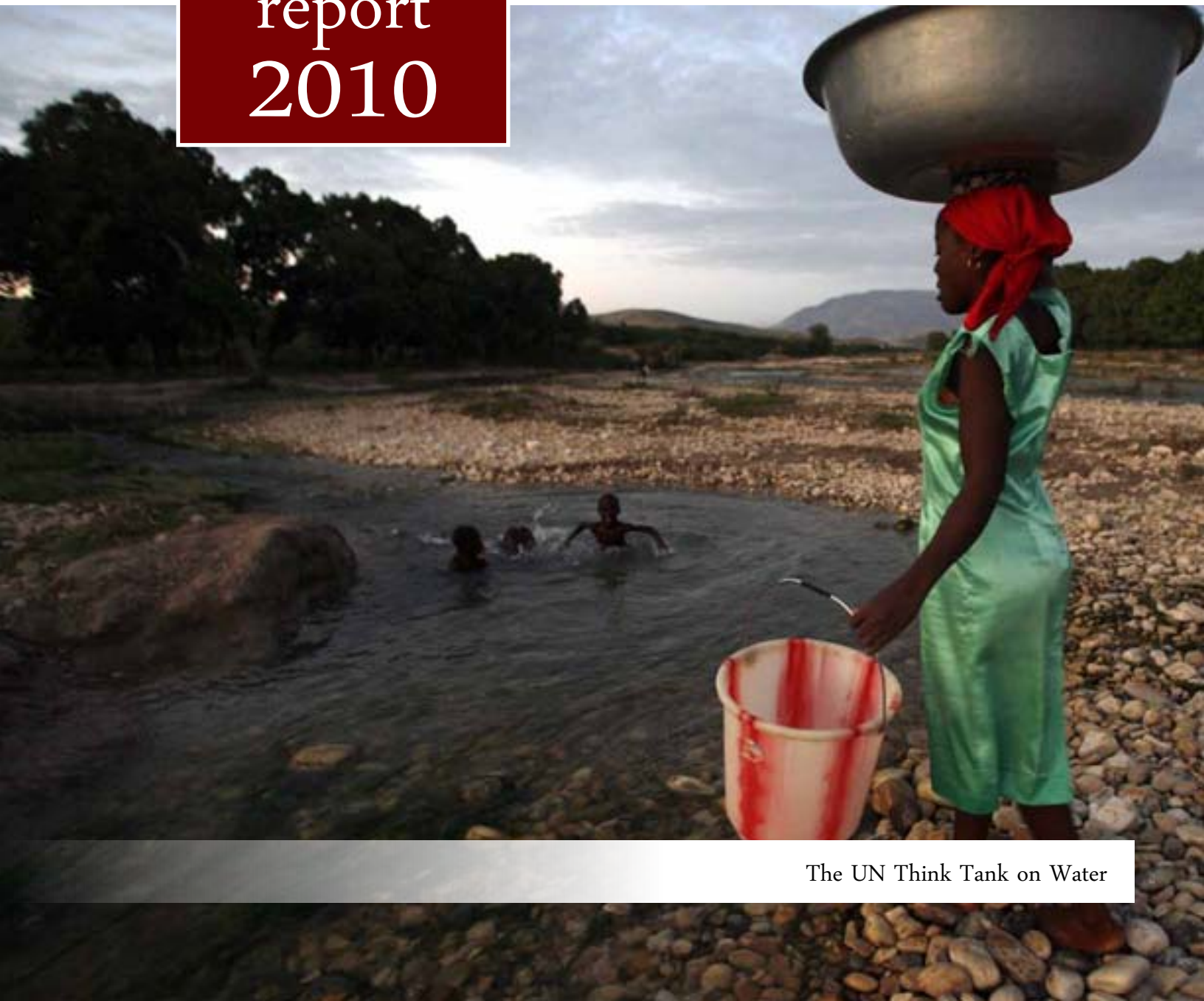


UNITED NATIONS
UNIVERSITY

UNU-INWEH

Institute for Water,
Environment and Health

annual report 2010



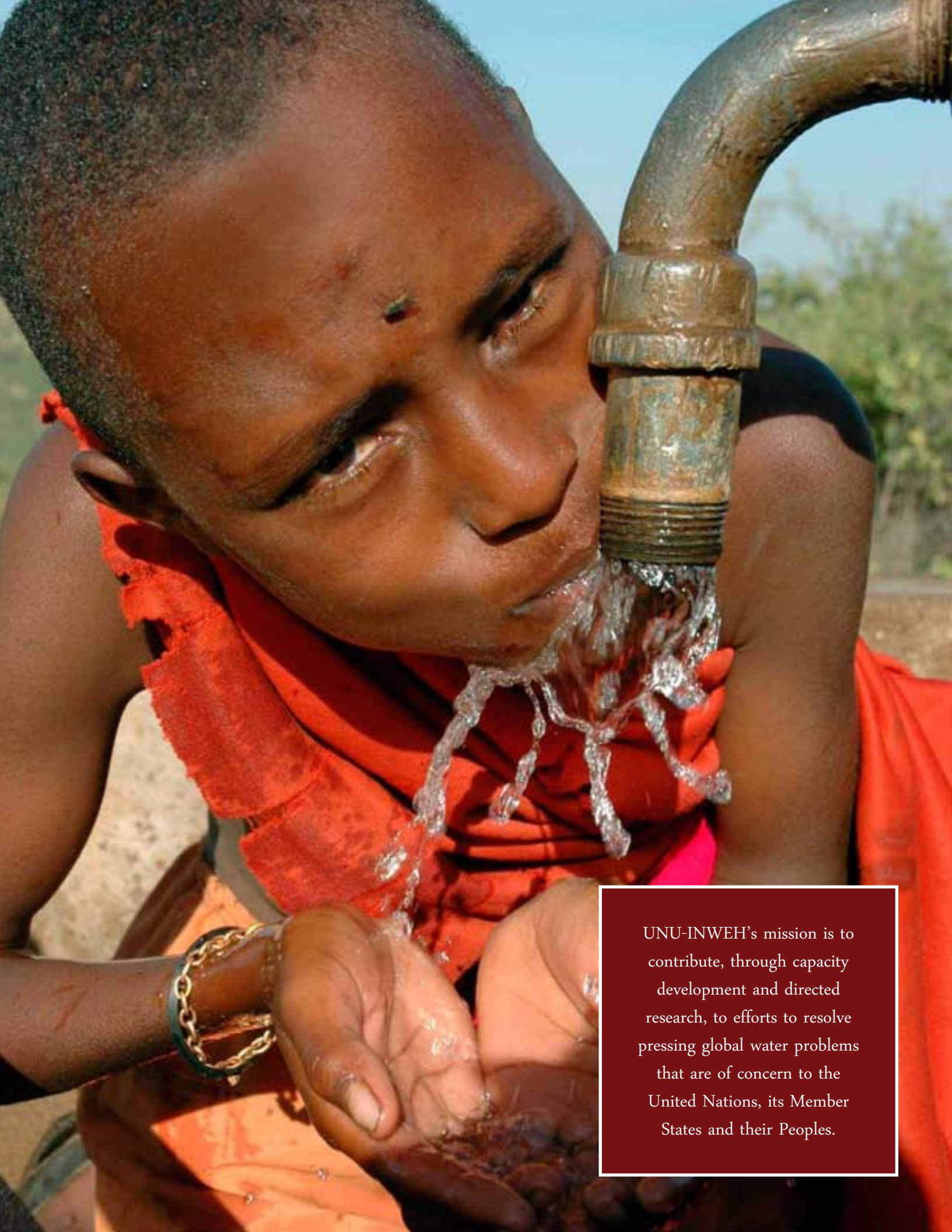
The UN Think Tank on Water



Over 3 million people, mostly children, die each year from water-related health problems, while billions are made ill. Importantly, it is now widely accepted that no other single intervention is likely to reduce global poverty more than the provision of safe water and sanitation. Safe water provisioning in unserved areas is barely keeping pace with global population growth, so that meeting the MDG targets for water is now in doubt. A holistic ecosystem approach, encompassing physical, economic, socio-political and cultural factors is required to address the issue.

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UNU-INWEH's mission is to contribute, through capacity development and directed research, to efforts to resolve pressing global water problems that are of concern to the United Nations, its Member States and their Peoples.

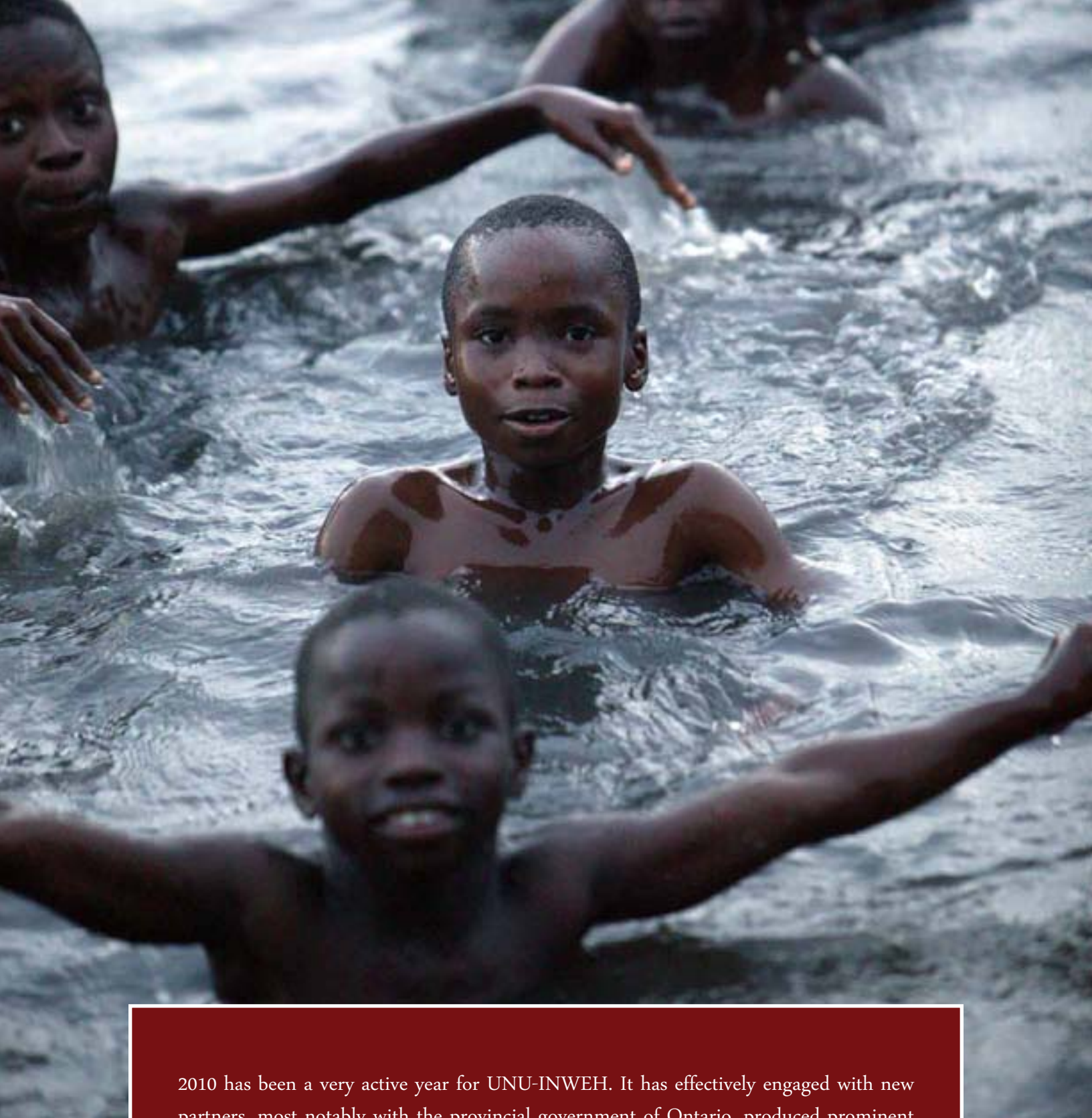


UNU-INWEH at a Glance

UNU-INWEH is the 'UN Think Tank on Water', responding directly to the global water crisis, and facilitates global efforts to meet the MDGs. In so doing, it aligns with the overall vision for UNU. UNU-INWEH's three core functions are derived from its mandate: (a) helping developing countries meet the MDGs through **capacity development**; (b) facilitating global **knowledge enhancement** and networking to address the global water crisis; and (c) fostering better approaches to water management and governance through applied research designed to **bridge critical policy gaps**.

UNU-INWEH's implementation team is grouped according to the four thematic sub-programmes. Each group is headed by a chief scientist (Assistant Director), responsible for managing the project activities within the theme, operationalizing strategies for growth, scouting for new partnerships and initiatives, and overseeing staff members. These functional groups are supported by an office support team comprising office administration, financial management, media interaction, and implementation in the Middle East and North Africa region. The support team is further underpinned by the Finance and Administration and the Human Resources units at UNU Centre.

The International Advisory Committee (IAC) provides advice and guidance to the Director. The IAC comprises up to six individuals appointed by the Rector and two ex-officio members (the Rector and the Director). UNU-INWEH is hosted by the Government of Canada, which hosts it in partnership with McMaster University. Core funding is provided through the Canadian International Development Agency (CIDA).



2010 has been a very active year for UNU-INWEH. It has effectively engaged with new partners, most notably with the provincial government of Ontario, produced prominent policy publications, launched a new academic programme and assumed a leadership role in the UN systems' work on water. UNU-INWEH also underwent an institutional review, which was organized in cooperation with the Government of Canada.

Director's Summary for 2010

UNU-INWEH's institutional review was undertaken by Goss Gilroy, Inc., working under the auspices of the Canadian International Development Agency (CIDA). The report, completed in September 2010, assessed the performance of UNU-INWEH's programme during the 2006-2010 period and the progress made in achieving its mandate. The report notes: "UNU-INWEH has achieved considerable success during the review period in extending its reputation (and, to some extent Canada's reputation) globally as a center of expertise in water issues." It further states that: "UNU-INWEH has strengthened its ties to Canadian universities both in academic programming and in project collaboration." The report recommends that the Canadian Government double its funding to UNU-INWEH, to CAD\$ 4 million per year, and execute a long-term agreement extending over 10 years beyond 2012. The report and its recommendations provide a very strong statement on the excellence of UNU-INWEH's work and its reputation as a water think tank in the UN system.

UNU-INWEH continued its dialogue with the Province of Ontario, Canada, by providing policy advice and seeking additional funds for activities of mutual interest. Significant progress was achieved on both fronts – particularly considering that there is no prior history of either. As a result of these discussions, the provincial policy focus on water issues was clearly elaborated in the throne speech, which stated: "As part of its Open Ontario Plan, your government will introduce legislation that will build on Ontario's expertise in clean-water technology." Furthermore, for the first time in its history, UNU-INWEH was recognized in the 2010 provincial budget document: "Ontario is also home to the United Nations University Institute for Water, Environment and Health, which focuses on resolving global water problems through the development of scientific research and capacity." Negotiations continue to secure specific funds for Canadian technology deployment in developing countries and to develop capacity in water and wastewater treatment and management.



UNU-INWEH successfully launched a new academic programme called "Water Without Borders" in partnership with McMaster University, Canada. The programme inducted its first cohort of 7 graduate students in September 2010. The programme was formally approved by the McMaster University Senate on 10 March 2010, after a thorough and formal review by all six faculties at the University and their subsequent endorsement. It was also approved as a UNU Diploma Programme by UNU management in June 2010. The programme attracts students from a range of backgrounds (natural sciences, human sciences, and health sciences) and disciplines (e.g., geography, engineering, business, philosophy, and medicine) corresponding with the academic specialties at McMaster University. The programme focuses on the common need to investigate key research issues at the water-health nexus while contributing to both policy and capacity building. The graduate students enrolled in the programme will have the opportunity to conduct research included in UNU-INWEH's projects and visit research sites in developing countries.

A significant development for UNU was that the UNU-INWEH Director assumed the role of UN-Water Chair for the 2-year period: January 2010 to December 2011. UN-Water is a mechanism that connects 28 United Nations organizations, entities and agencies in order to strengthen mutual coordination and coherence. It deals with issues related to all aspects of freshwater and sanitation; this includes surface and groundwater resources, the interface between freshwater and seawater, and water-related disasters. This appointment signifies UNU-INWEH's leading role in the international water community and offers opportunities to further strengthen its contributions to the worldwide efforts to overcome the global water crisis. During 2010, the UNU-INWEH Director chaired two meetings of UN-Water and participated in numerous high-profile events. A major highlight was the World Water Day celebrations in Nairobi, hosted by the UN Environment Programme.

Programmes

Coastal Ecosystems

Coastal zones comprise the most productive yet highly threatened ecosystems in the world. Population pressure is growing and nearly half of the world's coastal populations have no access to sanitation, a health risk further exacerbated by poor water quality. Communities and industries increasingly over-exploit coastal resources, while demands on coastal areas for shipping, waste disposal, military and security uses, recreation, aquaculture, and habitation are increasing. Over-exploitation of mangroves for fuel wood and shrimp aquaculture has gravely undermined the ecological functioning of these ecosystems. Freshwater diversion from estuaries has reduced water and sediment delivery 30% worldwide. Lastly, management of these complex coastal systems is inadequate, partly because of lack of resources, legal structures, and political will in many countries, but also because there are fundamental gaps in our understanding of ecosystem function and the impact of human activities.

UNU-INWEH's Coastal Ecosystems Programme focuses on improvement of scientific understanding to foster sound decision-making. This is directly linked to capacity development efforts to address critical gaps, achieved through diffusion of scientific research and promotion of human and institutional capacity. These initiatives are all directed to the long-term goal of Integrated Coastal Zone Management (ICZM).

Dryland Ecosystems

Drylands, comprising deserts, grasslands, and woodlands, cover about 41% of Earth's land surface and are inhabited by more than 2 billion people (about one-third of the world's population). Many of these dryland areas face severe land degradation in which marginal areas are turned into wastelands, and natural ecosystems are altered through destruction of surface vegetation, poor management of water resources, inappropriate land use practices, overuse of fertilizers and biocides, and disposal of domestic and industrial wastes. As a result, dryland populations on average lag far behind the rest of the world on human well-being and development indicators. In the absence of any remedial measures, the situation is likely to get worse over time due to population increase, land cover change, and global climate change.

UNU-INWEH's programme on drylands assists developing countries in dryland areas to better manage their land resources and to achieve sustainable use of their water and biodiversity resources. This is done through capacity development at various scales, ranging from community-based efforts to national training initiatives. The capacity building efforts are closely interlinked to knowledge management to support national policy development, particularly in relation to poverty-reduction strategies and better integrated natural resources management.

Freshwater Ecosystems

A major factor contributing to the global water crisis is the widespread failure to implement integrated river basin management. In most cases, conflicts in water usage – whether between sectors in a country, between upstream and downstream riparians or between countries sharing river basins – are not resolved effectively and sustainably. As a result, the continued neglect of water quantity and quality requirements for ecosystems has often led to devastating consequences for human health, natural capital, and aquatic biodiversity.

To better manage the river basins and to protect the ecosystems dependent on them, two core challenges must be overcome in many developing countries. The first is limited or absent scientific knowledge on water quality, quantity, ecology and ecosystem services. The second is the failure at the policy level to manage river basins in an integrated and holistic fashion.

UNU-INWEH's programme of work in this thematic area directly addresses these two challenges. The first challenge is addressed through targeted capacity-building efforts. The second is addressed by providing policy and management support based on the existing body of knowledge and information.

Water-Health Nexus

Over 3 million people, mostly children, die each year from water-related health problems, while billions are made ill. Importantly, it is widely accepted now that no other single intervention is likely to reduce global poverty more than the provision of safe water and sanitation. Safe water provisioning in unserved areas is barely keeping pace with global population growth, so that meeting the MDG targets for water is now in doubt. Holistic ecosystem approach, encompassing physical, economic, socio-political and cultural factors is required to address the issue.

The UNU-INWEH's focus on the Water-Health Nexus is aimed at the following three broad areas of interest: *Incorporating Ecosystems into the Health Equation* – examines human wellbeing within the context of relationships within the biophysical environment and prevents problems by fostering sustainable, healthy ecosystems.

Incorporating the Hydro-Social System into the Health Equation – examines human health within the context of the system that prevails within a country and determines the flow of water through society, and focuses on water-related illness and diseases.

Appropriate Provisioning – Approaches and technologies for engagement, ownership and empowerment that facilitate water provisioning.

GECHH

The Global Environmental Change and Human Health (GECHH) was launched in 2006 as a Joint Project of the Earth System Science Partnership (ESSP) to respond to the growing need to understand better the multi-faceted and complex linkages between global environmental change (including climate change, land and sea use change, global biodiversity loss and change, global socio-economic change) and human health.

The GECHH aims at elucidating the spectrum and magnitude of risks to human wellbeing and health, consequent upon human-induced global environmental changes, in order that society at large has a fuller understanding of the actual and likely consequences of the ways in which, collectively, human societies are changing the Earth System.



Comparative Advantages of the Institute

UNU-INWEH covers water issues broadly, offering services worldwide and occupying a unique niche in the UN system. It offers the following comparative advantages:

- **Access to the UN:** UNU-INWEH connects to various processes within the UN system, like the Commission on Sustainable Development (CSD) and Conference of Parties (COPs) of various environmental conventions, which allows it to directly provide policy guidance. A key example is that the UNU-INWEH Director represents UNU in UN-Water (and currently chairs the group), a group of 27 UN organizations working on global water and sanitation issues, another key example is drylands input to UNCCD.
- **Access to UN resources:** Its UN status allows UNU-INWEH preferential, and often exclusive, access to financial and human resources. These include the Global Environment Facility (GEF), the Arab Gulf Fund for UN Development (AGFUND), and the UN Development Account.
- **Unparalleled access to national governments:** UNU-INWEH has demonstrated its value in supporting water planning at the national scale, allowing unparalleled access to national governments.
- **Connectivity at various scales:** UNU-INWEH's activities connect the community-scale with the national scale, and extrapolate it to international water policy. For example, UNU-INWEH run pilot studies with small communities and synthesize the findings to impact policy formulation at national and international scales.
- **Knowledge synthesis capacity:** UNU-INWEH has demonstrated an unparalleled capacity to formulate policy-relevant recommendations.
- **Nimble administration:** UNU-INWEH operates within UNU's nimble administrative management system – while maintaining the full range of rules and regulations promulgated by the UN -- offering flexible and efficient implementation of projects and initiatives.

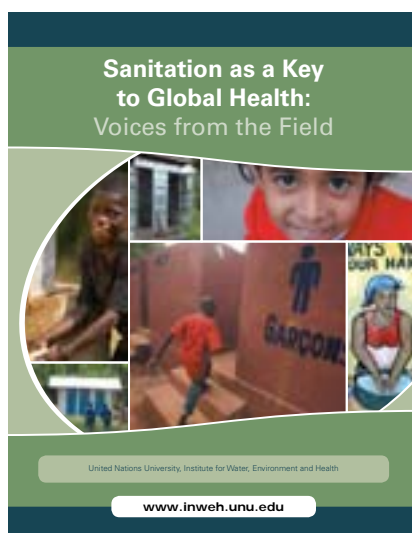
Policy Bridging / Think Tank Function Efforts

In April 2010, UNU-INWEH published the policy brief entitled: "Sanitation as a Key to Global Health – Voices from the Field." The public launch of the report was followed by wide media coverage. Nearly 400 stories appeared in print media, in over 13 languages and in over 30 countries.

The policy brief which summarizes the findings of a major international workshop organized by UNU-INWEH, highlights the moral, civil, political and economic need to bring adequate sanitation to the global population. The report makes it very clear that water-related diseases are responsible for a significant proportion of the global burden of illness – for example, 1.5 million children under 5 die each year from preventable diseases. Lack of access to clean, safe water and

adequate sanitation facilities are to blame. The report points to the need for smart investment into sanitation-provision initiatives: ones that develop the market and facilitate local entrepreneurship.

A side event was held at the UN Headquarters in New York to coincide with the Commission on Population Development (CPD). The policy brief was well received by the diplomats and delegates participating in the CPD meeting. A second discussion panel was organized at Carleton University in Ottawa, Canada to disseminate the sanitation brief and draw attention to the importance of water, sanitation and hygiene for child and maternal health. This second event was held immediately prior to the G8 summit in Canada in an effort to inform the dialogue.



UNU Postgraduate Programmes

UNU Postgraduate Programmes

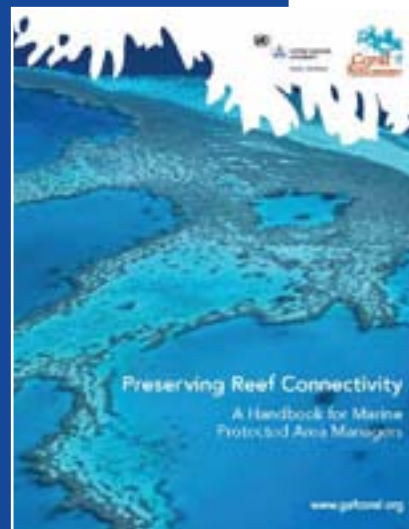
The deployment of a joint Master's Degree programme between UNU-INWEH and McMaster University – called "Water Without Borders" – reached a major milestone. The programme was formally approved by the McMaster University Senate on 10 March 2010, after a thorough and formal review by all six faculties at the University and their subsequent endorsement. The programme is intended to attract students from a range of backgrounds (natural sciences, human sciences, and health sciences) and disciplines (e.g., geography, engineering, business, philosophy, and medicine) corresponding with

the academic specialties at McMaster University. The programme will focus on the common need to investigate key research issues at the water-health nexus while contributing to both policy and capacity building.

Dr. Graham Knight of McMaster University was jointly appointed as the Programme Director by UNU-INWEH and McMaster University. Under his lead, the selection committee selected 7 graduate students, who were inducted into the programme in September 2010.

Media Campaign for the UNU INWEH publication: Preserving Reef Connectivity: A Handbook for Marine Protected Area Managers

During 2009-2010 the Coastal Programme of UNU INWEH together with partners around the world developed a publication titled: “Preserving Reef Connectivity: A Handbook for Marine Protected Area Managers”. The handbook is based on the outcome of a 5 year targeted research project coordinated by UNU-INWEH on the connectivity of reef organisms and implications for management of coral reefs. It outlines tools and techniques to assess connectivity for coral, fish, lobster and other coral reef species which can be used in designing and managing marine protected areas. The handbook was completed in July 2010 in both English and Spanish. The official press release took place on Tuesday 7 Sept. 2010. The distribution to the media was coordinated by media staff at UNU-INWEH and University of Queensland and distributed through their media networks around the world. Interviews were conducted with Dr. Peter Sale for three newspapers and one radio channel. Resulting media coverage occurred in five languages (English, French, Spanish, German, and Greek) in more than 119 articles across 24 countries and has been published by newspapers, news wires, websites, radio and newsletters. Since its release, we have received numerous requests from all over the world for copies of the handbook, which is available for free download from both the UNU-INWEH and Project websites (www.gefcoral.org).



MPA NEWS - September/October 2010

Handbook offers advice on connectivity for planning reef MPAs

A new guidebook explains the process involved in connectivity of coral reef ecosystems and offers practical advice to resource managers on how to incorporate this connectivity in MPA planning. Published by the Coral Reef Targeted Research program (CRTR), which is funded by the GEF, the handbook provides tips for estimating and tracking patterns of larval dispersal and exchange. It also answers common questions within MPA connectedness, such as “Are populations within MPAs self-sustaining?”, “What is the output of an MPA to surrounding areas?”, and more.

“If ever there was an area of research that would benefit from scientist/manager partnerships, the effort to pin down precise estimates of connectivity patterns for specific species is it,” write the handbook authors. The book is based on the results of research in the Caribbean and Pacific by CRTR researchers. The Connectivity Handbook: A Guide for Marine Protected Area Managers is available at www.gefcoral.org. It is also available at www.inweh.unu.edu, the website of UNU-INWEH, which managed the Connectivity Working Group within the CRTR project.



Progress Report on Coastal Activities and Projects

Coral Reef Connectivity and Large-scale Ecological Processes

The Coral Reef Connectivity and Large-scale Ecological Processes project was conducted as part of the Coral Reef Targeted Research and Capacity Building for Management project (2004-2009). This project was led by a team of 16 scientists (the Connectivity Working Group) from academic and research institutions around the world. It focused on understanding coral reef ecology, existing threats, and ways to improve the situation worldwide. New research was undertaken to quantify connectivity among local populations of selected coral reef organisms and effort was taken to improve local knowledge on the importance of connectivity in management and planning. It also emphasized capacity building to facilitate research and monitoring by experts in developing countries. New tools were developed for identifying sources and tracking movements of larvae, and demonstration projects on fish, corals and lobster were conducted. Management agency and local NGO personnel were directly engaged in research efforts as a way to build local capacity. Initial efforts were in Mesoamerican (western) Caribbean, and budget limitations prevented a planned replication of effort at Pacific sites until a future time. The project activities comprised four distinct but integrated projects, each of which developed novel methods for measuring connectivity quantitatively for specific species of fish, corals and crustaceans at specific locations.



Progress Report on Coastal Activities and Projects

International Training Course on Mangrove Biodiversity and Ecosystems

Since 2004, UNU-INWEH has been supporting this annual training course in collaboration with UNESCO-MAB and Annamalai University, India, where it is organized and held. The course primarily focuses on mangrove ecosystems while maintaining an integrated approach towards coastal ecosystem management. The main objective is to build the capacity of professionals and institutions in developing countries to undertake monitoring, research and conservation of critical coastal ecosystems within mangrove forests. This objective is achieved by training young professionals in the scientific methodology and description of latest research work on subjects relating to mangrove ecosystems. A secondary yet also important objective is to promote and encourage the development of a network of professionals from developing countries working in this field.



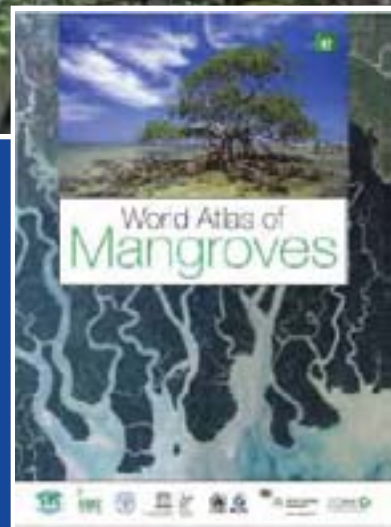
The tenth course was held in Parangipatai (India) from 1 to 15 October 2010. Participants from the East Asian region as well as India participated in the course.





World Atlas of Mangroves

The 2nd World Atlas of Mangroves was published by the International Society for Mangrove Ecosystems (ISME), in collaboration with UNU-INWEH, the International Tropical Timber Organization (ITTO), UNESCO, FAO, and the UNEP World Conservation Monitoring Centre (WCMC). It aims to further promote the conservation, restoration and sustainable use of resource-rich mangrove ecosystems, which are highly beneficial to the overall goal of sustainable management in coastal ecosystems. This second edition is intended for managers, conservation experts and scientists. It will help in decision-making related to conservation and development schemes. It will also strengthen awareness for the protection and sustainable management of mangrove habitats not only at the rural community level but also at the political level. The atlas is a comprehensive evaluation of existing data, and has led to the development of a current reliable and consistent baseline for mangrove ecosystems.

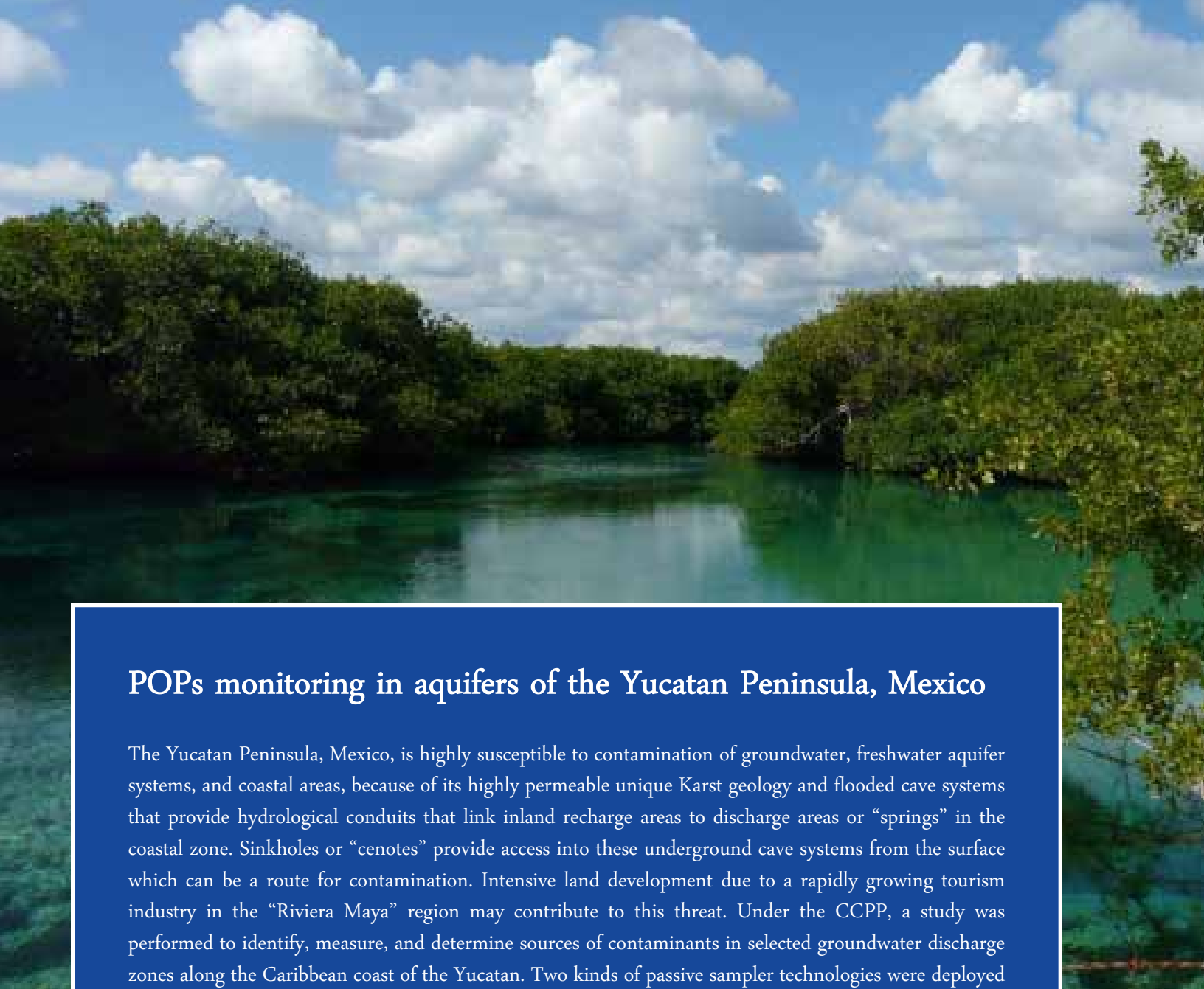




Progress Report on Coastal Activities and Projects

Reducing coastal pollution by improving baselines, awareness and monitoring capacity for Persistent Organic Pollutants (POPs)

The Caribbean Coastal Pollution Project (CCPP) project is evidence of how effective south-south networks can be built between academic institutions, analytical laboratories and management agencies in developing and developed countries. This project involved a Canadian based team that provided leadership and training to partner institutions in 8 Caribbean countries (Belize, Dominican Republic, Guatemala, Honduras, Jamaica, Mexico, St. Lucia, and Trinidad and Tobago). The objective was to enhance the capacity of regional staff and to implement a biological monitoring program, using a common fish species, to assess POPs and other harmful toxic substances in coastal waters. This project not only succeeded in raising awareness and regional expertise, but also supplied two partner analytical laboratories with much needed technical upgrades including state of the art laboratory equipment necessary for accurate chemical analysis. This stage of the project is now winding down, but future goals include finding donors to support the extension of this project to help further strengthen capacities and incorporate scientific findings into improving management of coastal areas throughout the Caribbean.



POPs monitoring in aquifers of the Yucatan Peninsula, Mexico

The Yucatan Peninsula, Mexico, is highly susceptible to contamination of groundwater, freshwater aquifer systems, and coastal areas, because of its highly permeable unique Karst geology and flooded cave systems that provide hydrological conduits that link inland recharge areas to discharge areas or “springs” in the coastal zone. Sinkholes or “cenotes” provide access into these underground cave systems from the surface which can be a route for contamination. Intensive land development due to a rapidly growing tourism industry in the “Riviera Maya” region may contribute to this threat. Under the CCPP, a study was performed to identify, measure, and determine sources of contaminants in selected groundwater discharge zones along the Caribbean coast of the Yucatan. Two kinds of passive sampler technologies were deployed for a one month period (December 2008 to January 2009) in 5 different underwater cave systems as this technique has proven useful for monitoring a wide range of contaminants in aquatic environments.

Collaborating with Mexican researchers, labs, local NGOs and students from Universities, collected data was analyzed and results were shared with regional stakeholders. There was evidence of contamination by pharmaceuticals and personal care products which likely originated from domestic sewage, the presence of Polycyclic Aromatic Hydrocarbons (PAHs) indicates contamination by runoff from highways and other impermeable surfaces, while samplers deployed near a golf course contained chlorophenoxy herbicides which indicates turf pesticide application as a likely source. These results led to stakeholder discussions for best management practices for reducing the likelihood of contamination in the Yucatan. Prevention and mitigation measures are needed to ensure that expanding development does not impact the marine environment and human health, thus damaging this regions tourism based economy.



Progress Report on Coastal Activities and Projects

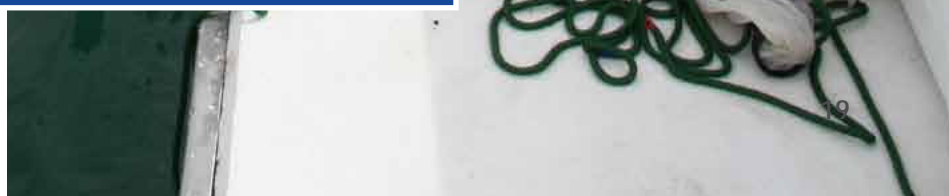
Assessing the environmental impacts of large-scale coastal developments in Dubai and improving overall coastal management capacity in the Persian Gulf region

This project centered on an ecological assessment of the environmental impacts of large-scale coastal developments in Dubai and improving overall coastal management capacity in the United Arab Emirates (UAE). Although currently suspended due to the global financial situation, the project has had positive impacts in the region. It served as a capacity building platform for people from the Gulf region in advanced training of environmental monitoring techniques. Furthermore, extensive field and laboratory studies were carried out to discover the nature of these newly developed ecosystems and how they respond to weather and other environmental variables. Important new scientific data were generated concerning the impacts of these man made islands on surrounding aquatic ecosystems. This research program also provided opportunities for graduate and undergraduate students at two regional universities to obtain valuable research experience. Much of the collected data has been synthesized and published in well respected peer-reviewed journals and a substantive policy brief is under preparation which will provide general guidance for coastal management in the Gulf region.



Tropical harmful algal blooms: an emerging threat to coral reef communities?

During the fall of 2008, a large-scale harmful algal bloom (HAB) event that was more than 500km² wide occurred in the Gulf of Oman. It caused widespread death of branching corals and substantial reduction in the abundance, richness and trophic diversity of associated coral reef fish communities. Such HAB events are on the rise and are negatively affecting coastal ecosystems around the world. Although the direct causes of this particular bloom are unknown, research conducted by our Dubai based team indicate that increased coastal enrichment due to wastewater discharge, natural oceanographic mechanisms, and the recent expansion of HAB species within ballast water discharge are contributing factors. Furthermore, with the rapid changes in oceanic climate, enhanced coastal eutrophication and increased distribution of HAB species that are now occurring around the world, such large-scale HAB events are predicted to increase dramatically in both intensity and distribution and can be expected to have increasingly negative effects on coral reef communities. The results of this study attracted media attention and were recently published in the Marine Pollution Bulletin in the hopes of highlighting this new threat to coastal ecosystems.





Progress Report on Drylands Activities and Projects

Ensuring Impacts from Sustainable Land Management (KM:Land)

Funded by the Global Environment Facility (GEF), the KM:Land Project aims at providing the scientific-technical basis for selecting indicators to record the performance, results and best practices of sustainable land management (SLM) projects in the GEF Land Degradation (LD) Focal Area. The KM:Land initiative has three specific objectives: i) to develop global- and project-level indicators which *inter alia* demonstrate global environmental benefits and related local livelihood benefits derived from actions on combating land degradation; ii) to exchange and disseminate knowledge and practices generated through SLM projects and programs through a Learning Network; and iii) to provide the means to measure results and performance of SLM projects and programmes through a coordinated monitoring and evaluation approach.

Through the extensive consultative process, the project has developed four global-level indicators to be used for determining global environmental benefits of GEF projects and for determining appropriate resources allocated to GEF funds. These indicators include land cover, land productivity, water availability and rural poverty. In addition, the project developed a second set of impact indicators to track progress at the project level. Five core impact indicators were selected; including land use, land productivity, water availability, human well-being and total system carbon, along with a set of continual indicators. In order to strengthen knowledge management and enhance the exchange of information and ideas between SLM professionals, the project has established an initial online Learning Network which comprises a Resource Centre with our online database of documents, and Communities of Practice to enable collaboration between SLM professionals.

A number of pilot testing activities were undertaken in collaboration with GEF project teams in Dushanbe (Tajikistan), Windhoek (Namibia), Dakar (Senegal) and Santo Domingo (Costa Rica), including field site visits. A final project workshop was held in cooperation with FAO at its headquarters (Sep 2010). This workshop was instrumental in finalizing the project outputs and engaging partners for future activities.



Inputs from UNU-INWEH to the UNCCD

The United Nations Convention to Combat Desertification (UNCCD) has published a set of ten recommendations on monitoring and assessing desertification and land degradation based on UNU-INWEH's work with the Dryland Science for Development consortium*. UNCCD concluded that monitoring and assessment (M&A) needed a rigorous science-based framework that addresses the complexity of land degradation. Biophysical knowledge needs to be integrated with social, policy, economic and institutional knowledge and sets of indicators need to be developed for each particular local circumstance. Aggregation of these local level indicators to the global level can be achieved using the hybrid Sustainable Land Management framework and global indicator set devised by UNU-INWEH's KM:land project (see previous page).

A landmark special issue of the journal *Land Degradation & Development* on monitoring and assessing land degradation will appear in early 2011 with UNU-INWEH staff co-authoring of 7 of the 14 articles. UNU-INWEH and DesertNet International have published a 'white paper' on knowledge management, institutions and economics that complements this publication.

The UNCCD has further selected a list of eleven impact indicators to measure progress on the implementation of the Convention for refinement, with the impact indicators developed under the KM:Land project figuring prominently in this process. Just as significantly, the universal SLM framework developed under the KM:Land project is being proposed by the UNCCD as the conceptual scientific framework to accompany the set of indicators. These proposals will be put forth to the Convention of the Parties (COP) in 2011.

*The Dryland Science for Development consortium consists of DesertNet International, the European Joint Commission's Joint Research Centre Institute for Environment and Sustainability, the International Center for Agricultural Research in Dry Areas, the International Crops Research Institute for Semi-arid Tropics and UNU-INWEH. The consortium was commissioned by the UNCCD to organize the first scientific-style conference of the United Nations Convention to Combat Desertification (UNCCD) that focused on 'Biophysical and socio-economic monitoring and assessment of desertification and land degradation to support decision-making in land and water management'.



Progress Report on Drylands Activities and Projects

Global Economics of Land Degradation

There is an urgent need to address the costs of continued land degradation (LD) and its corollary, the benefits of sustainable land management (SLM), in order to inform decision makers on future land use policies. Rising global interest in land for food security and bio-energy production is adding to the existing pressure from improper use of land. UNU-INWEH has consequently initiated a global study on the Economics of Land Degradation and has linked with other organizations such as the UNCCD's Global Mechanism and the Stockholm Environment Institute, amongst others to undertake this study. The outputs of this study will include an integrated ecological-economic framework for LD and SLM, robust replicable methodologies for the analysis of the value of land, national case studies, and a synthesis report targeted to national and global policy-makers. A research paper on the topic has already been submitted for publication.



UNU-INWEH suggests a need for an IPCC-like panel on land degradation

UNU-INWEH has proposed the establishment, via a consultative process, of an independent, international, interdisciplinary scientific mechanism to advise the UNCCD and other Multilateral Environmental Agreements such as the UNFCCC and UNCBD on land use and management issues.

UNU-INWEH suggested that an IPCC-like panel on land would examine the drivers and impacts of land degradation on the environment, economy and livelihoods in a paper presented at the high-level session of the UNCCD Conference of the Parties (COP-9) in Buenos Aires, Argentina, in September 2009*. UNU-INWEH repeated this call in the 'white paper' of the DSD consortium on knowledge, institutions and economics where it calls upon the COP to request the United Nations Secretary General to issue a call of interest to initiate a regional consultation process, (see "Inputs from UNU-INWEH to the UNCCD" page 21) and in a correspondence published in the journal *Nature* in June (Vol 465, p.869).

UNU-INWEH, together with DesertNet International, solicited the views of the scientific community on the establishment of such a mechanism or panel through an online international e-forum, and is currently developing a proposal on how to move this forward.

**This paper was co-authored by the "Hamilton group" that consists of authors from a number of international organizations speaking on an individual basis.*



Progress Report on Drylands Activities and Projects

Optimization & Enhancement of Groundwater Recharge through Reservoirs, Breakers and Dams in UAE

This project, undertaken in collaboration with and support from the UAE Government, aims to examine the effectiveness of dams in recharging groundwater aquifers. These aquifers serve as a major source of water supply, agriculture, and to a lesser degree, industrial uses. Their sustainable use over the long term requires an adequate balance between water withdrawal and recharge. Such balance must also account for changes in rainfall patterns as a result of global climate change.

The project will assess existing water harvesting techniques and review alternative methods available. The project will rely on participatory evaluation techniques involving local communities to assess the impact of water utilized for irrigation as well as the flood and erosion control measures. A systematic inventory of recharge dams will be prepared for 15 study sites. The project also entails significant capacity development, in particular through engagement of Ph.D. and M.Sc. students on the UAE project location. It is anticipated that the project will lead to better land and water management in UAE. These results are also transferrable to other arid and semi-arid countries throughout the region. Such cross-fertilization of ideas is explicitly included in the project design through engagement of project teams for the SUMAMAD-2 project from Tunisia, Iran and Jordan. The project's implementation began in the summer of 2010 and is expected to last for four years.



Progress Report on Drylands Activities and Projects

Sustainable Management of Marginal Drylands (SUMAMAD-2)

This 5-year project was formally initiated in March 2009, following the funding approval by the Flemish Government of Belgium. It builds on the first 4-year phase (2003-2007) that focused on assisting developing countries in Northern Africa and Asia to enhance the sustainable management and conservation of their marginal drylands. In this new phase, SUMAMAD-2 emphasizes training, capacity building and interaction with landowners and farmers. It also pays specific attention to climate change and the policy measures needed to effectively adapt to these changes in marginal drylands. The project has three major objectives: (1) Fostering scientific drylands research through improvement of dryland agriculture through the sustainable use of natural resources, focusing on sustainable water conservation and harvesting practices, restoration and rehabilitation of degraded drylands focusing on biodiversity conservation, and sustainable use of natural biotic resources; (2) Preparation of policy-relevant guidelines for decision-makers in drylands such as developing scenarios for land use changes including the assessment of trade-offs and economic valuation of dryland services, and interfacing with relevant policy-formulation institutions and processes in the respective countries; and, (3) Promoting sustainable livelihoods in drylands by encouraging alternative income-generating activities and diversification of economic options. The second phase of the project involves a collaborative network of researchers and institutions in nine countries (Bolivia, Burkina Faso, China, Egypt, India, Iran, Jordan, Pakistan, Tunisia), and is jointly managed by UNU-INWEH and UNESCO.



Progress Report on Freshwater Activities and Projects

GEF IV: Science

Following up on the major working IW: Science conference in Macao in January 2010 (joint activity between UNU-INWEH and UNU-IIST), work continues on this global initiative of the Global Environment Facility (GEF). The project is executed by UNU-INWEH and focuses on synthesizing scientific findings from GEF's International Waters portfolio. The objective of this \$2 million project is to provide a synthesis of scientific knowledge contained in GEF's International Waters portfolio with a GEF investment of over \$1 billion matched by over \$4 billion in co-finance. The purpose of the exercise is to extract scientific knowledge, identify programme gaps, improve science-to-policy bridging, and contribute to strategies for allocation of resources in the future. Project partners in the conference included: UNEP, UNESCO, the Scottish Association for Marine Science, the Land-Ocean Interactions in the Coastal Zone network, UNU-EHS, UNW-DPC, and the Canadian Water Network.

The second set of meetings of the five transboundary water system groups (River Basins, Lakes, Groundwater, Coastal Environment, LMEs and The Open Ocean) have recently been held individually in Scotland, Italy, Greece and South Africa over September/October 2010 to consolidate the working group outputs.



Progress Report on GECHH Activities and Projects

The Global Environmental Change and Human Health (GECHH)

The Global Environmental Change and Human Health (GECHH) is a Joint Project of the Earth System Science Partnership (ESSP) – a partnership formed by the four global programmes: IGBP, IHDP, WCRP and DIVERSITAS. It aims at fostering international networked research towards responding to the growing need to understand better the multi-faceted and complex linkages between global environmental change (including climate change, land and sea use change, global biodiversity loss and change, global socio-economic change) and human health. In this framework, GECHH aims to identify and quantify health risks posed by GEC, now and in the reasonably foreseeable future. It also focuses on the spatial (geographic, intra/inter-population) and temporal differences in health risks, to better understand vulnerabilities and priorities for interventions.

The broad objective of the GECHH project is to develop adaptation strategies for reducing health risks, assess their cost-effectiveness and communicate results (especially to decision-makers). This includes capacity building by fostering research training programs, boosting networked international research capacity in global environmental change and human health.

GECHH was formally launched in January 2010 with the opening of the GECHH International Project Office hosted at UNU-INWEH, situated within its Water-Health Nexus Programme. Among its initiatives a series of International Symposia has been planned, including the symposium “Global Environmental Change and Human Health: Protecting Water Quality” (Hamilton, Canada, 31 October – 2 November 2010) organised in partnership with UNU-INWEH.



Progress Report on Water-Health Nexus Activities and Projects

KAPE - Knowledge, Attitudes, Practices, and Empowerment

The project focuses on the provision of safe water to marginalized communities in the Lake Victoria basin of Kenya. Graduate students from McMaster University are working with researchers at UNU-INWEH to collect data (through focus groups, interviews, community mapping and photovoice) related to water and sanitation. While data collection is ongoing, already major differences are observed in knowledge, attitudes and practices across genders, age groups, and family status. The community's perspectives must be incorporated into the empowerment stage of the research, which will involve the development of (sustainable) interventions. Funding for the next phase of the research has already been secured from the Social Sciences and Humanities Research Council of Canada (SSHRC) and Rotary Canada.

The community was revisited in June 2010 and findings from the surveys along with water quality results were reported back. A subsequent partner meeting identified a 6 stage plan to build social cohesion, empower the community and support their implementation of a safe water provisioning plan. While in Kenya, a visit was made to Il Ngwesi, a Massai group ranch who are interested in solving their water issues. A quantitative health survey is being planned and will be undertaken in early 2011 to provide a baseline and important information to design an intervention. Two graduate students from the Water Without Borders programme will undertake research in the summer of 2011.



Abala Water Project, Kanya Kongo Village, Kenya

Women in this community used to walk 2 – 3 hours to fetch water from a dam before the Lake Victoria Basin Commission drilled a borehole and installed a manual footpump and storage tank. However, this community, like so many others in Sub-Saharan Africa, has a missing generation; migration to urban areas in search of employment and the HIV / AIDs epidemic have left Kanya Kongo with children and grandmothers. These older women could not work the footpump, so many returned to fetching their water from the polluted dam water. Based on the community's wishes, UNU-INWEH installed a solar powered footpump and extra storage tanks as well as an additional water point for these women. As a result, children have access to safer water and women are not spending hours to collect it. As an added benefit, the water tanks are filled in a couple of hours of pumping; they plan to utilise the extra solar energy generated in the local school.



Progress Report on Water-Health Nexus Activities and Projects

Vulnerability Mapping

This initiative is designed to measure, map and mitigate the vulnerability of individuals and communities to water-related diseases in the face of global environmental change. The project is a joint UNU initiative (INWEH, IIGH and EHS). Partial funding for this project has been secured from the Canadian Institutes for Health Research (CIHR). An outcome of the initial planning meeting was to focus on dengue and chikungunya fevers in Malaysia as a proof of concept. The findings from the preliminary work are being used to launch the global mapping exercise and to secure additional external funding, particularly from the Asian Development Bank which has expressed an interest in the initiative.

In 2010, a new proposal was developed and submitted to The Malaysian Science Fund. Ethics approval has been sought and awarded to the project by UKM, the Malaysia Ministry of Health and McMaster University. Census data have been purchased and we are in the process of obtaining meteorological data and disease data. The background documentation has been completed for the diseases and countries of study, and a data matrix has been developed to summarise data available in different countries. Exposure risks have been mapped for dengue fever, cholera and schistosomiasis in Vietnam to develop the methodologies and link to the Mekong Delta initiative. We are now waiting for provincial case data to validate the outputs.

Two graduate students - Kate Mulligan (PhD) and Sarah Dickin (MSc converted to PhD) - have joined the project as research students (McMaster University) while Haider will be working on the initiative from UKM. Firhad, a research assistant based in Malaysia, has been hired to co-ordinate collection of secondary data sets and aid with key informant interviews.



Kiyindi Water Project, Uganda

Kiyindi is a fish landing site on the shores of Lake Victoria. Given the absence of local alternative sources of clean drinking water, people in the community use the polluted Lake Victoria water for domestic and consumption purposes. A reservoir was built to capture natural spring water and pipe it to a storage tank for use by the fishers to clean fish, but the villagers still had to drink polluted water or pay vendors more money to cover their transportation costs. UNU-INWEH supported improvements to the existing supply by increasing the size of the underground reservoir at the source, increasing the storage capacity in the community and building 4 water kiosks with meters to better serve people. Today, people are accessing 700 jerry cans (20l) per day from these kiosks for 100 schillings each, rather than the 300-500 schillings it cost them from informal providers. Now they free up time and money for other activities and children are able to get to school on time. However, even though water is more accessible, the spring is not treated, so water quality cannot be assured; this still leaves consumers at risk for water-related diseases.

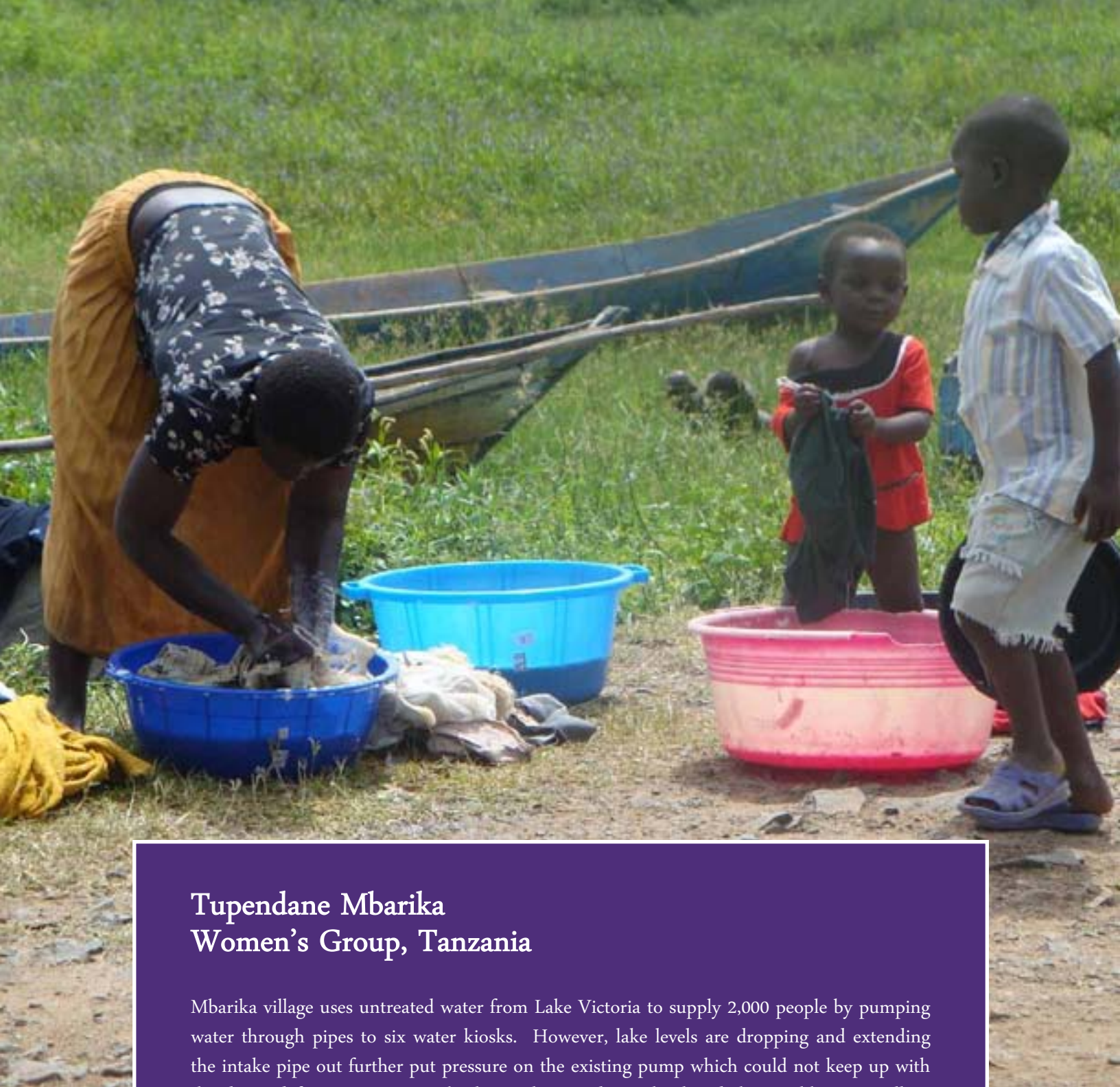


Progress Report on Water-Health Nexus Activities and Projects

Solutions to Polluted Lake-shore Drinking Water in Rural African Communities

Through a funding grant provided by AGFUND, the main objective of the project was to develop an integrated planning framework for the provision of safe drinking water to lakeside communities, based on a synthesis of regional Great Lakes experiences. Applicability of this framework has been tested through a pilot project in communities on the shores of Lake Victoria. Pumps now provide 12,000 households with access to easily drawn and safe water at a fee of US\$ 0.65 per month per household (with a solar-powered pump in Abala), US\$ 0.05 per 20 litres jerrycan (with electrically-powered pump in Kiyindi) and about US\$ 1.4 per month per household (with a diesel powered pump in Mbarika).

Two key lessons have been learnt. First, the beneficiary communities can manage their own developmental initiatives effectively if actively involved in planning, implementation, management and ownership. Second, the aspect of small grants achieving bigger impacts on the livelihood of communities is clearly demonstrated in the three projects. A complete transformation of the lives of more than 12000 people has been achieved through access to clean and safe water. This has translated into reduced medical bills (80% of the diseases diagnosed in the nearby dispensary were water borne diseases) and of course additional time for undertaking important economic activities such as farming. These lake water treatment programmes and technologies are being monitored and are designed to be replicable on a large-scale throughout the African Great Lakes Region.



Tupendane Mbarika Women's Group, Tanzania

Mbarika village uses untreated water from Lake Victoria to supply 2,000 people by pumping water through pipes to six water kiosks. However, lake levels are dropping and extending the intake pipe out further put pressure on the existing pump which could not keep up with the demand for water. A nearby hospital, secondary school and the neighbouring village could not access water from the current system.

UNU-INWEH invested in a stronger pump to transfer water the extra distance from the lake and constructed a new, excavated water intake closer to the lake to account for future falling levels in the lake. Now the system supplies water for 4,000 people and will be linked up to the school and neighbouring village.



Progress Report on Water-Health Nexus Activities and Projects

Safe Water Provisioning Knowledgebase

The development of an interactive knowledgebase of safe water provisioning solutions for rural, remote and otherwise marginalised communities around the world will provide simple, yet comprehensive information on proven solutions in order to empower and inform decision-makers. The initiative began with a workshop held in Hamilton in June 2009, funded by the Canadian Water Network. As a result of that meeting, UNU-INWEH has expanded the project partnerships to include additional research networks and aboriginal representatives.

Key stakeholder interviews were undertaken in December 2009 to identify knowledge gaps as they pertain to small systems, information that should be included in a knowledgebase and key features of a knowledgebase. The final report has been circulated to interviewees and project partners for their comments prior to posting on the project website. A second planning session was held in late November 2010, where the stakeholder findings have started being translated into knowledgebase design.

Usoma Village, Kenya

Usoma is a small rural community with an established fishing co-operative on the shore of Lake Victoria. This community, population approximately 1,000, engage in lake-based activities such as fishing, sand harvesting and water-hyacinth harvesting, exposing them to schistosomiasis. Schistosomiasis is an intestinal worm that does not have specific symptoms, but makes people lethargic and generally unwell because they aren't getting enough nutrients. This can undermine school food programs if, as in Usoma, almost 90 % of schoolchildren are infected. A lack of sanitation facilities continues the cycle of infection.

The community used to be served by a municipal pipeline (2 taps) in their community, but 3 years ago, during construction of an oil pipeline and transfer station, the water pipe was destroyed. A well drilled to replace the tap is too shallow and dries up during the year, sending community members back to Lake Victoria or a stream approximately 5 km away. The members of the community, despite a strong women's group and co-operative, have not been able to remedy this situation – a testament to the untapped capacity and lack of social cohesion that exists within the community. Now that we understand the community perceptions around water, environment and health, UNU-INWEH is working with local partners to implement programs that will build social cohesion prior to helping Usoma to develop and implement a water vision for their community.





Twinning

1) Alexandria University, Egypt

Discussions continue with the Alexandria University, Egypt to set up a joint research facility, leading up to the establishment of a twin institute. There has, however, been a setback in the process because the Egyptian security services deem water to be a politically-sensitive issue and are considering denying the approval to the university to establish such a research facility. A planning workshop, originally scheduled for May 2010, was indefinitely postponed by the Alexandria University.

An intervention by UNU with the political leadership in Egypt is likely needed to break out of this impasse. The UNU Rector will lead the process of communicating with the Egyptian Government.

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Andrew Dansie
Corinne Wallace
Elise Marquis
Hanneke Van Lavieren

Mark Butler
Richard Thomas
Ron Schaasberg
Zafar Adeel

UNU-INWEH Staff

Dr. Zafar Adeel, Director
Prof. Colin Mayfield, Assistant Director (IT and Freshwater)
Prof. Peter Sale, Assistant Director (Coastal Programme)
Dr. Richard Thomas, Assistant Director (Drylands Programme)
Dr. Alex Bielak, Senior Research Fellow (Freshwater Ecosystems Programme)
Prof. Chris Metcalfe, Senior Research Fellow (Water-Health Nexus)
Mr. Terry Collins, Communications Advisor
Dr. Walid Saleh, Regional Coordinator, Middle East and North Africa
Ms. Hanneke Van Lavieren, Programme Officer (Coastal Programme)
Dr. Corinne Wallace, Programme Officer (Water-Health Nexus)
Dr. Lucilla Spini, Project Officer (GECHH)
Dr. Bhim Adhikari, Programme Officer (Drylands)
Mr. Andrew Dansie, Project Officer (Freshwater)
Ms. Harriet Bigas, Project Associate (Drylands Programme)
Ms. Lisa Benedetti, Project Associate (Coastal Programme)

Mr. Bradley Berquist, Finance Officer
Ms. Ann Caswell, Office Administrator
Ms. Irene Gaerdes, Office Associate
Ms. Maria Baby, Finance Clerk
Ms. Gabrielle Glueheisen, Office Assistant

Prof. Ken Drouillard, Adjunct Professor UNU-INWEH, U. Windsor
Prof. Susan Elliott, Adjunct Professor UNU-INWEH, University of Waterloo
Prof. Gail Krantzberg, Adjunct Professor UNU-INWEH, McMaster University

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Head, Department of Biochemistry and Nutrition
All India Institute of hygiene and Public Health
Calcutta-700 073, India

Dr. Jose Galizia Tundisi
International Institute of Ecology
Sao Carlos, SP, Brasil

Ms. Deborah A. Turnbull
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The Alliance of Manufactures and Exporters Canada
Mississauga, Ontario, Canada

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former Executive Director of UNEP
NWMO (Nuclear Waste Management Organization)
Toronto, Canada

- 1) **A Public Panel Discussion - The Role of Water and Sanitation in Child and Maternal Health**
Ottawa, Canada, June 21, 2010 - June 21, 2010 (Completed)
Contact - Dr. Corinne Wallace, Water-Health Nexus
Co-organizers - Carleton University (Ottawa)
- 2) **Large Marine Ecosystems and Open Oceans**
Oban Scotland, September 15, 2010 - September 17, 2010 (Completed)
Event Description - This meeting is part of the Global Environmental Facility IW:Science project. It is the 2nd Technical Meetings of the Working Groups within GEF IW:Science.
Contact - Mr. Andrew Dansie, Freshwater Ecosystems
Co-organizers - SAMS, UNEP
- 3) **Groundwater Working Group**
Perugia, Italy, September 27, 2010 - September 29, 2010 (Completed)
Event Description - This meeting is part of the Global Environmental Facility IW:Science project. It is the 2nd Technical Meetings of the Working Groups within GEF IW:Science.
Contact - Mr. Andrew Dansie, Freshwater Ecosystems
Co-organizers - UNESCO
- 4) **International course: Biodiversity in mangrove ecosystems**
Parangipatai, Indida, October 1, 2010 - October 15, 2010 (Completed)
Event Description - The course focuses primarily on mangrove ecosystems while maintaining an integrated approach towards management of coastal ecosystems. Particular emphasis is given to teaching the methodology for assessing, monitoring and conserving biodiversity in mangrove ecosystems. This is achieved through a multidisciplinary team of lecturers and through hands-on involvement of the participants
Contact - Ms. Hanneke van Lavieren, Coastal Zone Ecosystems
Co-organizers - UNESCO, Annamalai University (India)
- 5) **Protecting Water Quality – GECHH 2010 Symposium in partnership with UNU-INWEH**
Hamilton, Canada, October, 31, 2010 – November, 2, 2010 (Completed)
Event Description - the inaugural symposium of the GECHH series which aims at catalyzing dialogue across different disciplines and countries, optimizing research efforts on global environmental change and human health, and at translating key research outcomes into policies and interventions.
Contact - Dr. Lucilla Spini, GECHH, Water-Health Nexus
Co-organizers - GECHH
- 6) **Land-Based Pollution Sources (Working Meeting)**
Athens, Greece, October 5, 2010 - October 7, 2010 (Completed)
Event Description - This meeting is part of the Global Environmental Facility IW:Science project. It is the 2nd Technical Meetings of the Working Groups within GEF IW:Science.
Contact - Mr. Andrew Dansie, Freshwater Ecosystems
Co-organizers - UNEP
- 7) **Contemporary Issues and challenges related to water, health and environment in Uganda**
Hamilton, Canada, October 12, 2010 (Completed)
Event Description - It is part of the Water-Health Seminar Series - "Another Drop"
Contact - Dr. Corinne Wallace
- 8) **Lake Basins and River Basins (Joint Working Meeting)**
Durban, South Africa, October 13, 2010 - October 15, 2010 (Completed)
Event Description - This meeting is part of the Global Environmental Facility IW:Science project. It is the 2nd Technical Meetings of the Working Groups within GEF IW:Science.
Contact - Mr. Andrew Dansie, Freshwater Ecosystems
Co-organizers - WRC
- 9) **Second review meeting for the International Mangrove Biodiversity course**
Nagoya, Japan, October 17, 2010 - October 17, 2010 (Completed)
Event Description - UNU INWEH has been providing core funding for this course annually since 2004. It is in UNU's interest to ensure that the course is continuing to serve a valuable purpose. To achieve this, UNU INWEH is planning to review the achievements of Annamalai University in convening the UNESCO - UNU-INWEH International Mangroves Biodiversity course and suggest ways to improve the focus and implementation of the course, consider expansion of the curriculum, possible new venue(s) for delivering the course, discuss possible partnerships, and discuss funding options for the future.
Contact - Ms. Hanneke van Lavieren, Coastal Zone Ecosystems
Co-organizers - UNESCO, Annamalai University (India)
- 10) **The science-policy bridge for a changing climate: water, health, diseases - side event**
Romania, Bucharest, November, 24, 2010 (Completed)
Event Description - side event at the Second Session of the Meeting of the Parties (MOP-2) to the Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes
Contact - Dr. Lucilla Spini, GECHH, Water-Health Nexus
Co-organizers - GECHH

United Nations University
Institute for Water, Environment and Health

175 Longwood Road South, Suite 204
Hamilton, ON Canada L8P 0A1
1.905.667.5511 • www.inweh.unu.edu