United Nations Environment Programme

UNEP

Fresh Water for the future

A synopsis of UNEP activities in water

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Contents

Foreword

Addressing water related challenges is one of the preoccupations we face in our day to day lives. It is also prioritized at a global level. Improving access to water is one of the key goals to meet in the Millennium Development Goals (MDGs); while many of the other goals related to human health depend indirectly on access to water. The current global trends show scenarios where maintaining our ecosystem and ecosystem services will become more difficult, therefore impacting on the provision of water that is so essential for human well-being.

In 2007 the UNEP Governing Council adopted it's Water Policy and Strategy which promotes an integrated water resources management approach. This approach to improve water management incorporates environmental, economic and social factors as key pillars for ensuring sustainable management and the equitable distribution of water. Five years down the line, the UNEP interdivisional water group has developed its Freshwater Operational Strategy which will guide its work up to 2017.

This booklet emerged from the process of preparing the Freshwater Operational Strategy, thus complimenting it. It presents UNEP's comparative advantages and its catalytic role in influencing other partners and UN agencies in meeting the global water challenges. It highlights a few of the organisations achievements and success stories over time as well as contemporary water challenges for further considerations along with partners as part of the international agenda.

In brief the publication gives a snapshot of the significant contribution that UNEP with its partners have made around the world in protecting our limited fresh water resources for the improvement of livelihoods, focusing on the ecosystems approaches in line with its mandate case studies range from on-ground intervention to normative work at national, regional and global level. The cases presented here illustrate UNEP's work at the global, regional, national, catchment and sub-catchment levels. No effort has been made to depict regional balance of the cases presented.

Finally, we would like to thank the many partners that we have worked with who have helped us in shaping our work. It is our hope that we will continue working together in the next few years as we focus on the four priority areas of the Fresh Water Operational Strategy: Meeting the global water quality challenge, benefiting from aquatic ecosystems, building resilience to climate change through water management and mainstreaming resource efficiency.

Division of Environmental Policy Implementation

1. What about water?

"The achievement of all the Millennium Development Goals... hinges on the quality and quantity of available water as water plays a disproportionately powerful role through its impact on, among other things, food production and security, hygiene, sanitation and health and maintenance of ecosystem services."

Achim Steiner, Executive Director of UNEP

It's no use closing the proverbial door after the horse has bolted, nor is it worth waiting until the world water situation is in even deeper crisis. With UNEP's water policy for 2007-2012 coming to an end, a Freshwater Operational Strategy (FOS) (2012-2016) has been prepared to address the increasing magnitude of water issues. The FOS is based on integrated water resources management, which takes a holistic approach to addressing water-related issues.

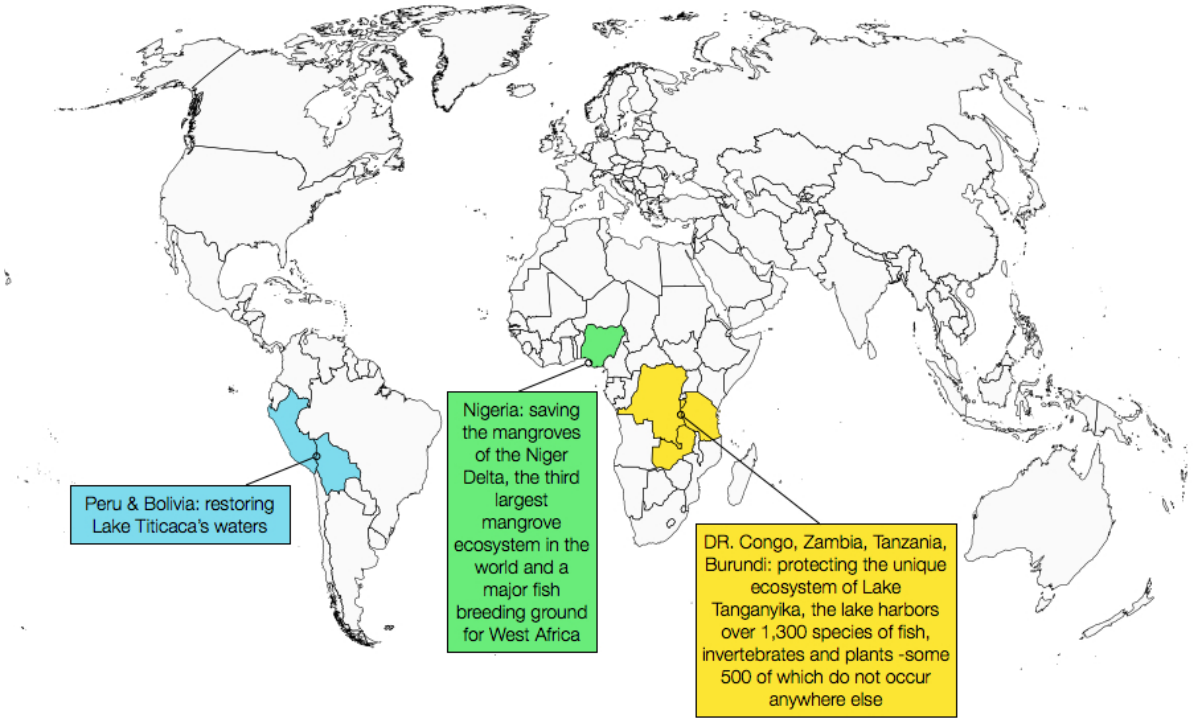
In today's world of growing human population and accelerating development, alongside the uncertainty caused by climate change, the world's ecosystems are under pressure. Water is fundamental for these ecosystems to remain alive and healthy. Water enables the provisio©n of multiple ecosystem services and supports food production. Industries are heavily reliant on water, both in terms of production and for electricity generation. At the household level, access to clean water and adequate sanitation services are a constant cause for concern

Water is one of UNEP's top priorities as it spreads awareness of the urgent need to transform financial systems through green economy approaches. UNEP's freshwater policy and strategy promotes environmental sustainability as key to the management of all water resources. This means using integrated ecosystem management approaches, within a wider framework of internationally agreed targets and goals relevant to water and socio-economic development. An ecosystem management approach factors in the full range of ecosystems, looking at hydrological basins as a whole, upstream to downstream, while also acknowledging environmental, and social, cultural and economic needs. These include maintaining the biodiversity and health of the environment while protecting ecosystems in order that they can continue their vital, multi-tasking role to humanity: combatting climate change and pollution, while providing services to promote our health and well-being.

UNEP plays a crucial role in assisting countries and communities dealing with disasters and conflicts, while also influencing resource management in the long-term. Increasing emphasis is put on managing water as part of this holistic ecosystem approach, within a Green Economy. The Green Economy concept and ecosystem approach promote taking a broader perspective when making decisions involving water efficiency, accounting for and valuing services provided by ecosystems, while also incorporating climate change considerations into planning and management approaches.

UNEP's worldwide assessment work, publications and projects highlight a range of critical issues for freshwater, identifying new opportunities for restoring ecosystems, improving water efficiency and productivity, as well as reducing waste and re-using water. Demonstrating innovative approaches and building capacities of countries is also an important part of UNEP's work to trigger change. Some publications and projects are briefly outlined here, demonstrating how UNEP has shown that human livelihoods and the environment can reap the benefits of sustainable water management.

"Well managed, healthy freshwater systems support sustainable development and human well-being." Vision statement



2. Water quality for life

Introduction:

Human survival is dependent on clean water. Yet our freshwater ecosystems are among the most degraded on the planet, suffering proportionately greater species and habitat losses than terrestrial or marine ecosystems. Every year more people die from the consequences of unsafe water than from all forms of violence, including war. Unsafe or inadequate water, sanitation, and hygiene cause approximately 3.1 per cent of all deaths – over 1.7 million deaths annually. Over 90 per cent of those who die as a result of water-related diseases are children under the age of five. The poor are those who suffer most: often forced to live near degraded waterways, they are unable to afford clean water, while women need to travel long distances to find safe water to sustain their families. It is estimated that 2.5

billion people are without improved sanitation, with over 80 per cent of the sewage in developing countries discharged untreated into water bodies. Most of the polluted freshwater is discharged directly into the oceans, damaging coastal areas and fisheries.

Water contamination can be caused by micro-organisms, bacterial or viral, as well as trace metals and toxic chemicals. The introduction of non-native species and changes in the acidity, temperature, and salinity of water also affect its quality. Worldwide pesticide application is estimated to be over 2 million metric tons annually. Industrial activity releases about 300-400 million tons of heavy metals, solvents, toxic sludge, and other waste into the world's waters each year. About 700 new chemicals are introduced into commerce each year in the United States alone. Despite this, nobody knows the exact extent of the world's deteriorating water quality as a global water quality assessment has never been conducted. Moreover a lack of knowledge on the extent of the problem means that countries are generally not in a position to come up with the appropriate responses.

The Millennium Development Goals, specifically the 7th, (halving the proportion of people without sustainable access to safe drinking water) aims for improved access to safe drinking water and basic sanitation. With this in mind, UNEP is addressing the serious issue of water quality through worldwide research, projects and publications, alongside capacity building and training programs.

Summary:

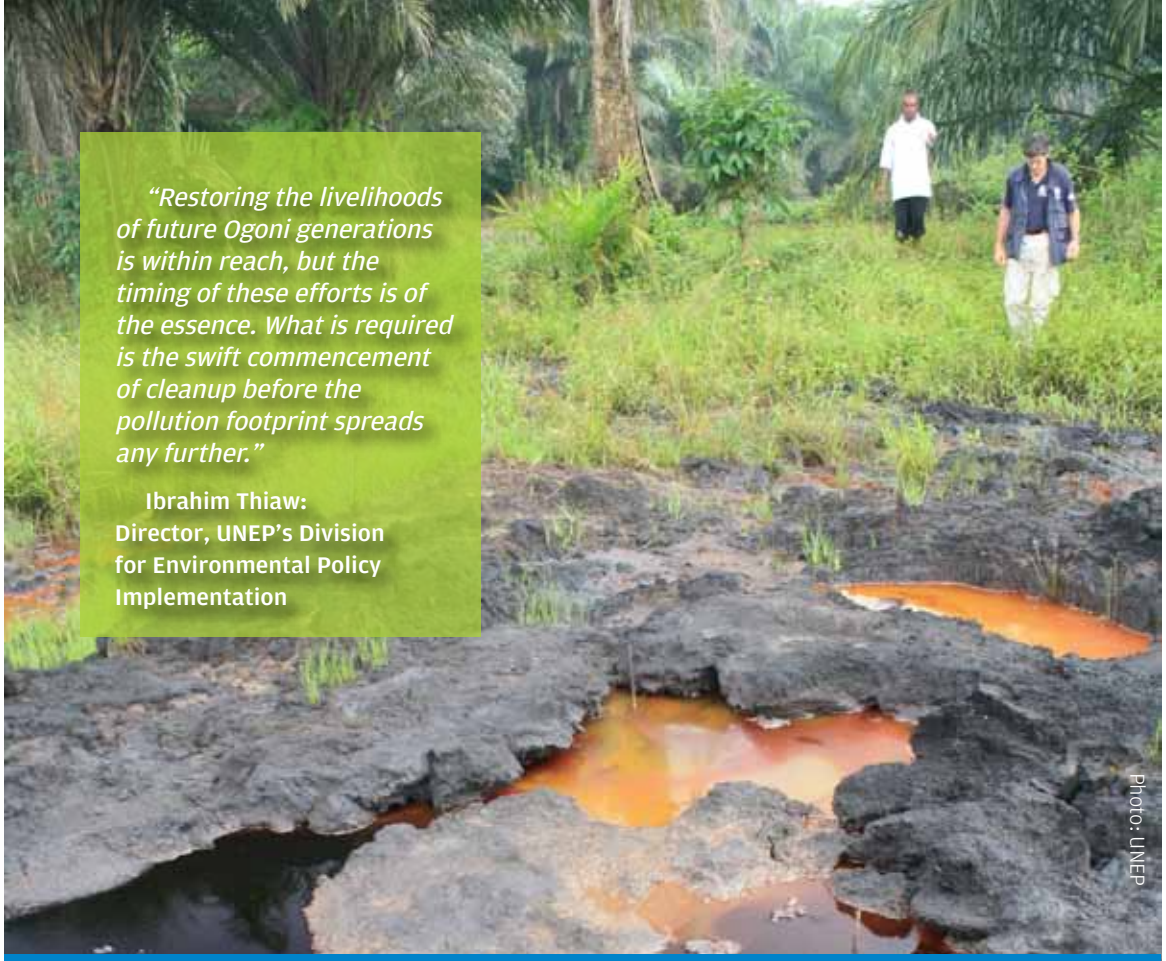
UNEP's two-year assessment in Nigeria's Ogonliland, in the Niger delta, has been one of the most complex on-site assessments ever undertaken. Prompted by severe threats from the oil industry, after detailed land and groundwater investigations the UNEP study found excessive hydrocarbon pollution, highlighting the urgent need for a major cleanup, before the long-term project gets underway to rectify people's health and livelihoods as well as to restore a globally-important aquatic ecosystem.

In the high Andes, UNEP's project in the Titicaca-Desaguadero River-Poopó-Coipasa Salt Marsh water system is examining how ecosystems are being severely affected by environmental degradation: dumping of wastewater from mining and urban sources and the improper practices in livestock raising, fishing and aquaculture. Added to these are desertification and salinization of the basin, as well as the accelerated retreat of glaciers. UNEP aims for sustainability of positive actions and capacity building of relevant institutions in Bolivia, Peru and the Lake Titicaca Binational Authority.

UNEP is providing technical assistance to improve monitoring of the shared water resources of Lake Tanganyika, a unique ecosystem under threat. This involves international partners and teams from the DRC, Tanzania, Burundi and Zambia.

The UNEP GEMS/Water Programme encourages worldwide participation in assessments, providing updated data on national and international water quality.

UNEP's publications, Clearing the Waters: A focus on water quality solutions and Sick water? The Central Role of Wastewater Management in Sustainable Development have brought global attention to the need for addressing waste water management in view of the current degradation of the earth's freshwater ecosystems.



"Restoring the livelihoods of future Ogoni generations is within reach, but the timing of these efforts is of the essence. What is required is the swift commencement of cleanup before the pollution footprint spreads any further."

Ibrahim Thiaw: Director, UNEP's Division for Environmental Policy Implementation

Photo: UNEP

Project: Science to ease social unrest in the Niger Delta

Facing challenges

Covering an area of about 70,000 square km, the Niger Delta is the third largest mangrove ecosystem in the world and a major fish breeding ground for West Africa, also rich in oil and gas reserves. Ogoniland lies within the Niger Delta in southern Nigeria, where concerns over petroleum-related environmental contamination have been at the heart of decades of social unrest. Although oil industry operations were suspended in 1993, widespread environmental contamination remains.

Sustainable solutions

Following a request from the Nigerian Government, UNEP conducted an independent study to determine the environmental and public health impacts of oil contamination and options for remediation. The two-year assessment covered issues of groundwater, surface water, contaminated land, sediments, vegetation, air pollution, public health and institutional reform. From a project office in Port Harcourt, a team surveyed 122 kilometers of pipeline rights of way and visited all oil spill sites, oil wells and other oil-related facilities in Ogoniland. More than 4,000 samples were analyzed, including water taken from 142 groundwater-monitoring wells drilled for the study. UNEP involved the Ogoni people to obtain local knowledge and access.

The study found that oil contamination was widespread, causing public health risks. The most serious case of groundwater contamination was discovered at Nisisioken Ogale, where an 8 cm layer of refined oil was observed floating on the groundwater which serves the community wells. The drinking water from nearby wells is contaminated with benzene, a carcinogen, at levels over 900 times above the World Health Organization guideline. UNEP's environmental assessment of Ogoniland report, presented in August 2011 to the President of Nigeria, provides clear operational guidelines to address the contamination in the region, while recommending a comprehensive cleanup operation.

Wider impact

The oil industry has been a key sector of the Nigerian economy for over 50 years, but many Nigerians have paid a high price, losing livelihoods and being exposed to serious health risks. It is UNEP's hope that the findings accelerate environmental and social improvements, as well as a strategic policy on how the oil industry will in future benefit the lives of affected communities. According to UNEP's report, individual contaminated areas can be cleaned up within five years while the restoration of heavily-impacted mangrove stands will take up to 30 years. UNEP is advocating immediate action to protect human health and reduce the risks.

UNEP's Ogoniland environmental study could be replicated in other parts of the world where concerns over the impacts of oil operations exist. Moreover, UNEP's findings and recommendations have implications for the oil industry in Africa and internationally.

Partners:
Government agencies at the national and Rivers State level, traditional rulers, chairmen of the local government areas of Ogoniland, local communities, laboratories, other UN agencies and the Rivers State University of Science and Technology

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Photo: Julia Mantzerova

Project: Restoring Lake Titicaca's waters

Facing challenges

Lake Titicaca, the highest navigable lake in the world, is set in a scenic region with an incomparable level of natural and cultural diversity, including the birth of the Inca Empire. Its highly varied, complex and fragile ecosystem has been recognized as being of paramount importance to the planet.

The Titicaca-Desaguadero River-Poopó-Coipasa Salt Marsh (TDPS in Spanish) water system in the Andes covers over 140,000 square km of territory, affecting the social and economic activities of nearly 2.5 million people. The governments of Bolivia and Peru created the Binational Autonomous Authority of Lake Titicaca in the early 90s, to manage the basin's resources. But studies over the past decade show the persistence of environmental problems including: defunct water-quality monitoring stations and laboratories; incomplete inventories of pollution loads and lack of procedures to identify and measure these; deficient sewage systems; few education programs; and an outdated water resources management plan. Critical issues requiring further research and immediate solution include sewage discharge, pollution from uncontrolled development and illegal mining, lack of reliable assessment of groundwater resources and possible negative impact of water diversions in the upper basins.

Sustainable solutions

With the financial assistance from the Government of Spain, UNEP implemented the project: Integrated Water Resources Management in the Lake Titicaca, Desaguadero River, Poopl, Coipasa Salt March System: Assessment and Update of Pollutants Discharge Levels. It mainstreamed ecosystems into the bi-national water-quality system, raising the awareness of around 2.5 million people in the basin on management issues. The project provided technical assistance to the Governments of Bolivia and Peru to tackle water quality, looking at the bigger picture.

The project has used science and the ecosystem approach to integrate and update water quality information through a bi-national information system. The latter guides decisions by relevant authorities, environmental, water and municipal, on water quality for drinking, fishing and agriculture. The project has engendered collaboration, support, transparency and trust. Thirteen properly equipped laboratories now share information on over 140 monitoring points.

Wider impact

The project's wider aims include promotion of the development of a "water culture" and a bi-national statute to achieve a sustainable integrated water resources management and environmental system.

The project has helped revitalize the Lake Titicaca Binational Authority, giving both governments useful ways of working through transboundary issues, engaging them further to adopt internal measures to assume their respective responsibilities in shared management of the basin's resources. Overall there is a renewed common understanding and vision on integrated water resources management of Lake Titicaca at all levels. There is also a new culture of trust, collaboration, transparency and mutual support between stakeholders, with increased public access to reliable and technical information.

Partners:
Ministry of Environment and Water of Bolivia; Ministry of Environment of Peru; Lake Titicaca Bi-national Authority; National Water Agency of Peru, Laboratory of EMSA-Puno (Empresa Municipal de Saneamiento Básico de Puno) Perú, Laboratory of EPS SEDA-Juliaca (Empresas Prestadoras de Servicios de Saneamiento – Juliaca) Perú, Laboratory of Water Quality (LCA of Universidad Mayor de San Andrés) Bolivia, Laboratory of EPSAS (Empresa Pública Social de Agua y Saneamiento) Bolivia, laboratory SPECTROLAB-Oruro, Prefectura of Oruro Bolivia, Prefectura of La Paz Bolivia, Regional Government of Puno Peru; local communities and municipalities; National and local Universities; Non-governmental organizations such as CARE-Peru, Rural Educational Services (SER) of Peru and the Center for Education, Research and Development (CIED) of Peru.

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http://www.pachamamaradio.org/05-11-2011/naciones-unidas-dona-laboratorios-a-seda-juliaca.html

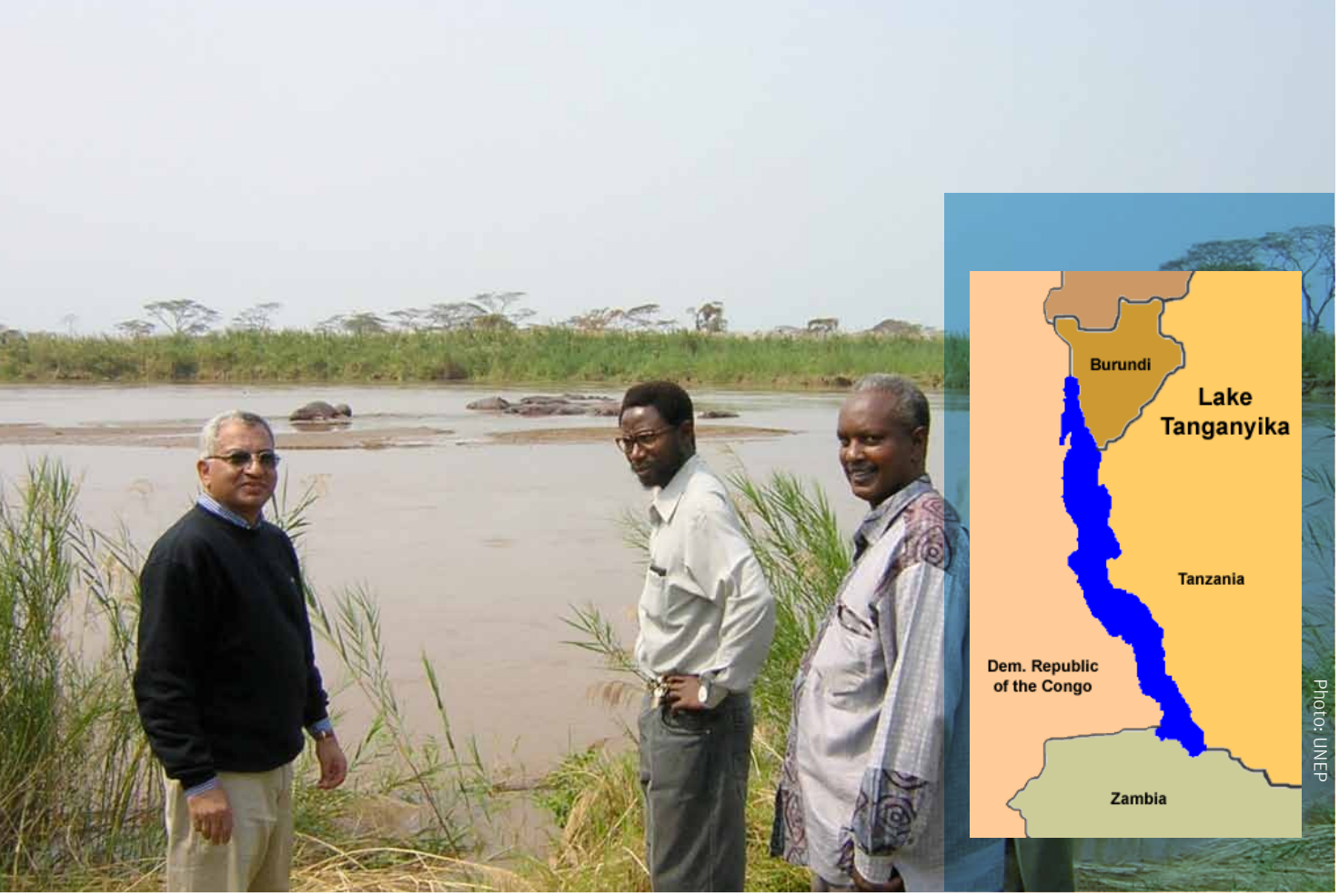

Photo: UNEP

Project: Protecting the unique ecosystems of Lake Tanganyika

Facing challenges

Lake Tanganyika, shared by DRC, Tanzania, Burundi and Zambia, harbors over 1,300 species of fish, invertebrates and plants - some 500 of which do not occur anywhere else. Many of these have no close relatives outside the lake basin, and are the result of prolonged evolutionary history. The rich diversity of this ecosystem is of worldwide importance. About 10 million people live in the lake basin, a tenth depending on fishing and related activities. With its growing population, the lake is highly vulnerable to pollution, especially from excess loads of sediment and nutrients caused by erosion in the watershed, as well as industrial and urban pollution and intensive fishing with inappropriate methods. The lake has also been warming up for the last four decades, leading to change in habitat and impacting water quality.

Sustainable solutions

UNEP has established a cooperation agreement with the Ministry of Science and Technology of China (MOST), signed in November 2008, to build capacity in ecosystem management, disaster reduction, climate change adaptation and renewable energy in Africa. A project to enhance the capacity of monitoring the shared water resources of Lake Tanganyika has been developed and is being implemented with international partners and teams from the 4 participating countries. UNEP is facilitating and coordinating the project, as well as providing technical support.

To achieve the project objectives, the Nanjing Institute of Geography and Limnology in China organized capacity-building sessions on the management and monitoring of the Lake's natural resources for the four participating countries. The institute also provided technical support to enhance the capacity of laboratories in Bujumbura to monitor the entire lake.

Wider impact

Monitoring water quality will provide data for decision-making on the protection of Lake Tanganyika's aquatic life, economic viability and human health. The project also aims to conserve and improve the health of the ecosystem resources of the lake system, taking the necessary action to maintain its water quality, coordinating the efforts of the Lake Tanganyika Authority (LTA) and the four countries to control pollution.

Partners:
Ministry of Science and Technology of China, Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences, Lake Tanganyika Authority and Governments of: DR Congo, Tanzania, Burundi and Zambia

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GEMS Water

Project: Keeping an eye on the freshwater quality of our ecosystems

Facing challenges

There is a wealth of information about the need of clean, adequate freshwater to support all living organisms and the smooth functioning of ecosystems communities and economies. However, declining water quality has become a global issue of concern as human populations grow, industrial and agricultural activities expand and climate change threatens to cause major alterations to the hydrological cycle (UN Water 2011, Policy Brief, Water Quality). Monitoring key water quality and ecosystem indicators, evaluations of water quality in ecosystems, building national capacity to collect, analyse and manage water quality data and information, improving water quality monitoring technology are some of the possible interventions identified at national and watershed levels to improve and protect water quality (UN Water 2011, Policy Brief, Water Quality)

Sustainable solutions

The GEMS/Water Programme was established in 1978, after a recommendation made at the 1972 Stockholm Conference on the Human Environment, with the purpose of encouraging countries to collect water quality data and to submit information on water quality parameters of interest to the Programme, for inclusion in a global-scale water quality database, GEMStat. GEMS/Water was established as a UN inter-agency program under UNEP and other partners.

Today the UNEP GEMS/Water Programme is the only program in the UN system exclusively dedicated to monitoring and assessing environmental water quality. With a network of partners worldwide providing data on water quality in rivers, lakes, reservoirs, groundwater and wetlands, the Programme has grown to more than 3800 monitoring stations over 126 countries, providing in excess of 4.2 Million data points.

Wider impacts

The UNEP-GEMS Water Programme has increased national level participation in global networks, as well as contributing to assessments at all levels, with active participation of network members and updated data from monitoring stations. These provide accurate representations of the water quality of freshwater ecosystems for various regions and countries.

The Programme further creates partnerships with governments, research and educational organizations to deliver capacity building and technical assistance to developing countries, enhancing their capacity to monitor water quality, obtain and submit further water quality data. Meanwhile there is an increase in the global understanding of water quality and the necessary decisions to improve it and conserve it. There are mutual benefits to the health of people and ecosystems, as well as the services that ecosystems provide. Through encouraging governments and organizations to establish monitoring programmes, stations and systems and sharing the data thus acquired, the network is constantly expanding. Monitoring stations can be replicated in different ecosystems worldwide, adapted to their specific location.

Partners:
British Geological Survey (BGS), Danish Water Quality Institute (DHI), Food and Agricultural Organization (FAO), Global Runoff Data Centre (GRDC), Government of Canada International Environmental Technology Centre (IETC), International Lake Environment Committee (ILEC), Monitoring and Research Centre (MARC), National Institute for Environmental Studies (NIES), Robens Centre for Public and Environmental Health, United Nations Educational, Scientific and Cultural Organization (UNESCO) – International Hydrology Programme (IHP), United States Geological Survey (USGS), World Health Organization (WHO), World Meteorological Organization (WMO), and others.

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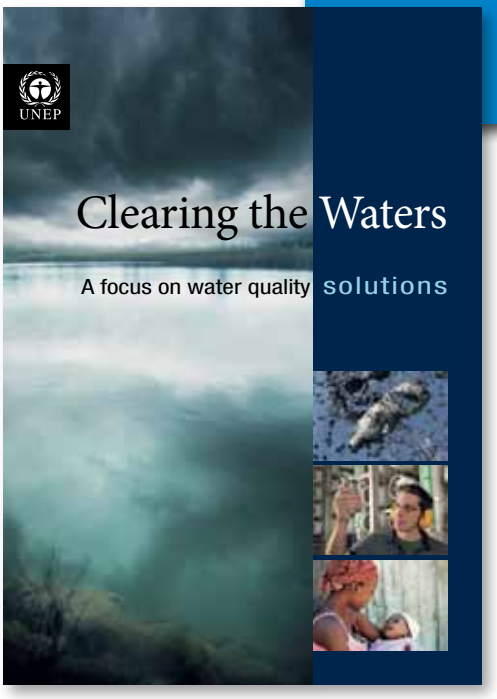
Publications: Focusing on water solutions



Facing challenges

Water quality is deteriorating as a result of human and natural processes, affecting its biological, chemical and physical characteristics. Water contamination weakens or destroys natural ecosystems that support human health, food production, and biodiversity, albeit from agricultural activities, mining and drilling or human waste. Growing population compound these problems, while climate change, inadequate water quality data and the fact that water quality is not given much attention on many agendas increase the challenges of improving water quality. Many livelihoods rely on water quality as well as quantity. Economic losses due to the lack of water and sanitation in Africa alone are vast, with women, children, and the economically disadvantaged the most affected.

Sustainable solutions

UNEP's report: Clearing the Waters: A focus on water quality solutions was launched in Nairobi in 2010. The report provided an important contribution to the World Water Day 2010, drawing global attention to the need for clean, safe water as well as action against water pollution. It gives an overview of current water quality challenges, elaborates on contaminants that degrade water quality, details impacts of poor water quality to different users and outlines solutions and mechanisms to achieve them. In addition, the report also presents a number of case studies from around the world and calls for worldwide action to increase awareness on improving water quality.

UNEP further advocates promoting policies that improve water quality through education and law, thus using investor and consumer pressure on corporations that pollute waterways. In 2010, UNEP and partners combined to address challenges posed by illegal and unregulated discharge of wastewater. The report: Sick water? The central role of wastewater management in sustainable development identifies threats to human and ecological health and the consequences of inaction, while also presenting opportunities for appropriate policy and management to trigger employment, support livelihoods, and boost the health of people and ecosystems.

Since 2003, UNEP-GPA, together with partners, has been training municipal wastewater managers on Improving Municipal Wastewater Management. Over 1,800 experts from 67 countries have benefited: results include wastewater and research projects, follow-up training courses, and changes in policy guidelines and regulations. UNEP and partners are encouraging community-based solutions to marine and freshwater pollution problems through improving sanitation and wastewater management practices. They achieve these through training: imparting skills for building and maintaining water supply and sanitation infrastructure, while improving expertise in monitoring and quality assurance.

Wider impact

One of the main objectives of the reports was to raise global awareness on the current degradation of freshwater resources and the deterioration of water quality, together with their impact on the health and services of our ecosystems. Clearing the Waters: A focus on water quality solutions noted that although there were guidelines for drinking water and wastewater reuse, there were none for ecosystems.

This had led to UN-Water establishing a Thematic Priority Area (TPA) on water quality, promoting attention to water quality globally and overseeing the initiative of developing water quality guidelines for ecosystems, a process led by UNEP on behalf of the group. A UN-Water Task Force on Wastewater management is now establishing a Multi-Stakeholder Collaborative Agenda on Wastewater that responds to these challenges.

A joint report was also produced by UNEP and UN-HABITAT, in collaboration with the Africa Ministers' Council on Water: Green hills Blue cities, an ecosystem approach to water resource management for African cities. This report warns of the challenges to African cities in the face of rapid urbanization and the impacts of climate change.

Partners:
UN-Water, Pacific Institute, UN-HABITAT, UN Secretary General's Advisory Board on waterand sanitation (UNSGAB), GRID-Arendal, WHO

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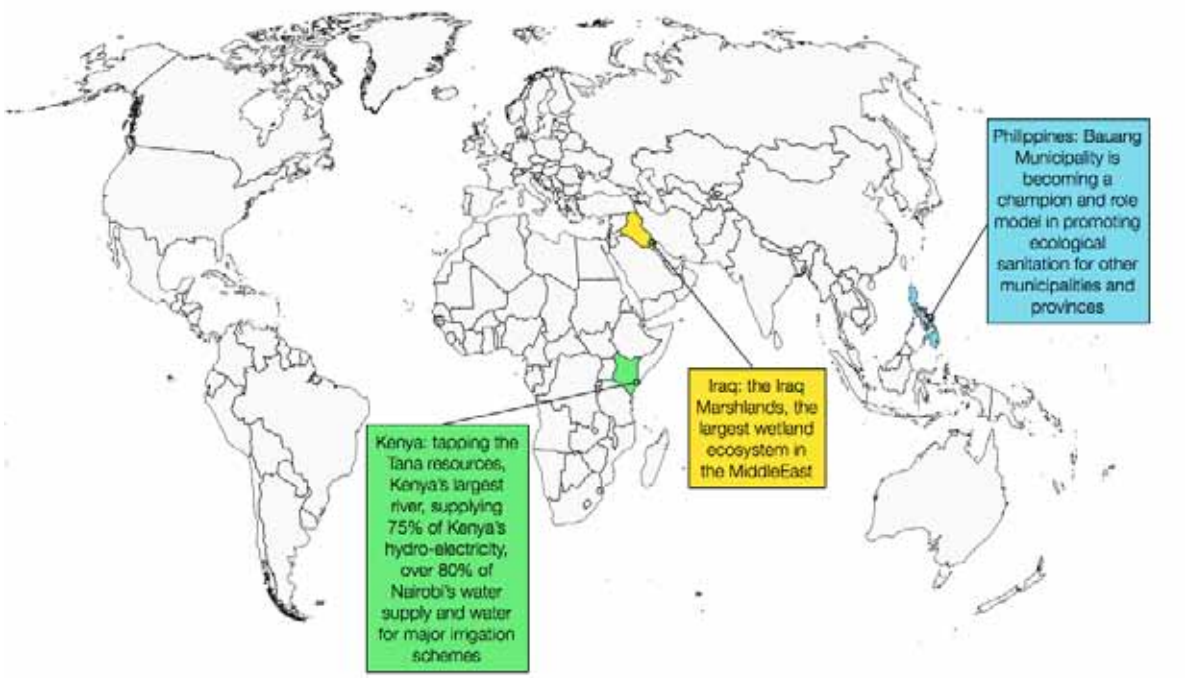

3. Restoring ecosystems for livelihood

Introduction:

Ecosystems consist of a biological community, its organisms interacting, with each one essential to the whole. Vital to human well-being, ecosystems also provide a range of services. As well as providing a water supply, they yield food, regulate floodwater and climate, treat wastewater, manage drought, support soil formation and nutrient cycling and often have important cultural value as well. Without water there are no ecosystems, but in turn water sustainability depends on how these ecosystems are managed.

The global ecosystems and biomes that have been most significantly altered by human activity include marine and freshwater ecosystems, temperate broadleaf forests, temperate grasslands, Mediterranean forests, and tropical dry forests. As a result 60 per cent of our ecosystem services are being degraded (15 out of 24 services examined). 12 per cent of bird species, 23 per cent of mammals, and 25 per cent of conifers are currently threatened with extinction. 32 per cent of amphibians are threatened with extinction, but information is more limited and this may be an underestimate. Higher levels of threat have been found in the cycads, where 52 per cent are threatened. In general, freshwater habitats tend to have the highest proportion of threatened species.

Water withdrawals from rivers and lakes for irrigation or for urban or industrial use doubled between 1960 and 2000 (worldwide, 70 per cent of water use is for agriculture.) Large reservoir construction has doubled or tripled the residence time of river water—the average time, that is, that a drop of water takes to reach the sea.

There are few statistics to illustrate the economic values of ecosystems services. Strengthening ecosystems to ensure they function properly is crucial. Meanwhile where degradation of ecosystems has already taken place, it is vital to initiate their restoration.

The development of Integrated Water Resources Management (IWRM) plans adopted by some countries in response to the Johannesburg Plan of Implementation recognizes the vital role of ecosystems for the sustainable management of water resources. The ecosystems approach goes beyond traditional management of distinct sectors, promoting an integrated approach that aims to maximize and sustain the delivery of a wide range of ecosystem goods and services while maintaining ecosystem structure and resilience.

Wastewater management commands increasing attention as the global water crisis worsens. It is not only about quantity of available freshwater, but also about quality. Increasing water demand for urbanization and food production needs is resulting in the unregulated and illegal discharge of untreated wastewater to the environment, leading to the contamination of freshwater resources.

Recent rises in world food prices have seen over 110 million more people living in poverty. Predictions are for food prices to rise by up to 50 per cent in the next decades due to supply being unable to keep up with demand. Moreover with 1.6 billion people currently living in areas of physical water scarcity, increased urbanization and changing dietary patterns, the amount of water required for agriculture would have to increase by up to 90 per cent to feed 9 billion people by 2050.

Looking at the bigger picture, ecosystems secure our future water and food supplies - a matter of concern in times of climate change and threatening shortages. UNEP, in both its projects and publications, is assisting with increasing global understanding on the important role of ecosystems in water management as well as related fields, including agriculture, in turn improving water security and human livelihoods. UNEP further demonstrates how damaged ecosystems can be restored, while tools are also being developed and tested to strengthen ecosystem functioning.

Summary:

In the Iraqi Marshlands, UNEP's assistance has been unique in using in long-term ecosystem management and conservation approaches to address urgent humanitarian issues.

UNEP and partners support the Tana River catchment area, implemented at local levels by Water Resources Users Associations, with projects in sub-catchment areas: developing management plans using an ecosystems approach. This protects the wider area, reducing the siltation of the Tana River and halting environmental degradation.

In the Philippines, UNEP has supported the installation of water-free toilets, which provide free fertilization for gardens and farms and further achieving international recognition.

UNEP's work with Maasai communities in Kajiado have demonstrated that the introduction of simple rainwater harvesting techniques can change the lives of people, while simultaneously improving their surrounding environment and combatting climate change.

Small Island Developing States in the Pacific currently facing serious water resource and environmental stress issues, assisted by UNEP, have found innovative and locally appropriate and adaptive solutions to address water supply challenges. These improve water resource and wastewater management and water use efficiency.

Over the course of a year, a UN peacekeeping operation of 15,000 personal would consume enough water to fill the Colosseum in Rome 400 times, placing considerable demands on the local water and other and natural resources. UNEP's report, Greening the Blue Helmets: Environmental Performance, Natural Resources and UN Peacekeeping Operations, highlights how resource-efficient practices, technologies and behaviors offer multiple benefits to peacekeeping missions.

Based on its publication, Ecosystems for Water and Food Security UNEP was invited to make important contributions at World Water Week 2011 and the Bonn +20 Conference 2010. Such publications, promoting the ecosystem approach, have received wide media coverage, while raising awareness of the critical role ecosystems play in water management.

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"We take this recognition to our hearts and congratulate all who have contributed to this achievement and well-earned recognition"

Hon. Mrs. Narmin Othman, then Minister of Environment of Iraq, on congratulating the project team for being selected for the UN 21 Award Prize in 2007

Photo: UNEP

Project: Reviving the heart of the Mesopotamia

Facing challenges

In southern Iraq, the Iraqi Marshlands, surrounding the confluence of the Euphrates and Tigris Rivers, constitute the largest wetland ecosystem in the Middle East. But in spite of being of enormous environmental, historical, and socio-cultural significance, they have been damaged extensively since the 1970s. The Marshlands had systematically been reduced by the construction of dams, but the major damage was during the 1990s when extensive drainage structures were built for the purpose of drying out the area. Wetlands were filled in to divert water for irrigation, build railways, canals and dykes to control flows, thus limiting the flow to the wetland system. By 2003, the Marshlands had been almost entirely destroyed, with over 40,000 Marsh Arabs displaced, the problem heightened by armed conflict.

Sustainable solutions

In 2001, UNEP released satellite images showing that 90 percent of the Marshlands had already been lost. There was subsequent identification of extensive ecological damage and accompanying displacement of much of the indigenous population as a major environmental and humanitarian disaster by UNEP, followed by the United Nations-World Bank Needs Assessment Initiative for the Reconstruction of Iraq in 2003.

In response, UNEP's Support for Environmental Management of the Iraqi Marshlands project commenced in August 2004. Priorities included addressing marshland water quality and management needs to protect human health, livelihood and the ecosystem. Environmentally sound interventions were required to meet the needs of people returning to an area of damaged ecosystems. The UNEP project facilitated strategy formulation, monitored marsh conditions, raised the capacity of Iraqi decision makers, and provided water, sanitation and wetland management options.

Wider impacts

Even during a period of great constraints and political changes, UNEP has managed to complete major project activities in Iraq. Communities participating in the pilot projects now have improved access to drinking water and wastewater sanitation, alongside improved ecosystems. UNEP's extensive data and assessments will assist with formulating a long-term management plan. The project team was awarded the 2007 UN21 Award commendation, considered as a model of international environmental cooperation by the Iraqi Minister of Environment and was lauded by community groups for engaging and benefiting local communities.

In 2009, UNEP and UNESCO launched a project for Iraq stakeholders to develop a longer-term and sustainable preservation and management plan in accordance with criteria for the inscription on the UNESCO World Heritage List. As Iraq attained its position to the Convention on Biological Diversity, this has the added benefit of promoting diversity to a national priority. Lessons have potential to be transferred to other areas in Iraq as well as replicated in other areas where environmental crisis threatens people's life and its ecosystem, such as the Sudd in the South Sudan.

Partners:

The government of Iraq, American University of Beirut, Arab Center for the Studies of Arid Zones and Dry Lands, Cairo University, Center for Environment and Development for the Arab Region and Europe, Global Environment Centre Foundation, International Agricultural Centre, International Institute for Geo-Information Science and Earth Observation, International Lake Environment Committee, Japan International Cooperation Agency, Nature Iraq, Osaka Municipal Government, Secretariat of the Ramsar Convention, Shiga Prefecture Government, UNESCO, UNESCWA, UNOPS, WHO, Wetlands International, Government of Italy, Government of Japan and the United Nations Development Group Iraq Trust Fund.

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Photo: Manyara

Project: Tapping nature's services for water provision in dry-land basins

"We will now urge other residents to reduce soil erosion. There are others here who keep bees, and this sand dam can help them to add more hives and also help others to increase their cattle and farming activities to increase their yields."

George Kyalo, chairman Ekalakala WRUA, Kenya.

Facing challenges

The Tana is Kenya's largest river, with its basin covering 21 per cent of the country and providing a home to 18 per cent of Kenya's population. Ecosystem services include supplying 75 per cent of Kenya's hydro-electricity, over 80 per cent of Nairobi's water supply and water for major irrigation schemes. In addition, the majority of the population in the basin directly depends on this ecosystem for their livelihoods. Unfortunately, the Tana catchment area has been degraded from poor land-use practices, rapid population growth, and climate change, in turn limiting livelihood options and increasing poverty. The newly established Tana Catchment Area (TCA) regional office of the Water Resources Management Authority (WRMA) has developed a catchment management strategy to be implemented at the local level through the Water Resource Users Associations (WRUAs), which required further action to produce its expected benefits.

Sustainable solutions

UNEP developed training manuals to assist in strengthening the capacity of WRMA-TCA staff to protect and rehabilitate ecosystems in the basin. The WRUAs were trained using material from partners to prepare the sub-catchment management plans for Mathauta and Ekalakala WRUAs, now incorporated into the TCA work program. This has enabled them to connect with other partners.

The communities in Ekalakala and Mathauta are implementing the sub-catchment plans to improve their livelihoods. To date, they have established nurseries, planted trees for catchment rehabilitation, and rehabilitated galleys to reduce siltation, among others. Farmers are also being taught sustainable land and water management, using rainwater harvesting combined with conservation agriculture, which will reduce erosion, improve production and support groundwater recharge with the impacts rippling further to groundwater-dependent ecosystems.

A low-cost, concrete sand dam was built on Kambiti seasonal stream in Ekalakala, enabling residents to keep bees, plant vegetables and trees, as well as water their livestock while simultaneously reducing the flow of silt into the Masinga dam. Women and children no longer walk miles to fetch water from the crocodile-infested Thika River and Masinga dam. Filtered by the sand, fairly clear water is accessed by digging wells. Meanwhile, animals cannot contaminate the water it lays below the sand surface.

The publication “Ecosystem Management: From Concept to Local Scale Implementation” was developed in partnership with the International Institute for Sustainable Development (IISD) and used at a workshop attended by 30 participants drawn from all the five drainage basins of Kenya, including technical staff from partner agencies. Feedback was positive: participants committed to local case studies, while universities pledged to explore new ways of providing the training through accredited short courses. Other training manuals used for capacity building include: “Comprehensive Options Assessment for Sustainable Development of Infrastructure”, and “Securing Land and Water in the Tana Basin: A resource book for water managers and practitioners”.

Wider impacts

By partnering with WRMA-TCA, in the process of capacity building, establishing and training WRUAs, ecosystem concepts will be spread and applied throughout the Tana Basin. Inviting officials from other basins to the training facilitated the dissemination of this knowledge throughout the country. On-the-ground activities have just begun, and lessons learned will be replicated to other WRUAs in the Tana and other drainage basins.

Partners:

Water Resources Management Authority - Tana Catchment Area (WRMA-TCA), The World Agroforestry Centre (ICRAF), MetaMeta Research, Monaco Modern’Art

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Photo: UNEP

"Bauang Municipality is becoming a champion and a role model in promoting ecological sanitation for other municipalities and provinces in the Philippines, receiving many visitors to see and study our activities. The local leadership is a key to success, empowering local beneficiaries through education that develops a sense of their ownership."

Mr. Martin De Guzman III, Mayor of Municipality of Bauang, the Philippines

Project: Water-saving sanitation, for the people and by the people

Facing challenges

In Asia, there is growing concern that inappropriate wastewater management would hamper sustainable socio-economic development. Remarkable progress in sanitation has been made in the big cities for the past decades. However, this development is too slow to keep pace with an increasing urban population. It is estimated that 84-89 per cent of wastewater is discharged untreated.

In many large Asian cities, sanitation coverage is relatively good, but in most semi-urban and rural areas there is a worrying lack of appropriate wastewater management. Centralized treatment systems require a dense population to be cost-effective and are thus not realistic solutions for these areas. Alternative solutions must be sought, with decentralized wastewater treatment systems and ecological sanitation as options to balance development with the provision of basic services for less privileged communities.

Sustainable solutions

UNEP and partners supported the project, Demonstration of Ecological Sanitation and other De-centralized Sanitation in the Philippines, assisting communities to install eco-san toilets. Fifty households from five local communities participated in having a Urine Diverting Dehydration Toilet installed, while also being taught about operation and maintenance. Urine can be diverted into gardens or farms as inorganic fertilizer. This project further mobilized contributions from the Bauang Municipality to install a community-based decentralized wastewater treatment system. This was complemented with an awareness-raising campaign among toilet users, local farmers and government officials through community meetings and training workshops. Case studies were collected from four selected Asian countries, Cambodia, Lao PDR, Philippines and Vietnam, to share the best practices and lessons learned.

Wider impact

The project has harnessed good relationships with key project partners, players, stakeholders and local beneficiaries from community to regional level, linking rural and city dwellers. A regional meeting, involving practitioners and experts from Philippines, Thailand, Cambodia, Lao PDR and Vietnam, looked ahead to establishing a regional network in this part of Southeast Asia.

Bauang is now recognized as a model for decentralized and ecological sanitation and receives many visitors from all over the world. This encourages users, farmers, local communities and government staff to further improve and promote their achievements. Meanwhile UNEP-IETC will analyze and systemize this practice for further implementation. As the Philippines and Vietnam are relatively advanced in implementing decentralized and ecological sanitation, this presents a further opportunity to encourage cooperation between developed and less-developed countries.

Partners:
Korean International Cooperation Agency, Center for Philippines Advanced Studies, Bauang Municipality of La Union Province, World Bank Water and Sanitation Programme Manila Office

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Photo: ICRAF / UNEP

Project: Watering dry Kajiado

"God's grace is bringing development..." Community leader

Facing challenges

The inhabitants of the Olepolos, a semi-arid area of Kenya, are traditionally nomadic Maasai pastoralists, dependent on ecosystems services for their livelihoods. They once had large expanses of land but this has been subdivided drastically reducing community access to pasture, water and firewood. The reduction in land area has increased grazing pressure on land; and coupled with prolonged drought and deforestation has resulted in the degradation of ecosystems. Women are the most affected, as they are responsible for providing water, fuel-wood and timber, all of which come from ecosystems. But unfortunately the women do not contribute to the management of the resources due to cultural norms.

Sustainable solutions

UNEP, in partnership with Earth Care Africa, provided training workshops to women to enable them to contribute to the management of natural resources, using rainwater harvesting as an entry point. After the women's capacity-building workshops, UNEP partnered with ICRAF and Maasai Environment Development Consortium to introduce rainwater harvesting and thus improve ecosystems services, while also improving livelihoods in the community. Rainwater harvesting has also been used for re-vegetating the area, with family tree plantations also reducing erosion. Family nutrition has been improved with the addition of vegetable gardens. In addition energy-saving stoves were promoted to reduce deforestation, while a micro-finance scheme was introduced for sustainability.

To improve the capacity of women to participate in the natural resources management, UNEP and partners implemented a project supporting community training, with demonstrations on the construction of domestic rainwater-harvesting ferro-cement tanks and plastic-lined runoff ponds. The initial 86 rainwater harvesting tanks were recently increased to 220, with the community also enjoying the financing mechanism put in place to increase the coverage.

Wider impact

Rainwater harvesting has demonstrated how to improve ecosystems for improving livelihood and is spreading to other areas. At the end of UNEP's intervention, the community had planted 2000 trees, installed 4 ponds, 86 domestic rainwater harvesting tanks, 4 bee hives and 3 kitchen gardens. Four years after the project ended, the community has planted 12,000 trees, with 80 per cent success rate, 40 ponds, 220 domestic rainwater harvesting tanks, 40 kitchen gardens and 40 bee hives - as a result of the water and trees.

The Maasai women of Olepolos have been empowered, significantly raising their incomes with profits from beadwork and kitchen gardening. The trees also reduce wind velocity thereby lessening soil erosion. Gully erosion has been reduced thanks to the construction of dams to check the flow of floodwater. The incidence of waterborne diseases has significantly reduced due to cleaner drinking water. Their children, who formerly had to assist with bringing water home, are able to focus on school attendance and studies. Personal hygiene has improved with more water available for washing, with enough for the livestock and plantations of fast-growing trees, which also encourage beekeeping and increase the supply of firewood for use in energy-saving stoves.

Overall this mitigation of the negative impacts of climate change has visibly changed life in this area, while it is hoped that other areas will adopt similar projects to see their own benefits. This project is an example of how communities, if supported with seed funds and innovative ideas, can sustainably improve their livelihoods, while sensitive to the needs of the environment. It is also a model for future solutions to be implemented in suitable areas.

Partners:
World Agroforestry Center, Maasai Environment Development Consortium, EarthCare Africa Monitoring Institute, Landuse

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Maimbo Malesu, Water Coordinator, World Agroforestry Center

"For most island nations even small variations in water supply can have a significant impact on the security of their communities with direct impacts on health, food production and economic development. In this light it is not surprising that a number of Pacific Island countries have sought support from the GEF to develop practical solutions needed to protect our fragile water supplies and the natural coastal defenses upon which we depend."

Tuiloma Neroni Slade, Secretary General of the Pacific Islands Forum Secretariat

Photo: UNEP

Project: Practical solutions to protecting fragile water supplies in Pacific SIDS

Facing challenges

Pacific SIDS (Small Island Developing States) currently face serious water resource and environmental stress issues - challenges that islands and archipelagos are likely to increasingly face under climate change in the coming decades. Combined with limited human and financial resources constraints, the Pacific SIDS are faced with finding innovative and locally appropriate and adaptive solutions to address water supply challenges.

Sustainable solutions

UNEP, in joint implementation with UNDP, through the Global Environmental Facility (GEF), is assisting the Pacific Island Countries to improve water resource and wastewater management and water use efficiency. They aim to balance overuse and conflicting uses of scarce freshwater resources through policy and legislative reform, using the Integrated Water Resource

Management approach and Water Use Efficiency plans. The GEF/UNDP/UNEP/SOPAC Pacific Integrated Water Resources Management (Pacific IWRM) Project aims to deliver across a range of the Millennium Development Goals targets using IWRM approaches as the wider development entry point, while helping the countries utilize the full range of technical, economic, financial, regulatory, and institutional measures needed to operationalize sustainable development strategies for waters and their drainage basins (both surface and ground water). The Pacific IWRM Project includes a network of 13 water supply and community protection demonstration projects that have been developed following an assessment of the most significant water management issues in each of the participating countries.

Wider impacts

Regional groups of SIDS often experience common water-related environmental problems that can be addressed through GEF in the context of altering sectorial activities on each island state to meet sustainable development goals. One example is inadequate protection of water supplies, coupled with poor wastewater management and saltwater intrusion. SIDS share common environmental problems and potential solutions, reflecting the partnership between their representative regional organizations and the capacity and institutional building needed on each island state to more comprehensively address these problems. This strengthens the requirement for international cooperation among sovereign island states as they seek to identify and utilize cost-effective and appropriate measures to protect their water resources. The GEF/UNDP/UNEP/SOPAC Pacific IWRM Project seeks to address the need to evolve and develop more effective inter-sectorial coordination and management. It further intends to develop strong coordination mechanisms and sharing of experiences and best practices between SIDS on a global as well as regional level.

In addition, the Project contributes to maintaining the marine ecosystem processes. The Pacific contains the most extensive system of marine habitats (especially coral reefs), which are critical to maintain biodiversity. These habitats play a number of different roles, and are recognized as being globally significant as natural filters of land-based pollution and as natural protection against storms and sea level rise. The natural filters help maintain the health of offshore waters, ecosystems and associated species including oceanic fisheries through their function as breeding, nursery and feeding grounds.

Partners:
Pacific Islands Forum Secretariat, Global Environmental Fund (GEF), UNDP, Pacific Islands Forum Secretariat, Global Environmental Fund (GEF), UNDP, European Commission (ACP-EU Water Facility), IUCN Regional Office for Oceania International Water Centre.

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Photo: UNAMID

Project: Greening the blue helmets

"Despite Sierra Leone having a wealth of natural resources, if they are not used properly it can be the cause of great dissent, discomfort and unrest for the population, and this is exactly what happened there. Originally, the peacekeeping mandate did not cover natural resources and the environment. I'm glad to see missions of today cover this important aspect."

Former Force Commander of the UN Mission in Sierra Leone, Major-General Vijay Jetley

Facing challenges

Natural resources can be key in achieving peace and security, including providing employment for former combatants and support for the recovery of livelihoods. But UN peacekeeping operations put pressure on ecosystems, with water use estimated at 84 liters per person daily compared with the refugee minimum allocation of 15 liters per person. UN peacekeeping operations are responsible for over half of the environmental footprint of the entire UN system.

Sustainable solutions

UNEP helped to develop the Environmental Policy for UN Field Missions and provides ongoing technical assistance for its implementation. Focuses include water, wastewater, hazardous wastes, energy and wildlife. It aims at decreasing overall consumption of natural resources and the production of waste, protect local environments and public health, thus establishing UN peacekeeping as a role model for sustainable practices. UNEP's assistance for the implementation of the environmental policy is currently focused on integrating environmental considerations into a new five-year Global Field Support Strategy. UNEP undertook a preliminary environmental assessment for the UN Support Office for the African Union's peacekeeping mission in Somalia of two proposed camps, a headquarters in Mogadishu and support base in Mombasa, each designed to accommodate 200 people over a 10-year period. Following the establishment of baseline data, UNEP's technical experts identified 18 water efficiency measures, some of which were calculated to have a potential to reduce water use by 42 per cent in both camps.

In early 2012, UNEP completed a study of good environmental practices, technologies and behaviors, with outcomes published in a flagship report: Greening the Blue Helmets: Environment, Natural Resources and UN Peacekeeping Operations. With the further aim to make natural resource allocation, ownership and access an integral part of peace building strategies, the UNEP report also examines the role that peacekeeping operations have played in stabilizing countries where violent conflicts have involved, or been financed by, natural resources.

Wider impacts

UNEP is highlighting how resource-efficient practices, technologies and behaviors offer multiple benefits to peacekeeping missions. Achievements include reducing deforestation pressure and water consumption in Darfur, rehabilitating and maintaining Liberia's water infrastructure and taking measures to increase water-use efficiency in South Sudan. It is UNEP's hope that its technical assistance coupled with data from natural resource management initiatives, will be a catalyst for change across all peacekeeping operations, thus influencing the wider UN system. Examples of good practice are emerging across the peacekeeping infrastructure, while providing platforms for peacekeeping missions to engage local communities, with well-managed natural resources providing pillars of recovery.

Partners:
Department of Peacekeeping Operations (DPKO) and the Department of Field Support (DFS), UNAMID (Darfur), UNMISS (South Sudan), UNAMA (Afghanistan), UNAMSIL (Sierra Leone) and MINUSTAH (Haiti).

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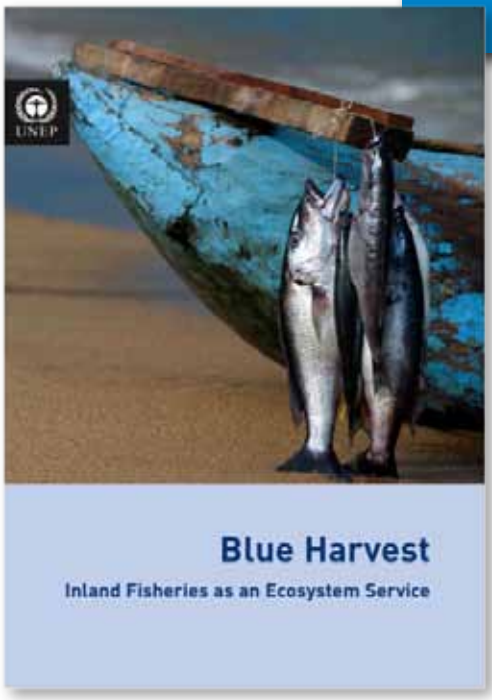
Publications: Food for thought



Facing challenges

With vulnerable ecosystems experiencing irreversible losses of biodiversity, the securing of our future food supplies needs to take into account the whole picture, including climatic factors, soil type and water availability, losses and waste along the food chain, management of natural resources at farm and broader landscape levels and policies in many sectors. Degraded ecosystems negatively impact food availability. For example, fishing, an important livelihood in many places, relies on freshwater sources. These are often under threat from the construction of dams and roads, channeling and dredging of rivers, abstraction of water from aquatic ecosystems, expanding agriculture and removal of forests. These adversely affect the breeding, feeding and migration of fish, reducing the productivity of wetlands, while diminishing their capacity to absorb floodwaters and remove pollutants.

Sustainable solutions

UNEP's publication Water Security and Ecosystem Services: the Critical Connection illustrates that water is itself an ecosystem service. Our existence would not be possible without the life-supporting services ecosystems provide. Properly functioning ecosystems are fundamentally related to water security. As discussed in this report, continued provision of ecosystem services for human welfare and economic development is dependent on properly functioning and sustainable ecosystem services, while water security is at the core of sustainable ecosystem management. The dual goal of ecosystem sustainability and water security must be pursued urgently: it could take

decades to master the political, institutional and technical aspects that enable humanity to use the full potential of ecosystem management for water security. The report highlights this reality, providing examples of cases where various measures were used to facilitate ecosystem sustainability and water security.

UNEP, in collaboration with partners, further launched a document on Ecosystems for Water and Food Security, showing how managing and investing in the connections between ecosystems, water and food, including diversifying crops, planting trees on farmland and improving rainwater collection, could help avoid water scarcity and meet growing food demands. It explains why policy makers should actually consider farmland, fisheries and other agricultural areas as "agro ecosystems" providing food as well as performing services like water purification and flood regulation.

Blue Harvest: Inland Fisheries as an Ecosystem Service, compiled by UNEP and the World Fish Centre, focuses on the importance of inland fisheries. It examines the degradation of ecosystems and the effects on inland fisheries, reviewing sustainable management of inland fisheries through ecosystem approaches, citing case studies. The integrative ecosystem approach to inland fisheries includes ensuring the wider participation of all concerned.

UNEP's publication Application of a Quantitative Method to Evaluate Flow Regulating Functions of Ecosystems in the Zambezi Basin aims to quantify selected regulatory services of ecosystems. By affecting transpiration and evaporation and influencing how water is routed and stored in a basin, each critical part of the ecosystem plays a crucial role in the hydrological cycle. But these services are seldom actually factored into the planning and management of water resources, partly through lack of understanding, in addition to the lack of quantitative information and a recognized method to incorporate them into decision-making. This report pragmatically approaches quantifying flow-regulating functions of flood plains, headwater wetlands and Miombo forests in the Zambezi Basin. The method, easy to utilize and incorporate into a decision support system, has been tested in 16 locations, indicating that differing ecosystems affect flows in varied and complex ways.

Wider impact

Two further documents: A background document on Ecosystem for Water and Food Security for Practitioners and a synthesis report on Ecosystem for Water and Food Security for Decision Makers have been developed. Meanwhile, closer collaboration between authorities in agriculture environment, forestry, fisheries and other sectors will remain essential, with ecosystems central to long-term food security.

Partners:
World Water Assessment Programme, WorldFish Center, African Ministers Council on Water, International Water Management Institute, Texas State University

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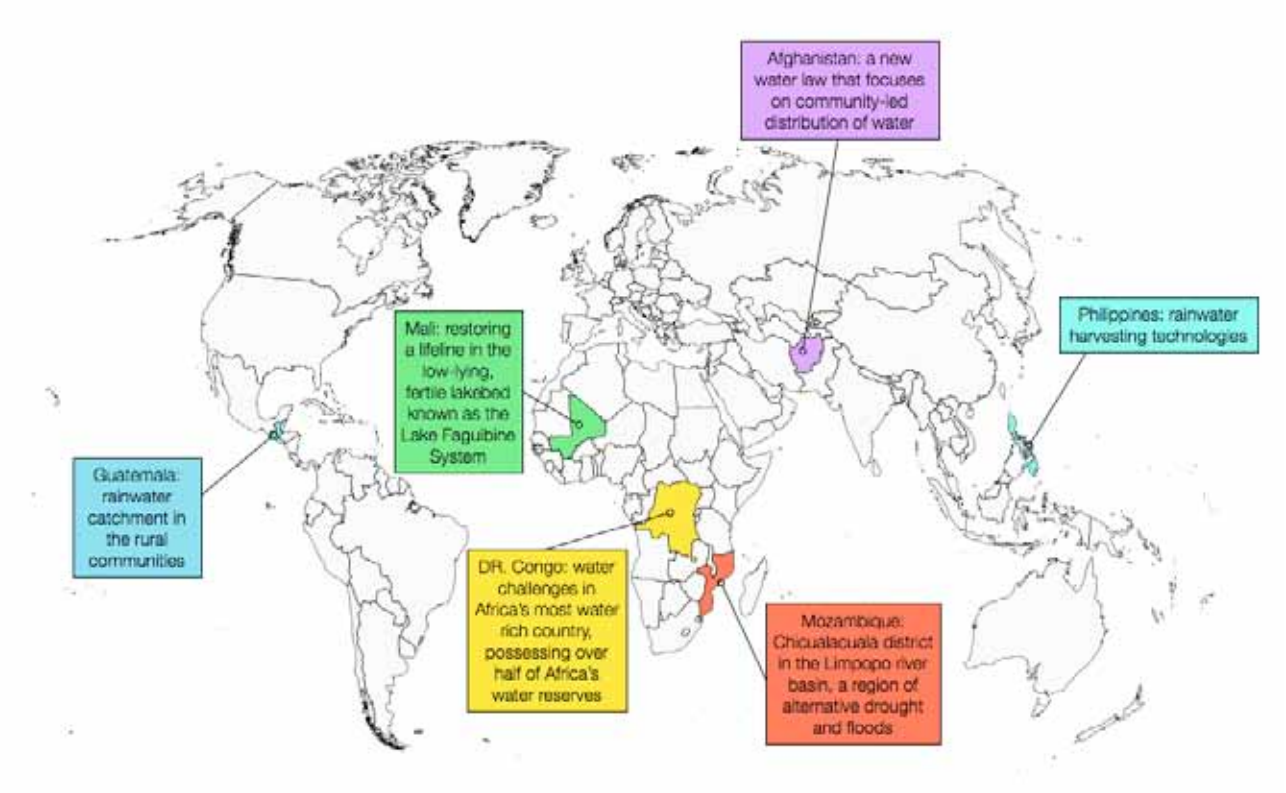

4. Coping with climate change and disaster

Introduction:

It is global water resources that suffer most under the damaging impacts of climate change. While wet areas become wetter and dry areas become drier, freshwater availability decreases as populations rise. Glaciers are receding, with the threat that many will disappear altogether. It is estimated that sea-level rise of up to a meter would directly affect over three million people in West Africa alone.

Water scarcity is predicted to become more widely prevalent. Improving water resource management is imperative and it has been acknowledged in an increasing number of countries that an integrated water resources management approach with an all-encompassing emphasis on ecosystems is the best way forward. Stakeholder

participation is essential at all levels, with a pressing need to raise awareness on the importance of this ecosystem-based approach for adaption to climate change.

UNEP's projects aim to reduce the negative impacts of droughts and flooding, highlighting the world's vulnerable areas - especially river basins where water is at the mercy of population growth and climate change. These projects underscore the importance of ecosystems in regulating the impact of climate change. UNEP also recognizes that it is vital to quantify and evaluate the contribution made by ecosystems, in order to enable sound future planning and management.

Summary:

The ecosystem restoration of Lake Faguibine in Mali is being implemented by UNEP through activities addressing environmental aspects, while strengthening the capacity of communities to participate in the development of sub-catchment management plans. The lake, which was regularly drying up, now receives larger quantities of water, increasing productivity for the communities. The project has further stimulated national dialogue to address long term challenges.

UNEP has been able to demonstrate the importance of storing water, implementing training in technologies including rainwater harvesting in the Tigum-Amam watershed in the Philippines. This is now playing a role in averting disaster.

In Mozambique's Chicualacuala district there UNEP's work has assisted with the creation of community-based water resource management plans, adapted from and based on global climate change models.

In Guatemala, after UNEP's involvement, the University (CUNORI) now has demonstration and training facilities, while the importance of adaption to climate change has been incorporated at Government levels.

In arid Afghanistan, climate change is reducing the glaciers of the Hindu Kush Mountains - a main source of the country's water. Years of conflict have worsened the situation. UNEP's model for environmental planning and action is centered in the Koh-e Baba area, its focus on improving water and related resource management by the communities themselves, casting back to old traditions in safeguarding the water sources.

Half of Africa's water reserves are found in the DR Congo, which has long been a place of conflict. Meanwhile severe degradation of watersheds has led to deterioration of water quality and quantity, affecting water supplies for the country. UNEP's assessment has been able to assist the DR Congo to develop a more holistic water management approach and identify practical solutions.

UNEP's study of the vast Sahel area in northern Africa has highlighted a vulnerable area, with over 300 million people in 17 countries threatened by extreme weather conditions, exacerbating further instability and problems as water becomes a major issue. UNEP's publication uses scientific knowledge to impact on national and regional policy, bringing landmark results.

Photo: UNEP

Project: Restoring a life-line in the Faguibine System, Northern Mali

Facing challenges

When it rains heavily in the Foutah Djalon Highlands of Guinea, the Niger River in Mali floods. Its waters swelled by the Bani River, water from the Niger then flows 170 km to 5 interconnected low-lying fertile lakebeds known as the Lake Faguibine System. But after the severe drought that began in the late 1970s, the lake frequently dried up. Climate change as well as extensive human activities, including the construction of dams along the Niger River and its tributaries, has had negative effects. Loss of vegetation that stabilized the dunes resulted in sand being blown and washed into the channels. With the collapse of the lake and floodplain ecosystem productivity, local communities, including pastoralists in the north and sedentary farmers in the south, were forced to abandon their traditional livelihoods. Nomadic groups lost most of their livestock and became sedentary in order to benefit from emergency relief programs. Many farmers migrated to parts of the system still flooding or to more southerly areas of Mali, especially to secondary towns and the capital, Bamako.

Sustainable solutions

UNEP's approach to restore the Faguibine System is holistic. It focus on promoting a national dialogue on water and wetlands within the c basin as the Faguibine system is highly dependent on this, while developing decision-making tools and mechanisms to monitor the water level and ecosystem services, creating a platform for local and regional governance. There is also the need to intervene at local level: dredging inflow channels and stabilizing areas from which the obstructing sediments originate - the sand dunes. This further builds capacity for local communities to engage them in the rehabilitation of the Faguibine system.

In the pilot phase, the concrete mitigation efforts focus on clearing waterways to allow the rivers and streams to flow and fill the Faguibine system. Siltation has played a large role in the destruction, necessitating the digging out of riverbeds and streams. Dredging equipment was bought for OMVF, the national counterpart, allowing 250,000 cubic meters of sand to be cleared from the channels in 2011. Additionally, dunes and riverbanks are being stabilized and reforestation is promoted to ensure a sustainable and lasting impact. Plant life strengthens the riverbanks and dunes to prevent collapse and blockages. Further rangeland management strategies include the introduction of income-generation revenue, particularly for women, (trees, vegetable gardens) and the promotion of rules and regulations for fisheries.

The awareness raised is beginning to have results with communities involved in rangeland management activities, translating national fisheries rules and regulation for implementation at local level and stabilizing channel banks using trees, which will also generate income for communities. There is now a clear interest by all partners to move towards a synergy of actions in the management of pastoral resources, illustrated in an agreement for the resource management of Lake Télé.

Photo: UNEP

Through numerous press releases by UNEP and presentations at various meetings during this pilot phase, awareness has been raised of the critical role of ecosystems restoration in adapting to climate change and improving livelihoods. As a result and following detailed discussions, the West African Economic and Monetary Union (UEMOA), committed about $6.4 million for the implementation phase of the Lake Faguibine project. Other development partners have also committed to the project in this phase.

Wider impact

The implementation phase, starting in 2012, will capitalize on the pilot phase of the project and upscale the implementation of the actions initiated and developed. It is intended to complement UNEP's ongoing efforts since 2009 and contribute towards the sustainability of results by putting focus on the implementation of concrete actions for restoring the Lake Faguibine System. This phase will involve contributing to the rehabilitation of the system while responding to the livelihood needs and aspirations of the 200,000 people from different ethnic and social groups with highly diverse backgrounds, expectations, experience and capacity. Its aim is to contribute to the sustainable integrated management of the Lake Faguibine System, resulting in sustainable improvements in the lives of the different communities

Partners:

United Nations Development Programme (UNDP) , World Food Programme (WFP), Food and Agriculture Organisation (FAO), Government of Mali: Ministries of Environment & Sanitation, Agriculture, Energy and Water, Livestock and Fisheries, Institut d'Economie Rurale (IER), Office pour la Mise en Valeur du système Faguibine (OMVF), Mali Country Water Partnership - Partenariat National de l'Eau (PNE), Direction Nationale de l'Hydraulique (DNH), Ambassy of Sweden, Norway representative ,Agence du Bassin du Fleuve Niger, UNICEF, Autorité du Bassin du Niger – Niger River Basin Authority (ABN-NBA).

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Project: Simple measures combat climate change

Photo: UNEP

"It is amazing how lowly, simple, and low-cost traditional technology, with improved management and expanded understanding of its benefits could be appropriate at this time when people need help for adapting to climate change and for repairing broken ecosystems."

Jessica C Salas, Project Manager, for Rainwater Harvesting in the Philippines

Facing challenges

In 2004 the Tigum River in the Philippines dried up - something that village elders had never seen in their lifetime. Even village wells were dry. Meanwhile many communities depending on the Tigum River were now annually subject to water shortages during summer months and flooding during the rainy season. City water supplies decreased and water rationing became the summer norm. Only water-carrying trucks did flourishing business, with unrestrained digging of deeper wells. The 2,500 farmers who irrigate their rice fields in the lowlands were also suffering. The people of the Tigum-Aganan Watershed were no longer able to sustain traditional lifestyles and a crisis had to be averted. This was blamed on a 3,000 hectare-plantation of 6 million exotic trees planted upstream about a decade previously on the assumption that trees bring water, in reality destroying the ecosystems and their ability to provide water.

Sustainable solutions

UNEP, in partnership with the Maasin Basin Authority, compiled GIS maps to characterize and understand the watershed's rain patterns, land use, topography, vegetation, population density and other relevant factors. Improving ecosystems services and achieving water security was addressed by a vulnerability study of the Tigum-Aganan Watershed, that recommended developing low-technology options for rainwater-harvesting and exploring the potential to treat and recycle storm water and sewage. It also examined options for floodwater diversion or storage in wetland systems in surrounding municipalities.

The project then installed and mainstreamed new rainwater-harvesting technologies, assisted by local partners, simultaneously teaching people the necessity to counter the effects of climate change: collecting rain during the rainy season which also prevented local flooding, then using the stored water during the dry season. Five demonstration areas were established in the uplands, lowlands, forests, urban and coastal areas. These demonstrated many types of rainwater harvesting devices, to increase water for domestic purposes through roof top tanks and ecosystems through ponds with teams from local government units trained to install these in schools, community centers and other group facilities. Watershed stakeholders' assemblies were then held to discuss the results, cost and benefits to the community as well as the river basin as a whole. A report was also made to the Legislative Body of the Iliolo province, with the media informed to increase awareness.

Wider impacts

Farmers can easily reach their target rice yields, using more cost-effective technology. Finding they were now more resilient to changing weather patterns, farmers now embrace new projects, including growing organic produce, fish-farming, tree-planting and vermiculture composting. They are recycling storm water, using existing roads as catchment, directing water into their ponds with simple canals, further protecting forests, boosting groundwater, lessening soil erosion and increasing vegetation cover, protecting the land during periods of both drought and heavy rain, reducing threats of flooding.

The province of Iloilo has adopted Rainwater Harvesting as its banner program, with 90 per cent of the 42 municipalities adopting rainwater harvesting. The Department of Agriculture has strengthened its program on soil and water management. Meanwhile the Department of Interior and Local Government circulated a report promoting the construction of rainwater collectors throughout the Philippines to mitigate the adverse impacts of climate change.

Partners:
Maasin Basin Authority, Legislative Body of the Iliolo province, Philippines Department of Agriculture, Philippines, Department of Interior and Local Government, Sang Panimalay Foundation

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Photo: UNEP

Project: Capacity building for rainwater catchment in rural communities of Guatemala

Facing challenges

Almost 90 per cent of farmland in Latin America is rain-fed. Unreliable rainfall and droughts constrain agricultural development and domestic food processing in Chiquimula, Guatemala. Improving water use efficiency and water management techniques, especially rainwater, mitigate such shortages, maximizing the socio-economic and environmental benefits. It is also essential to find sustainable methods for managing water, incorporating all stakeholders as well as the environment, while adapting to climate change.

Rainwater harvesting technology is low-cost, highly decentralized and empowers individuals and communities to manage their water. However rainwater harvesting is not included in water policies in many countries. In many cases water management is based on renewable surface and groundwater, with little attention given to rainwater.

Sustainable solutions

During 2006-2008 UNEP, in coordination with local organizations and UNIFEM (then the UN Women's agency) supported the training of local people in building rainwater harvesting facilities in Nicaragua and Guatemala; and the construction of a tortilla production facility in Chiquimula for women entrepreneurs. After the success of these pilot projects, UNEP received requests from other rural communities of the Chiquimula Department of Guatemala to support the development and implementation of additional rainwater catchment facilities. Phase two, the follow-up project, included the establishment of a regional training center at the Chiquimula University campus of Centro Universitario de Oriente de la Universidad de San Carlos (CUNORI) and the development and building of two rainwater harvesting facilities, with the participation of trained members of rural communities of the Chiquimula Department of Guatemala. The CUNORI training center is currently offering guidance on how to build rainwater harvesting facilities and their use for agriculture, industry and domestic purposes.

In agriculture, rainwater harvesting has demonstrated the potential of doubling food production compared to the 10 per cent increase from irrigation. It has also been used to improve access to water and sanitation at the local level.

Wider impacts

A strategic alliance has been developed with the Ministry of the Environment and Natural Resources of Guatemala to ensure the sustainability of the project and its expansion to other regions. It has been instrumental in integrating water harvesting in Guatemala's national budget. The Ministry has confirmed that the government has actually adopted rainwater harvesting as a policy measure to adapt to climate change. The Unit to Combat Desertification and Drought of the Ministry will be implementing 60 facilities in communities of the Chiquimula Department in the next 6 months

The project was endorsed by the Departmental Development Council (CODEDE) of the Department of Chiquimula, an institutional plant fora for public participation in Guatemala, where community representatives together with municipal authorities and other public functionaries, plan and decide on social investment plans, including health services and infrastructure.

In addition, the implementing partner (CUNORI) together with Agencia de Desarrollo Económico Local – Asociación de Servicios y Desarrollo Socioeconómico de Chiquimula,(ADEL-ASEDECHI) contributed with two other activities that were not part of the project. They approved a professional specialization course on rainwater harvesting techniques as part of the University curricula and they organized the first meeting of trainers of trainees on rainwater harvesting techniques, to share knowledge and experience. Two hundred and ninety-eight people were initially trained, now forming part of a network of trainers in rainwater harvesting. Another objective achieved was to extend coverage beyond the population of the Department of Chiquimula to the Northeast Region of Guatemala, especially as a result of the participation of people from the area known as the Dry Corridor. Gender equality was an important consideration in the process, with 46 per cent of the participants being women.

Partners:
Rural communities of the Chiquimula Department of Guatemala, Chiquimula University campus of Centro Universitario de Oriente de la Universidad de San Carlos (CUNORI) and with Agencia de Desarrollo Económico Local – Asociación de Servicios y Desarrollo Socioeconómico de Chiquimula, (ADEL-ASEDECHI)

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Photo: UNEP

Project: Chicualacuala rejoices in rain

Facing challenges

According to a global disaster database, Mozambique has suffered from 53 natural disasters in the past 45 years. Chicualacuala district in Mozambique Gaze Province is located in the Limpopo river basin, a region of alternate drought and floods. Ecosystems and water resources are affected by low and unreliable rainfall alternating with recurrent floods from local but intense rainfall, periodic tropical cyclones. There are limited infrastructures to manage flows along the main river system, while most of the lower basin system is vulnerable as it lies below 100 m above sea level. Meanwhile the frequency and duration of floods is perceived to be increasing, in between longer droughts. Most of the Chicualacuala communities depend on natural resources for survival, often forcing them to move to more urban areas. Considering that various sectors of the Mozambican economy are vulnerable to the effects of climate change, adaptation is the only option.

Sustainable solutions

UNEP is implementing a project as part of the UN Joint Programme on Environmental Mainstreaming and Adaptation to Climate Change implemented by 6 UN Agencies. Overall aims of the project include informing and empowering all stakeholders about environmental and climate change issues, strengthening climate proofing methods and mainstreaming them into development plans at all levels. In turn, as community methods of coping with climate change are enhanced, their livelihood options diversify. The climate change models were downscaled to estimate the rainfall, water situation and crop production under different climate change scenarios.

The study found that, in general, the Limpopo basin will be getting drier which has implications on agriculture and water availability. UNEP supported the Chicualacuala community to improve their ecosystems as a means of coping with the impact of climate change. An ecosystems map to showing the trends was developed. Officials from provincial and district levels were trained on integrated water resources management (IWRM) and developed the plan for Chicualacuala, which was adopted as part of the government's development programs.

UNEP, IUCN and UNHABITAT are supporting the communities to implement rainwater harvesting. Representative from Chicualacuala District, Government ministries and local communities came to Kenya to learn about this, while 12 artisans were trained in constructing rainwater harvesting structures for domestic purposes. This activity improved local capacity, while enabling community members to explore options in gathering and conserving rainwater. Fifty domestic and communal rainwater harvesting facilities have now been built. The introduction of solar-powered boreholes and fish farming has further enhanced livelihoods.

Wider impacts

The Limpopo is a transboundary river and the climate change models were applicable to the whole basin. Results on river-flow and rainfall will contribute towards identifying the potential impacts of climate change by the Limpopo Basin Commission, assisting with developing coping mechanisms.

The provincial level staff were also involved in the IWRM training, benefiting a wider group of people, while IWRM plan plans are on the way to be integrated the to the wider Limpopo basin. The project also raised knowledge about the importance of ecosystems and their linkage to water, as well as the importance of water resource management for sustainable development.

The project has also shown that rainwater harvesting is not limited to domestic roof top systems, but can be used in ponds and dams, stabilizing riverbanks and rehabilitating the greater catchment area.

Partners:.
Government of Mozambique,Unidade de Gestão da Bacia do Limpopo, (UGBL), UN-Habitat

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Photo: UNEP

Project: Reviving ancient water traditions in the Koh-e Baba (Grandfather) Mountains

"UNEP's parallel development of policy and action for environmental management is a model for the government to follow. Community based approaches can be upscaled as part of the national development strategy throughout our programs in water, land, forests and medicinal plants."

Deputy Minister Ghuriani, Ministry of Agriculture, Irrigation and Livestock, Afghanistan

Facing challenges

Approximately 75 per cent of Afghanistan is vulnerable to desertification. After 30 years of conflict, much of its natural and cultural heritage is under threat. Virtually its entire supply of water for irrigation, drinking and the maintenance of wetland ecosystems is fed by rainfall and the seasonal melting of snow and ice-fields in Afghanistan's Himalaya and Hindu Kush Mountains. But in the past 50 years, drought and rising air temperatures have shrunk larger glaciers by

30 per cent, while smaller glaciers have vanished altogether. Over 80 per cent of Afghanistan's population is directly dependent on natural resources to survive. Water insecurity is chronic, but local management and planning capacity are not equipped to change this. The ongoing national conflict adds a significant additional challenge.

Sustainable solutions

UNEP was asked by the Afghanistan Government to demonstrate a model for environmental planning and action, focused on improved community management of water and other natural resources. The field location chosen was the Central Highlands, the source of five of Afghanistan's major river systems, and an ideal location to illustrate the importance of watershed planning.

At present, about 2,000 households in 11 villages in the Koh-e Baba region of the Central Highlands are direct beneficiaries of the project. Activities range from simple village level slope management, river restoration and community training work to broader upstream-downstream planning, zonation into core, protected and buffer regions, and science and research. This impacts 700 square kilometers of range, grassland, river plains and marsh, and includes over 33,000 acres of watersheds and wilderness. Located 10 miles south of Bamyan City, the Koh-e Baba is unique in providing wilderness so close to a major urban center. With relatively good security, national government officials can travel here and test new skills. The new water law, which expands on the environment law to guide water management practices, can be clearly demonstrated here. This law focuses on community-led distribution of water, with the government providing regional technical support.

Wider impact

Afghanistan currently has four environment and agricultural, rural development national development priority programs. UNEP's community driven approach provides a model that is being integrated in each of these.

The UNEP project team has formed the Koh-e Baba Initiative, led by local Afghan government and civil society groups. Since the project began in 2009, it has achieved an outstanding record in leadership, technical guidance, and connecting groups, ensuring local ownership. With inclusion of 7 additional villages, it can be a model to enable further sustainable environment management to take place throughout the land.

Partners:
Bamyan Governor's office, Ministry of Agriculture (MAIL), the Environment Protection Agency (NEPA), the European Union, World Food Programme and the UN Country Team. Eleven ommunity councils from the region, Aga Khan Foundation (AKF), Catholic Relief Services (CRS), Conservation Organisation for Afghan Mountain Areas (COAM).

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Photo: UNEP

Project: Water, water everywhere in DR Congo but is it safe to drink?

"Since peace was brokered in 2003, the government has gradually reversed the negative trend in water coverage decline that has plagued the DR Congo since its period of turmoil. This represents an important achievement, which should be applauded. However, the stark reality is that the DR Congo has one of the fastest urbanization growth rates in the world and this is not being matched with adequate water and sanitation service delivery."

Mr Hassan Partow, UNEP
DR Congo Programme Manager

Facing challenges

the DR Congo is Africa's most water-rich country, possessing over half of Africa's water reserves, yet 74 per cent of its population – approximately 51 million people – lacks access to safe drinking water. After a long period of conflict and crisis, most Congolese are crying out for jobs, reconstruction and economic growth. With some of the richest natural and mineral wealth on earth, the DR Congo has immense potential.

But despite recent water sector reforms, the DR Congo cannot meet its water targets under the United Nations-set Millennium Development Goal (MDG) of reducing by half the proportion of people without access to safe drinking water by 2015. Moreover, to meet national development goals, which are significantly below the MDG water target, the country faces the enormous challenge of supplying an additional 20.3 million people with safe drinking water by 2015.

Sustainable solutions

In response to a request from the Government of the DR Congo, UNEP initiated in 2009 an assessment of priority environmental issues. Although the DR Congo possesses plentiful freshwater resources, water access is limited and unequal.

Based on extensive fieldwork between 2009-2011, the UNEP assessment found that inadequate water and sanitation in DR Congo's rapidly expanding urban centers is due to insufficient, aging and overloaded networks. Bacteriological contamination and sediment pollution from deforestation and poor land use practices seriously impact water treatment operations. Combine this with the degradation of critical water sources and forested watersheds, being cleared through uncontrolled agricultural and urban expansion, impacting on water availability in cities and rural areas.

UNEP published Water Issues in the Democratic Republic of Congo – Challenges and Opportunities and UNEP's Post-Conflict Environmental Assessment of the Democratic Republic of Congo: Synthesis Report for Policy Makers. An investment of approximately US$70 million over a five-year period is required to help strengthen the water sector. One key UNEP recommendation is to build on and replicate successful initiatives, namely low-cost community managed water supply systems based on full cost recovery and to ensure infrastructure maintenance and sustainable service delivery.

With this comprehensive environmental assessment, which includes input from more than 50 partners, UNEP has set the stage for long-term support. An important step will be prioritizing recommendations in a National Environmental Action Plan.

Wider impact

UNEP's water study and its recommendations have been used as a key reference for addressing water sector challenges by government authorities and other stakeholders, also raising awareness. UNEP plans to follow up on its DR Congo report by developing a country program, a successful model implemented in over 10 post-conflict countries since 1999.

Parallel to UNEP's work, the creation of the neighborhood-based Water User Associations, brainchild of the Congolese NGO ADIR, supported by an international partnership, aims to provide safe drinking water to more people, while becoming financially self-sustaining and supporting national development by improving living conditions and creating job opportunities.

Partners:
Ministry of Environment, Nature Conservation and Tourism (MENCT), Ministry of Planning (CNAEA), Ministry of Energy, National Rural Water Service (SNHR, Ministry of Rural Development), Belgian Development Agency, United Nations Children's Fund (UNICEF) and Action pour le Développement des Infrastructures en milieu Rural (ADIR).

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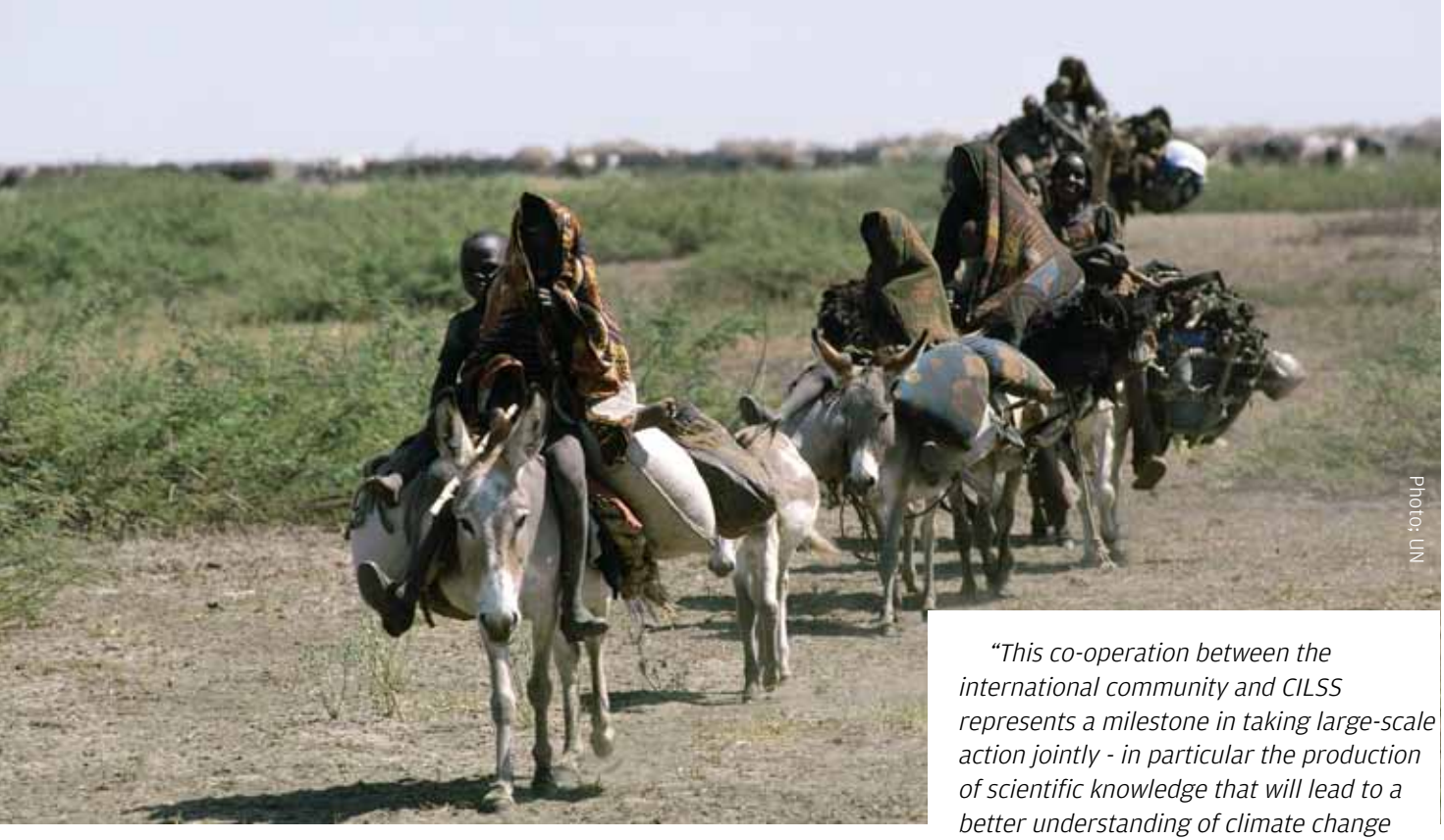

Photo: UN

Publication: Climate change, migration and conflict in the Sahel

"This co-operation between the international community and CILSS represents a milestone in taking large-scale action jointly - in particular the production of scientific knowledge that will lead to a better understanding of climate change impacts on migration and conflict in this very fragile Sahelian region - for the benefit of the population."

Professor Alhousseini Bretaudeau, Executive Secretary, Permanent Interstate Committee for Drought Control in the Sahel (CILSS)

Facing challenges

The Sahel lies below the Sahara, stretching across Africa from the Atlantic to the Red Sea. It is already a region of chronic instability, without the addition of extreme weather conditions. Rising temperatures and severe droughts since the 1970s, while also seeing an increase in floods have resulted in some communities requiring

emergency assistance. As well as losses of crops, cattle and human life, these natural disasters result in population displacement. Major urban centers - including Accra, Kano, Niamey, Nouakchott and Ouagadougou - are located within areas most affected. The Sahel's population is facing massive growth, pervasive poverty and food insecurity, with the majority directly dependent on natural resources for their livelihoods.

Sustainable solutions

UNEP's research encompassed the nine countries belonging to the Permanent Interstate Committee for Drought Control in the Sahel (CILSS) – Burkina Faso, Cape Verde, Chad, the Gambia, Guinea-Bissau, Mali, Mauritania, Niger and Senegal - with eight neighboring West African States – Benin, Côte d'Ivoire, Ghana, Guinea, Liberia, Nigeria, Sierra Leone and Togo – also included given the transboundary nature of climate change, migratory patterns and economic trade in the region. The resulting report is based on an innovative mapping process, analyzing trends in temperature, rainfall, drought and flooding in the region over the last 40 years. It further draws from existing literature, case studies and field observations, to determine how climate changes exacerbate existing vulnerabilities and may lead to conflict and migration. In turn, these affect food and water security, causing health issues, threatening the availability of natural resources and political stability.

Wider impact

This joint study between international- and regional organizations supports adaptation and peace building practitioners worldwide, as well as ongoing international climate change negotiations. Having found that changes in the regional climate have already taken place, adding to the problems of competition over water, the ultimate goal is to increase the resilience of livelihoods to tackle challenges in this broader context. The project is also part of UNEP's efforts to raise the issue of climate change and security higher up on the agenda of the international community.

The 309 million people in 17 countries will be the ultimate beneficiaries: The study is yet to show full impacts on national and regional policy, but is solidly anchored in the region, through the close cooperation with CILSS. It can easily be replicated in other areas of the world.

Partners:
International Organization for Migration (IOM), the Office for the Coordination of Humanitarian Affairs (OCHA), the United Nations University (UNU) and the Permanent Interstate Committee for Drought Control in the Sahel (CILSS), with technical input from the University of Salzburg's Centre for Geoinformatics (Z_GIS).

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5. Keeping the economy green with resource efficiency

Introduction:

A green economy requires efficient water use, water demand management and sustainable infrastructure while valuing those services provided by ecosystems, without which there would be no water. But in an increasing number of regions, affordable opportunities to access more water are limited. With no improvement in efficiency of water use, water demand is expected to outstrip supply by as

much as 40 per cent by 2030. Improving access to clean drinking water and sanitation services is a vital step towards a more sustainable, resource-efficient society. Improving the efficiency and sustainability of water use is also imperative if the world's increasing energy demands are to be met. As countries become wealthier and more populous, industrial demand for water is expected to increase.

Understanding the urgent need for water security worldwide, UNEP is implementing water demand management and efficiency projects to ensure that water dependent industries, water suppliers and governments around the world promote improved management. This includes changes in operations and supply-chains and partnerships. One way forward is increased investment in the water sector, which will have multiple benefits for human well-being alongside economic growth.

UNEP's International Resource Panel analyses the decoupling of economic growth from water resource use and negative environmental impacts. This would allow countries to reduce water scarcity and environmental degradation and the eventual achievement of the Millennium Development Goals.

Summary:

In view of unequal geographical water resource distribution in South East Asia, UNEP and partners are addressing the growing need to enhance water efficiency, improve water quality and ultimately water governance. UNEP has developed a capacity-building guide on water accounting and footprint methodologies, approaches and management tools as well as training for the private and public sector.

UNEP's project in Latin America and the Caribbean has helped to pinpoint the needs of the region, while increasing coordination and understanding of sustainable resource management among key stakeholders, the scientific community and government administrations. Awareness-raising and training have increased regional capability to deal with sustainable water resource management.

UNEP's publication Water Footprint and Corporate Water Accounting for Resource Efficiency provides an overview of public and private initiatives, as well as methods and tools for worldwide water accounting and efficiency.

The Bioenergy and Water Nexus provides policy makers with scientific information to support strategies and policies. It also provides recommendations and outlines options for bioenergy to support a green economy.

UNEP's International Resource Panel (IRP) aims to help nations use natural resources sustainably without compromising economic growth and human needs.

The Green Economy Report explains the role investment can play in assisting with issues facing water resources, as long as managed within the right frameworks, thus offering potential opportunities to businesses, investors and civil society.

Photo: UNEP

Project: Promoting water efficiency for green growth in Southeast Asia

Facing challenges

Southeast Asia's water resources are abundant but unequally distributed geographically and seasonally. This affects food security for farmers, as well as supply to non-agricultural sectors. Achieving the Millennium Development Goals while continuing to sustain the population and deliver economic growth, presents water managers with challenges and opportunities. While governments in the region recognize the critical role that land and water resources management will play as the area develops, water accounting systems are in their infancy.

Sustainable solutions

As part of the UNEP's umbrella project on Water Footprint and Efficiency, UNEP in cooperation with the Korea International Cooperation Agency is addressing the growing need to further enhance water efficiency and improve water quality. A final objective is to improve water governance through the engagement of the public and private sectors, including business, industry and financial services, in collaboration with UNEP.

Together with the UN Global Compact's CEO Water Mandate, UNEP has developed a capacity-building guide on water accounting and footprint methodologies, approaches and management tools. Training on water accounting and efficiency measures has been developed for the private and public sector in Southeast Asian countries, including Thailand, Vietnam and Cambodia, Philippines and Lao. This assists with the question of how to carry out a water footprint assessment, as well as creating an understanding of how this can ultimately contribute to better water governance and more sustainable water strategies.

A report is in progress on the water footprint in Vietnam, in partnership with the Vietnam Environment Administration. In collaboration with the CEO Water Mandate and the Vietnam Cleaner Production Centre, a project is also being developed to improve corporate water management among companies in Vietnam. A full water audit is being conducted and technical assistance provided to 4 suppliers to facilitate and promote the transition towards sustainable corporate water management practices.

Wider impacts

Quantifying and accounting for water flows within the economy, including environmental needs, assists in the development of allocation and management systems within a green economy. Improving water efficiency allows countries to reduce water scarcity and environmental degradation. Efforts to improve water accounting and efficiency in the public and private sector directly contribute to the development goals of many countries in the region, especially those that are chronically short of water or the capital to invest in water development.

Partners:
CEO Water Mandate of the UN Global Compact, Environment Administration, Vietnam National Cleaner Production Centre, WWF Cambodia, Philippines National Water Resources Board, Philippine Water Partnership, Laos Department of Water Resources of the Ministry of Natural Resources and Environment

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Photo: UNEP

Project: Promoting water efficiency and management in Latin America and the Caribbean

Facing challenges

The Latin America and Caribbean region is a major source of renewable and nonrenewable resources for the world market. Improving water resource management in the region will produce important benefits for regional communities as well as worldwide. Latin America has an abundance of freshwater, but social inequalities, urban poverty, poor farming practices and unregulated industrialization have negatively affected access to water and sanitation, degrading water resources and ecosystems. There are many opportunities to enhance water management in the region, while nurturing sustainable water use and preserving ecosystems. Some business corporations are developing water accounting and stewardship schemes but there is a need for parallel improvements in management of water by local, national and regional governmental institutions.

Sustainable solutions

UNEP's project, Strengthening National Capacities for Sustainable Resource Management in Latin America and the Caribbean, has helped to pinpoint the needs of the region, increase coordination and understanding of sustainable resource management among key stakeholders, the scientific community and government administrations. Awareness-raising and training have increased regional capability to deal with sustainable water resource management. Capacity building activities on water accounting and efficiency, also raising awareness, were carried out online and in different seminars, in various countries including Brazil, Mexico and Argentina. This has been complimented by the implementation of four projects on life-cycle water accounting, footprint and efficiency for tourism, aquaculture and mining in Argentina, Colombia, Chile and Dominican Republic. These focused on sustainable water management, including extraction and further processing to optimize value and prevent wastage and emissions.

Wider impacts:

Heightened regional awareness and knowledge will assist governments and stakeholders with the necessary tools to improve coordination between agencies, ultimately developing suitable policies for the sustainable management of their resources.

Partners:

ROLAC, ECLAC, Argentina: CLIOPE Group of the National Technological University, Regional Faculty of Mendoza. Colombia: Colombian National Center of Cleaner Production and Environmental Technologies. Chile: Research Centre of Mining and Metallurgy. Dominican Republic: Ministry of the Environment and Natural Resources

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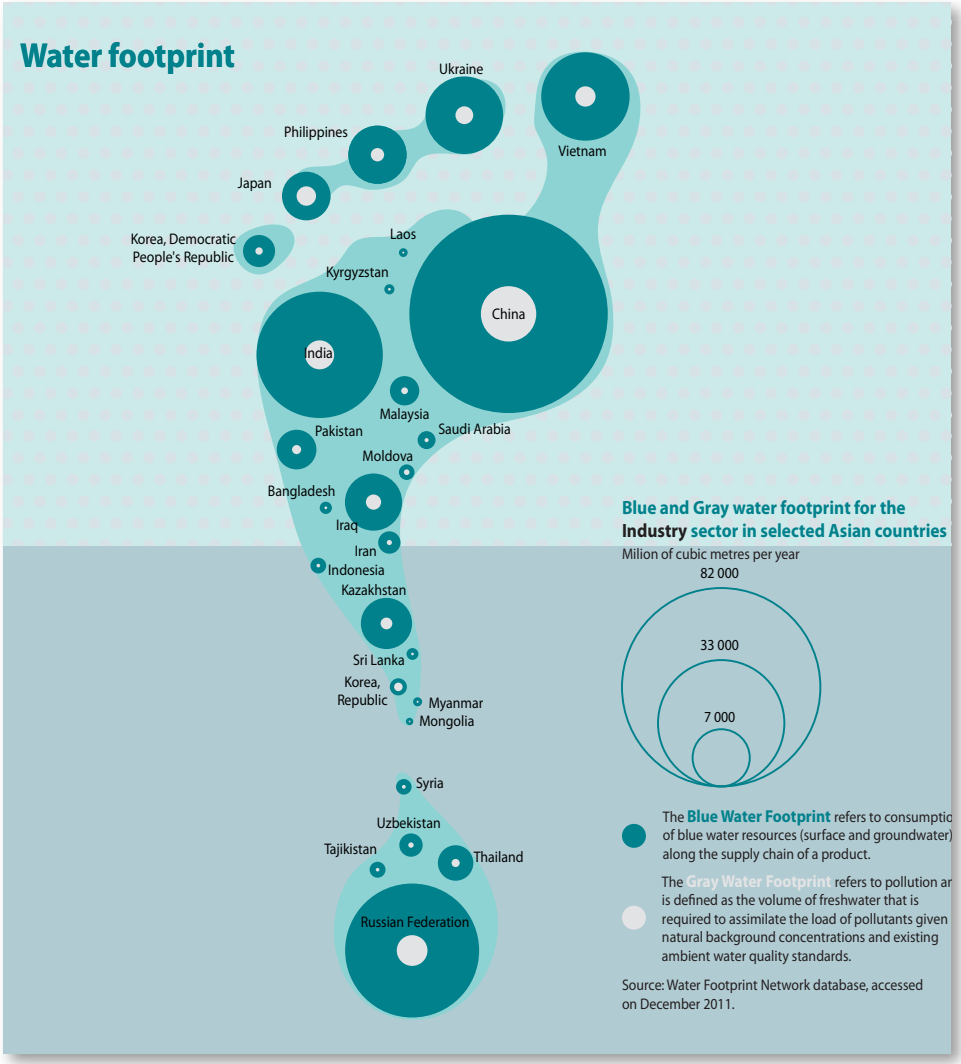
Publication:

Water footprint and corporate water accounting for resource efficiency



Facing challenges

As water resources are unevenly distributed and, in some regions, scarcity and droughts are increasing, concerns about them are also becoming increasingly important on the political agenda. The availability of data and information on how much water is available, how it is being used, and frameworks for assessing the distributional needs of each society is necessary to enable improved decision-making. In this context, a better understanding on the existing approaches to water accounting, footprint and management tools for public and private organizations is also important. Water accounting and management tools can help to enhance water efficiency practices and improve water quality worldwide.

Sustainable solutions

The UNEP report Water Footprint and Corporate Water Accounting for Resource Efficiency addresses the growing need to understand the different water accounting tools to promote water efficiency and quality from a life cycle perspective. This is especially pertinent in water-intensive industries and water-stressed areas, especially in developing countries. It provides an overview on the public and private initiatives as well as methods and tools for water accounting and efficiency worldwide. It includes three sections: Water Footprint Assessment, Policy and Practical Measures in a Specific Geographical Setting; Corporate Water Accounting - An Analysis of Methods and Tools for Measuring Water Use and its Impacts; and Mapping Initiatives on Corporate Water Disclosure.

Wider impacts

This UNEP report will ultimately create worldwide awareness, enhancing sustainable water management globally in the context of a green economy.

Partners:
UN Global Compact's CEO Water Mandate, Water Footprint Network, Global Reporting Initiative and Pacific Institute

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Publication: The bioenergy and water nexus

Photo: UNEP

Facing challenges

UNEP's report Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication, estimates that investing two per cent of global Gross Domestic Products into ten key sectors, with energy and water central, can catalyze this transition if supported by forward-looking national and international public policy making. This requires good scientific and analytical evidence on the risks and opportunities of different kinds of technologies and development choices

Sustainable solutions

The UNEP report The Bioenergy and Water Nexus examines in depth the interlinkages between bioenergy and water, highlights risks and opportunities, and offers an outlook on ways to address them. Building on the work of various initiatives including UNEP's International Resource Panel, it provides policy makers with scientific information to support strategies and policies. It also points to the need for further research.

Wider impacts

Water quantity and quality are factors that determine the extent to which bioenergy can contribute to the overall energy mix. In a world with over 70 per cent of freshwater being consumed by the agricultural sector, bioenergy development is likely to increase the pressure. At the same time, there are opportunities to harness bioenergy development to help increase access to water through efficient water management techniques, increasing soil absorption capacity in dry areas, selecting appropriate crops and providing energy for water pumping and cleaning water.

Understanding the risks and harnessing the opportunities by seeing bioenergy as part of a far bigger sustainability picture can assist countries to find integrated solutions.

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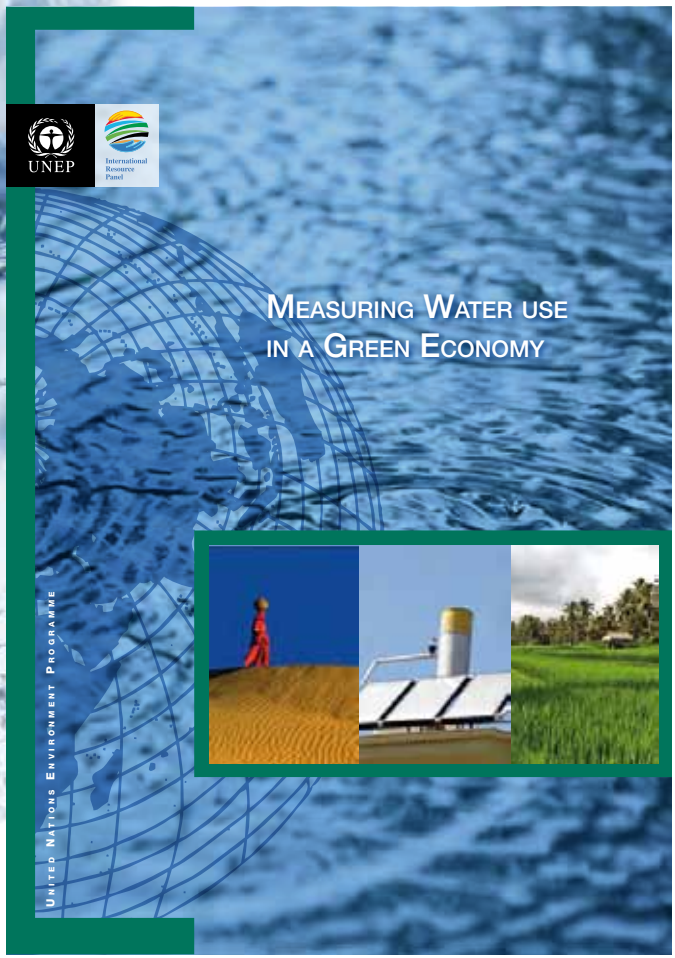

Publication: International Resource Panel: Sustainable water management for a green economy

Facing challenges

In a context of unevenly distributed water resources, increasing droughts and precipitation in some regions, enhanced water efficiency and management is a major opportunity for businesses and final consumers. In most parts of the world, the consistent water accounting systems are in their early stages of development. Quantifying and accounting for water flows within the economy, including environmental needs, with attention to the related impacts in the appropriate time and spatial scales, would enable

transparent information systems. These could then be used in allocation and management systems to sustain a green economy. This holistic approach to resource management could include making the most of opportunities in efficient water use, water demand management, sustainable infrastructure and valuing services provided by ecosystems. This would allow countries to reduce water scarcity and environmental degradation, thus actualizing the eventual achievement of the Millennium Development Goals.

Sustainable solutions:

UNEP's establishment of the International Resource Panel (IRP) is a first step towards addressing this need. The Panel, officially launched in November 2007, aims to help nations use natural resources sustainably without compromising economic growth and human needs.

The objectives of the IRP include providing scientific assessments of policy relevance on the sustainable use of natural resources as well as to decouple economic growth from resource use and environmental degradation. The IRP Working Group is examining ways of achieving this through improved water productivity, for example in the harvesting, use and reuse of water. It is further defining a measurement framework for achieving efficient, effective and equitable water use.

Wider impacts

The IRP will publish two assessments – an overview of the scope of the water management problem around the world and an analysis of the economic and social elements of water productivity and efficiency together with aspects of governance and institutional arrangements.

With the recognition of water as vital natural capital while developing a healthy and productive water sector within an economy that enables social equity, the IRP reports will raise awareness and knowledge among decision makers in governments and civil society.

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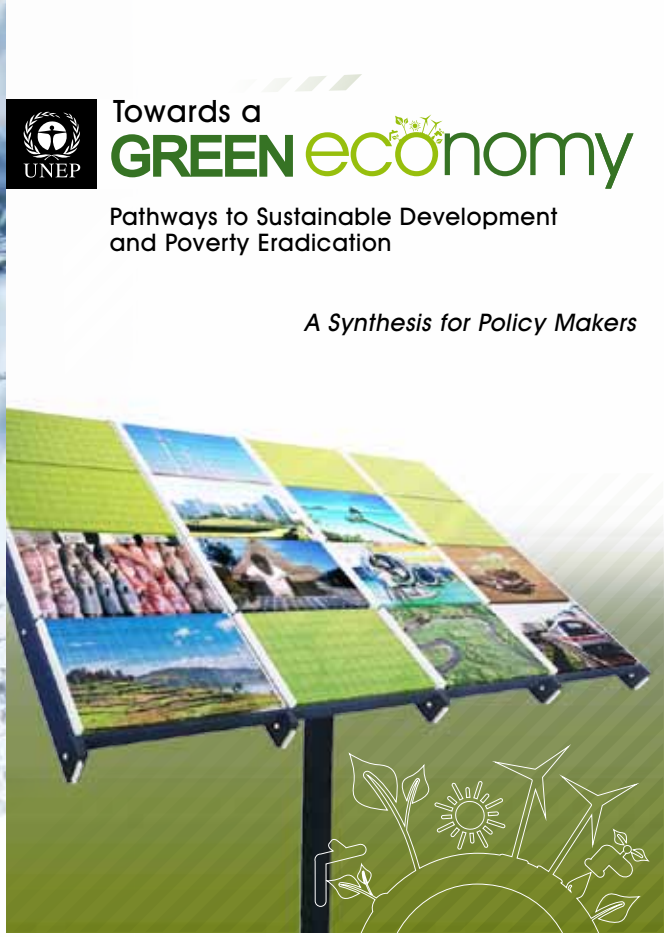

Publication: Water in the green economy

"The Green Economy Report shows how accelerated investment in water-dependent ecosystems, water infrastructure and water management, coupled with effective policies, can boost water and food security, improve human health and promote economic growth"

Achim Steiner, UNEP Executive Director.

Facing challenges

In an increasing number of regions, finding affordable water presents difficulties. Access to clean water and adequate sanitation services for all people remain critical goals. Water is also fundamental to food production and providing ecosystem services. It is further required for industrial production and energy generation. As demand increases and supplies change, finding ways to use the

world's water more efficiently, make it available to all at a reasonable cost, while leaving enough to sustain the environment, are challenges which must be met. To achieve these goals, it is imperative to work within scientifically established and common practice limits.

Sustainable solutions

The UNEP Green Economy Report shows how accelerated investment in water-dependent ecosystems, water infrastructure and water management, coupled with effective policies, can boost water and food security, improve human health and promote economic growth. The green economy thus offers potential opportunities to businesses, investors and civil society. The report explains how improvements in water productivity as well as increases in supply, from new dams and desalination plants as well as recycling, are expected to improve the availability of affordable water. Meanwhile infrastructure investment, water policy reform and the development of new technologies are crucial. Attention to the design of robust water entitlement and allocation systems is critical.

Wider impacts

Direct benefits to society can be expected to flow from increased investment in the water supply and sanitation sector, including investment in the conservation of critical ecosystems. With investment in green sectors, including the water sector, more jobs and greater prosperity can be created, with more jobs created in other sectors. Assisted by good planning, investment will further assist the world's increasing energy demands to be met. This will go hand in hand with improving access to cleaner drinking water and sanitation for all people.

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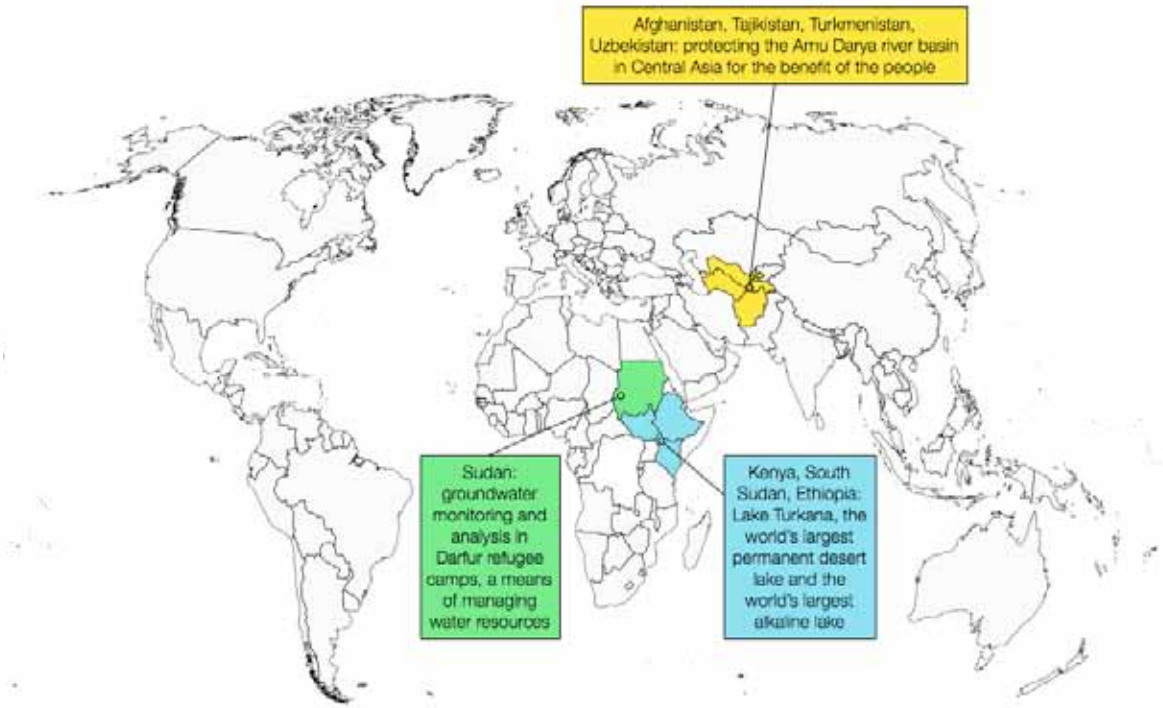

6. Water governance for a green economy

Introduction:

Water governance cannot be left to individual countries, with the state of global freshwater resources in crisis. Both surface and groundwater resources are being depleted and polluted to an extent never before witnessed. Ecosystems, as well as people, are increasingly suffering. Rapid population growth and increased demand from the agricultural and domestic sectors for freshwater resources have put pressure on water, especially in developing

countries. Water contamination is increasing, due to unsustainable use and extraction of freshwater, pollution, population pressures, and urbanization. Add in pollutants from agriculture, household wastewater, mining and sanitation, with concentrations of waste frequently exceeding the ability of rivers to assimilate them.

Nearly half of the world's population now lives within the geographic boundaries of a surface water basin that traverses an international boundary. Over 260 watercourses and more than 270 groundwater basins are shared by two or more sovereign States, the territories of at least 145 of which border on international watercourses. Of these, 21 nations lie entirely within an international surface water basin and another 33 have more than 95 per cent of their territory within such a basin. Meanwhile, 19 international surface water basins are shared by five or more riparian sovereign States, while international transboundary aquifers underlie the territory of nearly every non-island nation. This calls for cooperative management, with the establishment of institutions to manage these vital ecosystems, using an integrated water resource management approach. Notably, 158 of the world's 263 international river basins lack any type of cooperative framework, and of those with such frameworks most continue to lack the tools necessary to promote long-term integrated transboundary freshwater governance.

UNEP's activities in the field of water governance are playing an extremely important role in in laying the basis for addressing the diverse and increasing water challenges strengthening cooperation as well as promoting sustainable management of these transboundary water resources. The ultimate goal -equal access to clean water for all- can only be achieved with the participation of all countries involved.

Summary:

UNEP undertook a comprehensive review of the environment in Darfur in 2007, where many factors have exacerbated conflict, as well as the pressures on natural resources. Since then UNEP has implemented a successful program to integrate water resource considerations in the UN humanitarian program in Darfur.

In Central Asia, the Amu Darya Basin provided a complicated transboundary case, which has UNEP's integrated river basin management approach in their comprehensive assessment.

Kenya and Ethiopia border Lake Turkana, where conflict and drought have ravaged the region. UNEP's assessment on the environmental situation of the lake basin aims to further achieve cooperative management as well as planning of priority development projects, with increased sensitivity to the environment.

Despite the existence of many global-scale water assessment programs, these have not addressed transboundary issues. The first global assessment of transboundary waters was undertaken by UNEP, to ensure more attention from relevant shoreline countries.

The most comprehensive global survey to-date has resulted in UNEP's global status report on the Application of Integrated Approaches to Water Resources Management produced for Rio+20. This is based on responses of over 130 countries to a detailed questionnaire as well as interviews with key stakeholders in 30 countries.

UNEP's organization of the 1st International Environment Forum for Basin Organizations, planned for 2012, aims to strengthen the governance of transboundary water resources and incorporate environmental aspects into freshwater laws and policies at the basin level.

UNEP's publication The Greening of Water Law: Managing Freshwater Resources for People and the Environment, saw its first meeting in Kampala, with the next scheduled for Latin America. This promoted a new balance between the needs of ecosystems and people, to be integrated into new laws on managing water resources.

Project: Water in Darfur – some, for all, forever

Facing the challenges

The Darfur conflict has created a crisis of environmental governance. Humanitarian standards for water supply are widely achieved despite the complex operating environment. However, with large concentrations of people in Darfur's camps, stress on the aquifers has become acute, with some water tables dropping by as much as 10 meters.

Photo: UNEP

The camp water supplies provide an income source for displaced people who face limited options for livelihoods. Water is frequently sold outside the camps or used for brick making, an industry fed by the property boom that has accompanied humanitarian missions. It is also a driver for the extensive deforestation around the camps and towns. Thus the links between natural resources and conflict, the competing needs of different water users and the fragility of the natural environment combine to create a challenging scenario.

Sustainable solutions

UNEP provides advice on addressing environmental concerns in the humanitarian and peacekeeping programs in Darfur. When UNEP supported the integration of water resource management into the humanitarian response in Darfur through a program of groundwater monitoring, this led to greater awareness of resource management issues. As a result, UNEP was requested to support the development of IWRM approaches in the Darfur states, then at the/a national policy level.

Recognizing South Africa as a country that transformed its water sector during its post-conflict period, UNEP worked with the Water Research Commission in South Africa to coordinate a study tour, bringing together key water leaders from across Darfur. Meeting water resource managers in South Africa, some of whom had been subsistence farmers in the apartheid era, but who now sit on the board and run successful cooperative farms, was a major inspiration. The technical leadership of Darfur's water sector urged UNEP to sponsor a second tour for political decision makers.

Wider impacts

UNEP's work, with support from local organizations, has promoted stakeholder participation in addition to resource sustainability, thus providing principles relevant for larger issues on reform of environmental governance. UNEP's program of groundwater monitoring and analysis has now been widely taken up across the humanitarian sector. Follow up from the study tours has led to principles of IWRM informing major initiatives such as the Darfur International Water Conference. Darfur's water sector has diversified with more focus on water resources, not just supply.

The Ministry of Water Resources has implemented a new process of vision building for national implementation of IWRM. Sudan, like much of the Sahel, is facing resource management challenges in the face of population growth, urbanization, climate change and the impacts of conflict. Therefore the work on IWRM is highly significant and has important potential in supporting Sudan's agricultural sector as well as promoting pathways to peace.

Partners:
Water Research Commission in South Africa

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Photo: UNEP

Project: Protecting Rivers and people in Central Asia

"Trust building, re-thinking agricultural production including irrigation systems and fostering cooperation on shared resources and infrastructure will be key to sustainable development in this part of Central Asia. The report sets out clear recommendations on how this can be achieved in a partnership between the countries concerned and the international community"

Achim Steiner, UN Under-Secretary General and UNEP Executive Director

Facing challenges

Water resources in Central Asia have been greatly affected by decades of development in the Soviet Union era. Large-scale engineering projects have built dams, diverting substantial flows from the Amu Darya river basin into cotton, wheat and fodder farming in arid regions. Such projects have substantially contributed to land degradation and soil damage, especially in the Aral Sea, which partly relies on water from the Amu Darya: water levels in the southern part have dropped by 26 meters and the shoreline has receded by several hundred kilometers.

While upstream Tajikistan and Kyrgyzstan enjoy water in abundance, downstream nations of Uzbekistan, and Turkmenistan experience water shortages, worsened by inefficient irrigation agricultural practices. Declining water quality, impacting human health, is affected by chemical run-off from cultivated land, washing soils in winter to reduce salt levels, pollution along the river system and airborne dust and salt from dried out parts of the Aral Sea. Between 1960 and 1990 the salt content of water in the lower Amu Darya basin doubled.

Sustainable solutions

UNEP, under the Environment and Security Initiative (ENVSEC), has produced an in-depth assessment of environment and security linkages and impact in the Amu Darya River Basin. This is the first such assessment of the Amu Darya River Basin in Central Asia, advocating management and monitoring of the river basin as a whole. The assessment report is based on missions and consultations led by UNEP with state authorities, representatives of the media and civil society in Afghanistan, Tajikistan, Turkmenistan and Uzbekistan during 2007-2010. Maps and visual representations ensure that information is clearly and effectively presented to decision-makers at different levels.

Wider impact

The project has contributed to an improved understanding of the Amu Darya River Basin, sparking discussion amongst practitioners in the five countries. It makes an important contribution to improving the environment, as well as human health and livelihood, in addition to assisting national and international policy and dialogue.

The report suggests that a good first step would be for relevant nations to ratify the UN Economic Commission for Europe's Convention on the Protection and Use of Transboundary Watercourses and International Lakes to establish a legal framework for the collective management of the river basin's resources. River basins should be modeled, managed and monitored as a whole by a dedicated body including representatives and stakeholders from the entire basin - a security consideration that could benefit other basins in the world. UNEP together with ENVSEC partners have unified five Central Asian countries, as well as Afghanistan, in this assessment. The international community can (now) use this report as a building block to support joint interventions in the region and encourage dialogue between Afghanistan and the Central Asian states.

Partners:
The Ministry of Foreign Affairs of Finland, The Government of Norway, GRID-Arendal, Zoi , UNDP , The Ministries of; Foreign Affairs, Environment, Agriculture and Water Resources, from the respective countries, NGOs, CBOs.

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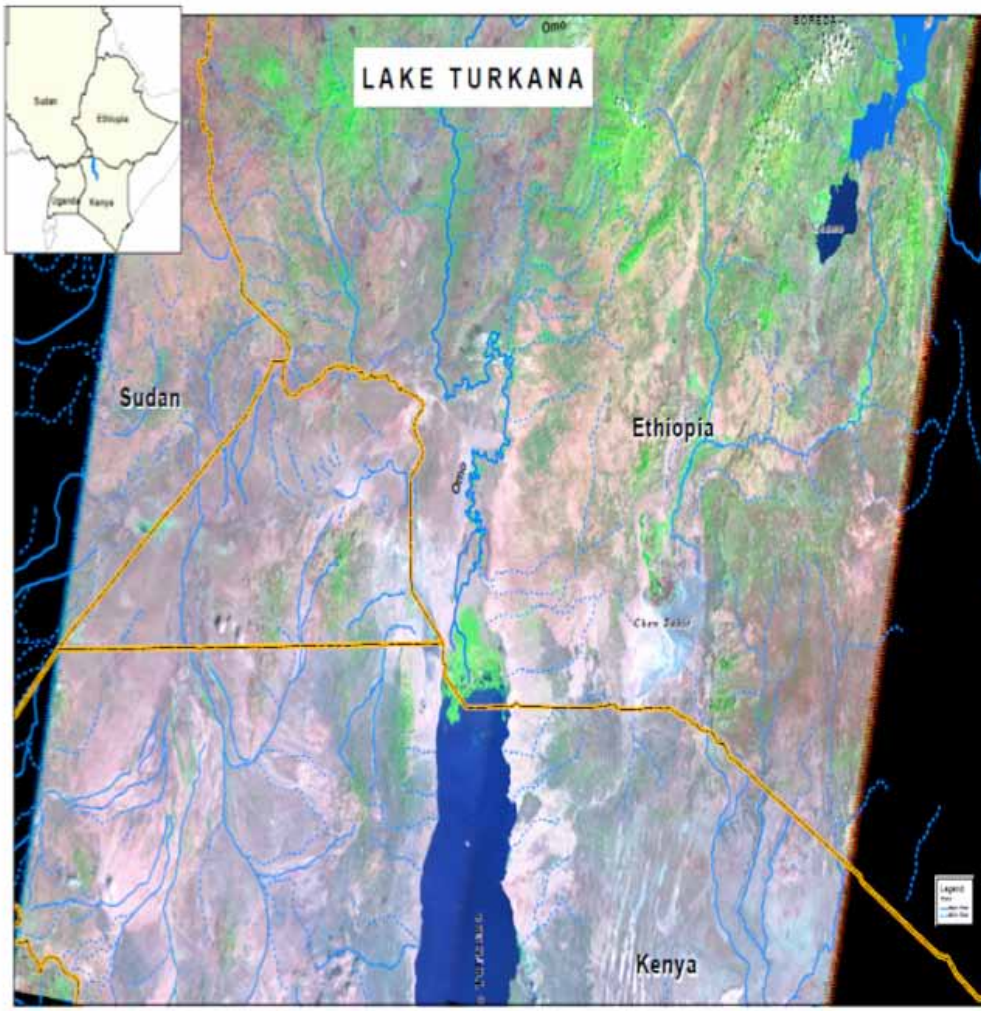
http://www.envsec.org/publications/AmuDarya-EN-Web.pdf
http://www.envsec.org/publications/AmuDarya-EN-Web.pdf

Project: Assessing Lake Turkana to achieve peace and sustainable development



Facing challenges

Lake Turkana is the world's largest permanent desert lake and the largest alkaline lake. More frequent and prolonged droughts in the region, together with a rapidly growing population, have caused degradation. A history of tension over competition for water and grazing areas causes large losses of livestock and regular requirements for humanitarian aid. Currently, the region is facing the worst drought in decades, claiming many lives -both human and livestock- while escalating transboundary armed conflicts. To achieve a sustainable future in the Lake Turkana Basin region, where people's livelihoods and security depends on natural resources, the environmental, economic and social pillars of sustainable development must be given equal footing.

Sustainable solutions

An environmental assessment and the establishment of management mechanisms for sustainable development in the Lake Turkana Basin will be implemented by UNEP in cooperation with the Governments of Kenya and Ethiopia, its purpose is to assist all stakeholders of the Lake Turkana area to enhance their capacity to sustainably manage the ecosystem services provided by the Lake. It also aims to prevent conflict disaster, through better policies, technology, investment and monitoring the health of the ecosystem.

Wider impact

This assessment on the environmental situation of the Lake Turkana Basin aims to promote cooperative management and the establishment of a clear vision on basin management and the planning of priority development projects around environmental hotspots. It will also monitor improvements in ecosystems and ecosystems services, be these provisioning, regulating or support services.

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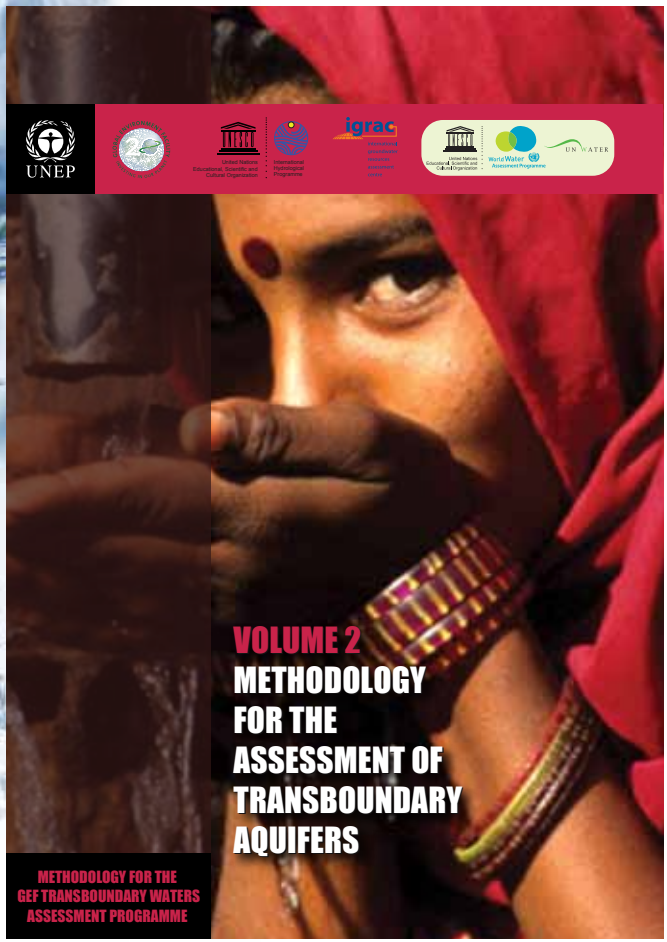

Project: Assessing water across boundaries

Facing challenges

Despite the existence of many global-scale water assessment programs, they are not highlighting the transboundary issues: with many significant water resources shared by more than one country, a global assessment of transboundary waters became necessary, to ensure more attention from relevant riparian countries. But the methodologies for such assessments have so far not been established, neither have the assessments been undertaken.

"UNEP's engagement in West Africa clearly shows that much can be accomplished with fairly modest funding. The high level of commitment from national Governments and other stakeholders has been a key factor for the success of the work to date. Recognition that adopting and adapting to IWRM approaches can be a long term process, often requiring continuous external support, is essential for maintaining the required momentum"

Nick Ahrensberg, Project Manager, Improving Water Governance in African Countries through Support for IWRM Plans (ACP-EU, West Africa Project)

Sustainable solutions

The transboundary waters assessment project, TWAP, was implemented by UNEP and partners. This has transformed global political discussions, providing a framework to collect, share, and monitor information at the transboundary level. This enables comparison of transboundary basins and the transfer of good practices. To facilitate a global assessment, TWAP defines five categories of transboundary water systems: aquifers, lake or reservoir basins, river basins, large marine ecosystems and the open ocean transboundary. The phase of developing methods has been completed, forging partnerships among organizations. It has developed the methodology for assessment for transboundary water systems, establishing the institutional arrangements needed to carry out a global transboundary waters assessment as well, as the in-depth assessment of selected water bodies.

Wider impact

While seeking to minimize costs, the TWAP will use ongoing projects and assessments, current database sets and information, and established partners with effective coordination among agencies carrying out regular assessments. This will help to secure long-term sustainability of the assessment. Understanding inter-linkages among transboundary water systems, including the influences of human use and governance, is critical in determining the baseline and projected status of water systems. A common data and information management platform will be established to organize and present data. Common and cross-cutting data sets, authoritative data sources, and key indicators will be identified and made easily accessible, in order to strengthen the assessment work.

Partners:

DHI Center (rivers) with partners, SIWI, IUCN, Kassel and Frankfurt Univ., City University of New York, Oregon State Univ., IGBP, CIESIN, UNESCO-IHP (aquifers), with partners; IGRAC, WWAP, ISARM, FAO,UNESCO-IOC (LME, Open Ocean))with partners, NOAA, CERMES, CMAP, GESAMP, IGBP/LOICZ, UNEP-WCMC, UBC Sea Around Us project, Univ. Dalhousie, Univ. Miami, GOOS, EC-GEOWOW, WCRP, UNEP GRID-Arendal ,ILEC with partners; Shiga Univ., Texas State Univ., RIHN; Russian Academy of Sciences; Lake Laguna Development Authority; Chlika Development Authority; Federal Univ. of Rio de Janeiro; Indian Association of Aquatic Biologists; Univ. of Palermo; Univ. of Nairobi; and Pro-Lago Atitlan.

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Photo: UNEP

Project: Towards improved water management and governance in West Africa

"UNEP's engagement in West Africa clearly shows that much can be accomplished with fairly modest funding. The high level of commitment from national Governments and other stakeholders has been a key factor for the success of the work to date. Recognition that adopting and adapting to IWRM approaches can be a long term process, often requiring continuous external support, is essential for maintaining the required momentum"

Nick Ahrensberg, Project Manager, Improving Water Governance in African Countries through Support for IWRM Plans (ACP-EU, West Africa Project)

Facing challenges

In West Africa, increasing demand for water as a result of population increases and economic development is a growing concern. The challenge of balancing water needs, available resources and environmental functions is exacerbated by environmental constraints as well as poverty, population growth and low technical capacity. Some countries in the region are hampered by conflict, resulting in weakened governance structures in all areas, including water resources management.

Efforts to address the situation with a holistic approach based on Integrated Water Resources Management (IWRM) require time, patience, and substantial work. External support is vital to a region where progress towards long-term sustainability is often pushed aside by immediate needs and political instability.

Sustainable solutions

In 2007 all countries were invited to participate in a survey aimed at establishing the status of water resources management that could be used to identify areas for specific attention. This led to Côte d'Ivoire, Gambia, Guinea-Bissau, Guinea, Liberia, Sierra Leone and Togo formally requesting assistance to accelerate their water resources management progress. UNEP was able to secure financial support from the European Union for an initiative to run from 2008-2012, aimed at developing national IWRM plans.

Over the past five years, UNEP has been helping West African countries address their water management challenges through IWRM, with technical expertise and financial assistance, in collaboration with an extensive network of partners. For example, more than 250 people from all the countries have been involved in training workshops. In Côte d'Ivoire 30 journalists have been trained in water resources management issues and related national political processes to assure promotion of IWRM to a wider group of stakeholders. In Togo, some 30 high-level national technical experts were recently brought together for advanced training on IWRM ecosystem management and climate change adaptation planning.

Wider impact

Gambia, Sierra Leone, Guinea and Guinea Bissau have recently finalized IWRM "roadmaps" for improved water management. Togo has already finalized its IWRM plan and is moving towards implementation. Meanwhile Liberia and Côte d'Ivoire are in the process of finalizing IWRM plans that are expected to be adopted by their governments during 2012. In Liberia, specialized training over a period of several years has helped to develop national capacity that has also led to the country's first ever National Water Policy. As a result of this and related initiatives, UNEP's support is laying foundations of long-term sustainable water resources management.

Partners:

UNEP-DHI Centre for Water and Environment; Economic Community of West African States/Water Resource Coordination Center; Global Water Partnership; the Africa, Caribbean and Pacific Union Water Facility; the governments of Cote d'Ivoire, Gambia ,Guinea Bissau, Guinea Conakry, Liberia, Sierra Leone and Togo

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http://unepdhi.org/Publications.aspx

Report: How well do we manage our water? Measuring global progress towards sustainable water resources management for Rio+20 and beyond

"Nowadays, an integrated approach to the development of multipurpose projects and the incorporation of climate change impacts in the design of infrastructure can increasingly be observed." Mexico

Facing challenges

The Earth Summit of 1992 was a first step in recognizing the critical role of water resources development and management, calling for the application of integrated approaches to the development management and use of water resources. This marked the birth of the Integrated Water Resources Management (IWRM) approach as we know it. This landmark decision stemmed from a desire to address the growing water resources management challenges, trying to balance the need for infrastructure solutions with that of soft r interventions. Since then countries have allocated an increasing amount of time and resources in the drive towards more sustainable water resources management. However, equally important is the need to assess any progress.

The Rio+20 United Nations Conference on Sustainable Development marked 20 years since the historic Earth Summit. The Rio+20 conference was a milestone event that provided an opportunity to reflect on progress and decide how to build on this in future. A report on the status, impacts and challenges of global water resources management was needed in order to provide a factual basis for sound decision-making – both during and after Rio+20 conference.

Sustainable solutions

The global status report on the Application of Integrated Approaches to Water Resources Management produced for Rio+20 is based on the most comprehensive global survey to-date. It draws on the responses of more than 130 countries to a detailed questionnaire and multiple interviews with key stakeholders in a total of 30 countries. The report presents key findings and focuses on changes in water resources management since 1992, the current state of progress, identifies the main barriers to progress, and suggests ways these barriers can be overcome. It was prepared on request from the UN Commission on Sustainable Development (UN CSD) and overseen by UN-Water who mandated UNEP to lead a team comprising of experts from the UNEP-DHI Centre, UNDP, SIWI, and GWP. The report complements an earlier UN-Water report from 2008, which primarily took stock of the development and implementation of Integrated Water Resources Management and Water Efficiency Plans. The 2012 status report is more extensive and addresses the development, management and uses of water resources, as well as possible outcomes and impacts of integrated approaches.

Wider impact:

The UNEP-led reporting on the status, impacts and challenges of the application of integrated approaches to water resources management informed the global policy discourse and the decision-making of the Rio+20 conference in particular. The report also provides a useful basis for informed decision-making by national governments and facilitates a dialogue with the international community about areas for specific attention and possible support. It further provides countries with the possibility to share experiences and learn about measures being taken elsewhere to address challenges. Furthermore, it contributes to the development of a permanent monitoring and reporting framework to promote future sustainable development and management of water resources. The work also facilitates information exchange among UN agencies, national governments and civil society in a way that will enhance coherence and impact of the work of the UN at country level.

By providing an overview of the progress so far, the lessons learned and next steps needed, it is the shared hope that the report will help the journey towards sustainable water resources management to continue and accelerate.

An integrated approach to water resources management is crucial to meeting the challenges of increasing water demand (including that from ecosystems), increasing water scarcity and increasing uncertainty/ variability due to climate change. It is also central to advancing a green economy and supporting sustainable growth. While IWRM has been criticized for being difficult to implement, the status report reveals that more than half of countries have started implementing IWRM plans. Many countries have taken a pragmatic approach true to the intent of the process by making their own interpretation of IWRM that takes into account local conditions and needs, rather than following a standard prescriptive plan. UNEP's support to IWRM related processes, both at the global, regional, national and basin scale, has been – and continues to be – a very important driver of this progress. With the increasing focus on ecosystems and their fundamental role in food security and climate change adaptation, UNEP is well positioned to push the water agenda further.

Partners:
UN-Water, UNEP-DHI Centre for Water and Environment, UNDP, Global Water Partnership (GWP), UN-DESA; World Water Assessment Programme(WWAP) UNESCO, Danida, Swedish International Water Institute(SIWI), Governments from more than 135 countries.

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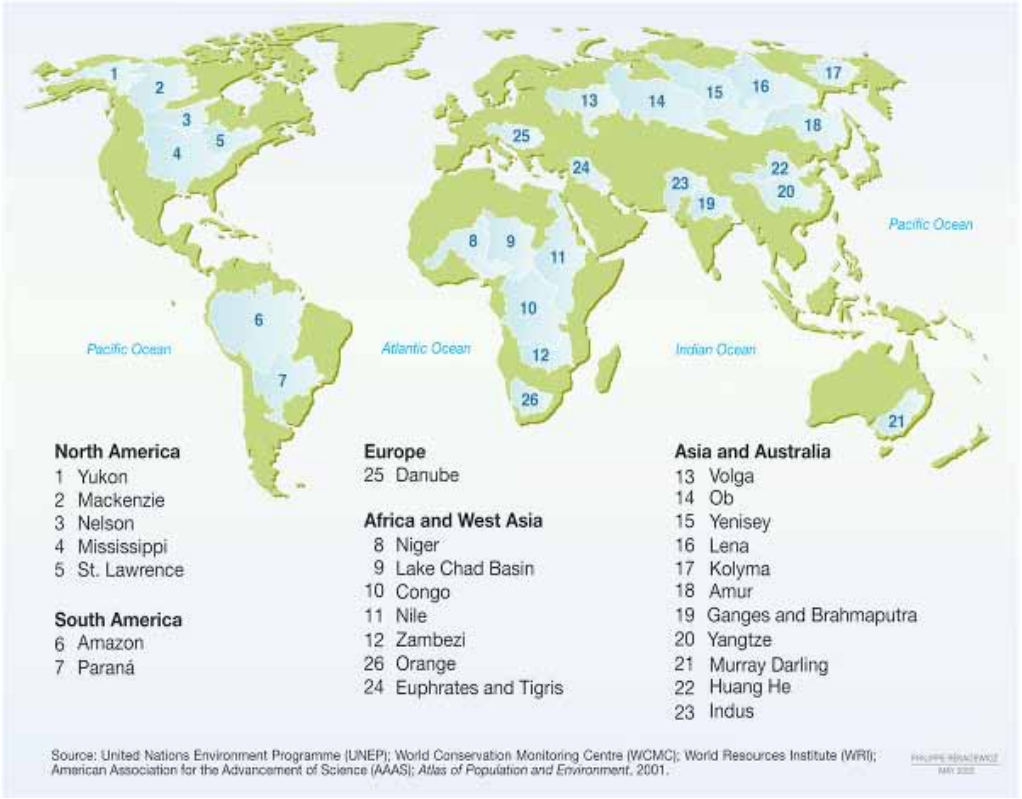

Forum: Breaking ground with an International Environmental Forum for basin organizations

Facing challenges

Existing governance structures are largely geared towards providing frameworks for satisfying human water demand. Often these frameworks fail to address the protection and sustainable use of the actual freshwater resources and related ecosystems which themselves provide valuable services to communities. Effective cooperative arrangements for joint management of transboundary basins which recognize the environmental dimension in the governance of these vital resources is indispensable, especially with climate change added into the picture.

Sustainable solutions

To strengthen governance of transboundary water resources and improve integration of environmental aspects into freshwater laws and policies, UNEP is organizing the 1st International Environment Forum for Basin Organizations. This will unite basin organizations from all around the world and other key stakeholders in the management of transboundary basins, such as UN Agencies and other relevant international institutions.

The Forum will take place in 2012, probably in Bangkok, where it was previously postponed due to floods in 2011. The Forum will present opportunities to share experiences, pass on practices, discuss new approaches, build partnerships and establish mechanisms for improving their capacities. It will create opportunities for basin organizations and key stakeholders worldwide to work together towards strengthening the governance and management of transboundary basins, with focus on vital environmental aspects. Key topics will include: ecosystems and biodiversity conservation, climate change adaptation, environmental laws, as well as regulations and institutional challenges.

Wider impacts

The wider aim is to establish a regular platform for basin organizations to work together towards strengthening the integration of environmental concerns in their governance systems and take action to protect and restore ecosystems across the basin. It is hoped to hold similar forums every two years, using information gained to assist UNEP's operational strategy for freshwater and future activities related to freshwater governance and law.

This Forum is another aspect of UNEP's work in supporting the implementation of Multilateral Environmental Agreements. Over the past few decades the international community has adopted an important number of MEAs responding to a complex set of environmental challenges. The implementation of these, many of which are administered by UNEP, bears great significance for the sustainability of freshwater resources across the globe and can actively support the effectiveness of international water law. The forum will further raise awareness on the role of basin organizations as key components of the environmental governance system, in particular in terms of implementing relevant MEAs at the basin and regional level. It will present the ideal opportunity to further support the implementation of international water law and to facilitate mutually beneficial outcomes within a broader international legal system, particularly in anticipation of an eventual entry into force of the UN Convention on the Law of the Non-Navigational Uses of International Watercourses (UN Watercourse Convention).

Partners:

African Ministers' Council on Water (AMCOW) , Asian Development Bank (ADB) ,• International Association for Water Law (AIDA), International Association of Hydrogeologists (IAH) , International Bar Association (IBA) , International Network of Basin Organizations (INBO) , International Union for Conservation of Nature (IUCN) , The League of Arab States, Mekong River Commission (MRC), The Organization of American States (OAS), Ramsar Convention on Wetlands, Stockholm International Water Institute (SIWI) , United Nations Convention to Combat Desertification (UNCCD), United Nations Economic Commission for Europe (UNECE) , UNECE Water Convention, UNESCO-International Hydrological Programme (IHP)

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Publication: The greening of water law

Facing challenges

Access to safe drinking water is limited in many developing countries. Water resources are exposed to increasing contamination and pollution as a result of inadequate and inefficient water management policies. In many parts of the world, communities compete with nature for dwindling supplies of water, to the detriment of both. The challenge is to ensure that both people and the natural environment have adequate freshwater to sustain and nourish their existence. Yet, water for the environment is often secondary in water management practice, adversely affecting the aquatic environment.

With growing global concern for the future of our freshwater resources, governments have come under increasing pressure to improve policies and strategies for freshwater management. In particular, the negative impacts of unsustainable water use on human population, ecosystems and their dependent species have created a growing movement toward more environmentally-friendly water management, to be integrated into national and international water laws and policies. The aim is a sustainable balance between water for people and economies, and water for ecosystems.

Sustainable solutions

UNEP has developed a publication: The Greening of Water Law: Managing Freshwater Resources for People and the Environment, and is organizing a series of regional conferences on the same theme. The first meeting, The Greening of Water Law in Africa, was held in Kampala, Uganda, in November 2010. A second regional conference will be held in Latin America in 2012. Participants include government officials, legal professionals and academics.

One of the main findings of the Greening of Water Law report is that an increasing number of countries have taken a different approach to balancing socio-economic development and environmental protection when drafting or reviewing their water related legislation. There is a broad array of examples of mechanisms being employed to strengthen the environmental dimension of domestic laws and regulations. The Greening of Water Law report cites many examples of national and international “green” water laws, including in Namibia, Paraguay, California and Switzerland.

Wider impact

The Kampala conference in 2010 helped promote the integration of the environmental dimension in national water laws, increasing understanding on the benefits for the whole African continent. It was also an opportunity to exchange views and share lessons learned on greening up water-related legislation. The conference addressed and assessed a variety of legal and procedural mechanisms, national and international, designed to elevate the status and importance of environmental concerns in the wider context of competition for water resources. The conference showed a sustained effort by UNEP and interested partners to support and help enable green water law at national level.

One objective of this series of regional conferences is to collect the outcomes in a comprehensive publication to identify the trends of the "greening" process in each region. It will also highlight best practices and raise awareness on the issue.

Partners:
Government of Uganda, International Water Law Project, International Association for Water Law (AIDA), International Bar Association (IBA), UNESCO-IHP

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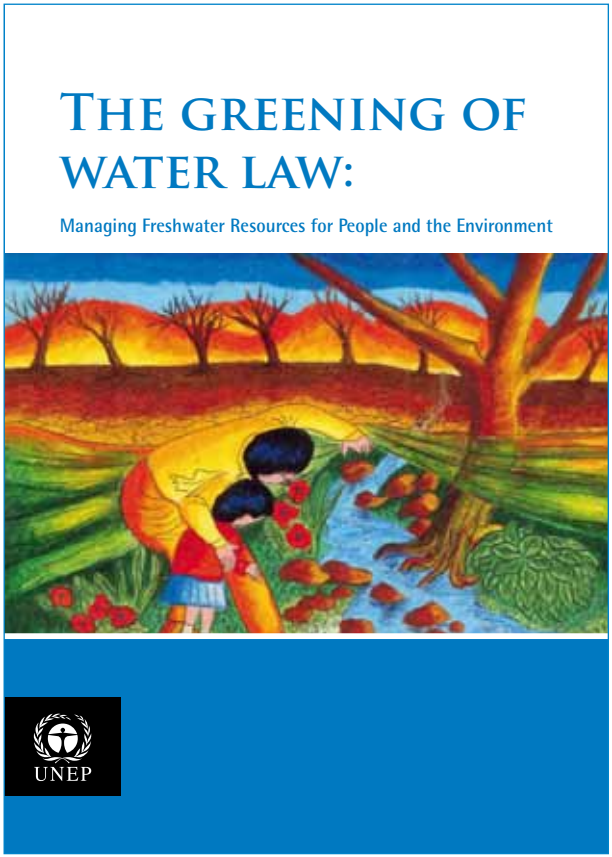


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