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- Secretariat of UN Framework Convention on Climate Change **(CCC)**
- Secretariat of the International Strategy for Disaster Reduction **(ISDR)**

Water for thirsty cities



MEETING THE FUTURE HEAD-ON

During the course of the first quarter of this century, more than half of the inhabitants of this planet will live in urban areas. Urbanization is a reality that we must face and turn to our advantage, as cities drive the engines of economic and social development. However, urbanization has also put enormous pressure on the world's natural resources, water in particular. Depletion, wastage and pollution of water resources are threatening the sustainability of economic and social development.

Effective demand management measures can not only save on new investments, but also reduce the cost of wastewater treatment.

- **Protecting health and the environment from urban pollution**

There is an urgent need to address the increasing water pollution caused by poor sanitation, solid wastes and uncontrolled industrial effluents, which critically affect health and productivity, particularly of the urban poor, and threaten recipient ecosystems.

- **Improving urban water governance**

A paradigm shift is urgently needed in urban water governance. Public-private partnerships can bring in much needed efficiency gains in the urban water sector, and community participation can help in ensuring transparency and equity in water management.

- **Four key challenges**

- **Making water available to all**
The vast majority of the urban poor are denied access to municipal supplies. Forced to rely on private vendors, they pay as much as five to twenty times of what their affluent neighbours pay. Making available safe drinking-water to all, at prices they can afford, is an outstanding challenge that must be tackled as a first priority.

- **Improving the efficiency of water use**
More than half of the water treated at a high cost and supplied to many cities remains "unaccounted for" because of leakage, wastage and illegal connections.



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Integrated water resources management



A KEY TO SUSTAINABLE DEVELOPMENT

UN DESA implements at country level the integrated water resources management (IWRM) approaches of Agenda 21 to ensure strategic integration of economic, social and environmental aspects of sustainable development.

UN DESA can provide:

- Formulation, execution and evaluation of technical co-operation projects and advisory services, with the principal objective of assisting developing countries to build their own capacity, particularly regarding applications of water-related sustainable development concepts in a growing context of decentralization of the decision-making process.

This includes the development of enabling IWRM frameworks, both institutional and regulatory, water resources assessments, planning and decision-making tools and information systems. Rural water supply and sanitation programmes are also carried out in the context of poverty reduction.

- The newly established "Water Virtual Learning Centre" (WVLC), a long-distance educational programme, in partnership with the United Nations University and the International Telecommunications Union. The promotion of sustainable water resources development and management is delivered through a core curriculum on integrated water resources management that offers opportunities for continuing education and upgrading skills. This programme is to be executed via a regional network of training institutions and universities, supported by a core Website maintained by SidsNet at UNDESA.
- The inter-agency secretariat for various UN agencies dealing with water resources issues, thus facilitating coordination and co-operation among those agencies and multilateral negotiations on sustainable development, such as the Commission on Sustainable Development and the World Summit on Sustainable Development.



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Learning to govern water wisely



PROMOTING INTEGRATED MANAGEMENT IN THE FIELD

UNDP is contributing to the World Water Development Report (WWDR) by sharing its extensive experience with field operations and its own publication of the Human Development Report. UNDP will also play an important role in disseminating WWDR results using its country-level networks.

UNDP's role in water governance

UNDP is strongly positioned to help countries pursue strategies of integrated water resources management (IWRM) and poverty reduction. UNDP's water niche lies in what is termed water governance. This comprises the operational role of assisting countries to build cross-sectoral capacities and establish effective policies and institutions to manage and develop water resources in a sustainable way and thereby reduce poverty.

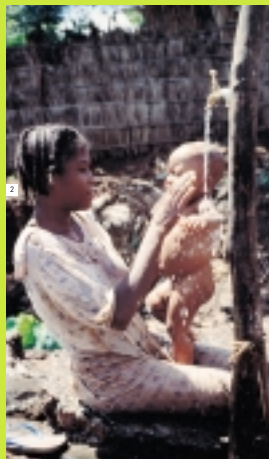
Particular areas of interest

- **Integrated water resources management**
Building institutional and human capacity is a prerequisite for sustainable development. A capacity-building network (Cap-Net) supports South-South as well as North-South partnerships for enhanced IWRM.

- **Transboundary waters**
In many parts of the world there is an urgent need to increase and accelerate co-operation of shared water resources. UNDP's transboundary river basin activities encourage dialogue between and within riparian states.

- **Gender mainstreaming**
Involving both women and men in IWRM helps reduce poverty and increases the effectiveness, efficiency, equality and development impacts of water resources management efforts. In collaboration with other agencies, UNDP is developing a Tool Kit for gender and IWRM.

- **Ecosystem-based management of sanitation**
UNDP supports pro-poor, sustainable and innovative activities in water supply and sanitation, including reuse of wastes based on an ecosystem approach. Special emphasis is placed on advocacy, South-South collaboration and linkages to urban agriculture.



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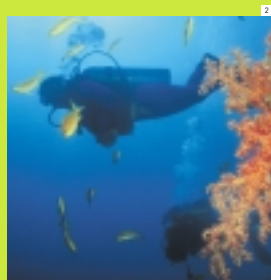
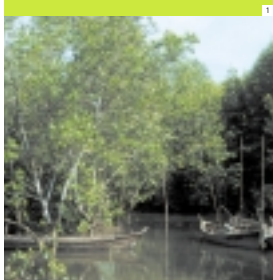
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Oceans for life on earth



A GLOBAL PROGRAMME OF ACTION FOR PROTECTING THE MARINE ENVIRONMENT FROM LAND-BASED ACTIVITIES

The people:

- 3 billion people live within 80 km from the sea shore.
- 13 out of 19 mega-cities are coastal, and these are growing in number and size.
- 1 billion people, mostly in developing countries, depend on fish as their primary source of protein.

The economic losses:

- 1 in 20 adults fall ill from bathing in polluted coastal waters.
- US \$10 billion/year costs for diseases due to eating infected shellfish.
- US \$100 million cost due to algal blooms (1987-1993).



The activities:

- 40% of sewage discharged without treatment.
- 20-fold increase of tourism (1950-2000).
- 6-fold-fertilizer use and 3-fold increase of higher load per hectare (1950-2000).
- Mining, agriculture, harbors, transport.
- Increase of aquaculture.
- 45,000 dams in over 150 countries.

HELPING TO FIND SOLUTIONS

The GPA:

- Adopted in 1995 in response to UNCED's Agenda 21.
- Promotes conceptual and practical guidance.
- Encourages governments to work with private sector and stakeholders, and UN agencies to facilitate government programmes.
- Is a UNEP programme.

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80% OF MARINE POLLUTION ORIGINATES FROM LAND

The environmental effects:

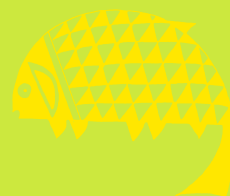
- 70% of the world's coral reef seriously threatened.
- 50% of coral reefs in SE Asia at high risk due to coastal development.
- 50% of mangrove ecosystems are being lost.

How to act:

- Move from planning to action.
- Multi-stakeholder Work programme 2002-2006.
- Partnerships involving all stakeholders and institutions.
- Focusing on finance and good governance as the main challenges.
- Voluntary action, together with regulatory and economic instruments.



Improving water assessment capacity



ELECTRONIC TOOLS FOR CREATIVE LEARNING

The United Nations University, through its Canadian-based International Network on Water, Environment and Health (UNU/INWEH) is contributing a major new training curriculum on Integrated Water Resources Management for the World Water Assessment Programme. UNU is a founding partner in the WWAP and has contributed to the design of both the WWDR and the WWAP Water Information Network, in addition to capacity-building.

The regional network will provide "train-the-trainer" courses and promote self-paced distance learning. UN University diplomas will be given, with an online examination system provided for remote students.

The longer-term objective is a "tiered" course structure that includes the core curriculum, short courses for non-water professionals and a series of advanced courses for water specialists. The goal is better water assessment leading to more integrated and effective water management.

In partnership with the UN Department of Economic and Social Affairs, UNU/INWEH is developing an online "Water Virtual Learning Center" to provide distance learning opportunities and information on best water management practices for developing countries.

The programme will be aimed at practicing professionals in the water sector wishing to upgrade their knowledge of modern water management concepts and practices.

This year-long curriculum will be disseminated via Internet and CD-ROM through a global electronic network of regional and national training institutions, the first components of which will be established in Africa and the South Pacific. The core curriculum will be customized to regional needs.



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Water for food: new challenges



TOWARDS BETTER UNDERSTANDING OF ROLES AND IMPACTS

Irrigated agriculture has provided the keys to improving the livelihoods of the poor in all regions of the developing world. But the pressure put on the limited water resource base has often resulted in degraded environmental systems and lost opportunities for other productive uses of land and water. The challenge for irrigated agriculture today, is therefore to find ways to contribute to poverty alleviation and enhance the productive use of limited water resources, while also reducing environmental stress.

Three-quarters of the world's irrigated areas lie in developing countries, where smallholder agriculture predominates. Here, farmers and rural communities benefit from irrigation through enhanced diet, better incomes and more job opportunities. Irrigation services are therefore key in combating poverty and ensuring food security. However, achieving the required expansion, intensification and diversification of irrigated agriculture will demand much more progressive approaches to water management.

The patterns of development and population growth are resulting in competition for limited resources amongst the key productive sectors – agriculture, industry, municipalities – and are also degrading the freshwater ecosystems that furnish the resource. Finding equitable and efficient ways to reconcile this competition and maintain the integrity of the environmental systems has become the dominant thrust of agriculture policy in both developed and developing countries.

Building the knowledge base

Yet, the critical understanding of the role irrigated agriculture can play in solving local and global food security problems is limited by a very fragmented knowledge of water resource use, its socio-economic benefits and environmental impacts. Under the World Water Assessment Programme, FAO and its partners are working towards a better understanding of the multiple roles and impacts of irrigated agriculture.



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Isotope hydrology: a tool for understanding water



DRAWING THE MEASURE OF FRESH WATER

Nearly all the renewable fresh water on Earth is carried in rivers and lakes – and is becoming increasingly susceptible to misuse by human activity.

Fresh water is vital to life and a prudent balance between its use and assessment of its availability is imperative to protect limited reserves and avoid costly development of new resources.

A critical component in assessing fresh water is knowledge of Earth's water cycle - how water supplies are renewed - and the birth and life expectancy of groundwater resources.

During its evaporation and condensation, the concentration of oxygen and hydrogen isotopes, in a water molecule, undergo small changes.

Water fingerprints

As a result, in different parts of the hydrologic cycle, water is naturally tagged with isotopic "fingerprints", which vary according to the history of a particular body of water and its pathway through the hydrologic cycle.

Isotope techniques in water management provide important and sometimes unique tools for obtaining critical information.

If it is present, they can identify the source of renewal to groundwater; determine the age of groundwater; its rate of movement; the relationship between rainfall, run-off in streams and rivers, flooding and sedimentation.

Cost savings

Fully integrated into hydrology, isotope techniques provide significant cost savings.

Each year the IAEA allocates nearly US\$3 million to its water resources program, and the agency has invested about US\$30 million in 150 projects in 60 countries to improve water management using isotopes. In the process, hundreds of young scientists have been trained in isotope hydrology.



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Water and health: two precious resources intertwined



THE CHALLENGE OF MEETING BASIC NEEDS

Every year around 3.4 million people die from water-related disease, much of it preventable. The biggest killers are diarrhoea and malaria and those most affected are poor children under 5 years of age. The major causes are lack of hygiene, lack of access to safe drinking-water and sanitation, as well as poor water resources management which encourages disease vectors.

Much of the death toll and human suffering could be avoided if men, women and children had access to things as basic as safe water, adequate sanitation and simple improvements in water management.

Water in the home improves hygiene and protects health. Used in irrigated agriculture, it helps nourish much of the world's population.

WHO's work supports health and non-health sectors in reducing water and waste-related disease and optimizing health benefits of sustainable water and effective waste management.

The vicious cycle of sickness and poverty

Water-related disease problems are most severe among poor communities and contribute to the cycle of poverty.

- Today, 1.1 billion people nearly, one-fifth of the world's population, still lack access to improved water resources.
- 2.4 billion people, half of the population in underdeveloped countries, live without basic sanitation.
- 200 million people in the world, mainly the rural poor, are infected with schistosomiasis.

Addressing these basic needs is a major challenge for WHO and other partners

Other contributions to WWAP

WHO and UNICEF's Joint Monitoring Programme (JMP) tracks progress towards universal access to safe drinking-water and sanitation and will contribute to the WWAP.

Other efforts will focus on the burden of water-related disease and the effects of good water management on disease prevention.



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Data and information: a foundation for wise decisions



THE NEED FOR ASSESSMENT

The collection of basic data on the availability and quality of freshwater is essential to the assessment, and hence, the sustainable development of water resources.

Without adequate long-term information, much higher costs are incurred in the design and construction of water projects, because of the need to take account of uncertainty. Without it, poor decisions may also be made as to the amount and quality of water that is actually available. Other alternatives, such as improving efficiency or reducing demand, may not be given proper consideration. Forecasts of floods and the likelihood of droughts also depend on having a reliable flow of data. The cost of an effective programme of data collection and information management need only be a very small percentage of the cost of the water resource projects that depend on these data.

Water-related data cover

- Rainfall and evaporation.
- Streamflow and lake levels.
- Groundwater levels.
- Water quality of surface and underground waters.

Availability

Even though collected and stored, data have no value unless they are made rapidly available to those who need them, including agencies and countries.

Forecasting

The toll of death and injury caused by floods has risen steadily over the years and the cost of flood damage has increased many-fold. Flood management must be integrated within overall water resources management and should include improved forecasting and land management. Good forecasts of river flow and groundwater levels also allow for improved efficiency in the use of water resources.

Climate and water

Variation in availability of freshwater depends on the variability in climate. Any change in future climate will have its greatest impact through a decrease or increase in rainfall and streamflow, which means more frequent and extreme droughts and floods. It is therefore essential to link studies of climate with freshwater studies when planning for sustainable development.

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Managing shared water resources co-operatively



FROM POTENTIAL CONFLICT TO CO-OPERATION POTENTIAL: WATER FOR PEACE

One of UNESCO's contributions to WWAP, in co-operation with Green Cross International, is a project entitled "From Potential Conflict to Co-operation Potential (PC→CP): Water for Peace". It addresses the challenge of shared water resource management. All efforts have been conceived with the idea that, although shared water resources can be a source of conflict, their joint management should be strengthened as a means of co-operation between various water users.

Activities will develop along three major tracks:

- A disciplinary track.
- A case-study track.
- An educational track.

The outputs of the project will comprise:

- Case studies with a comparative historical analysis.
- Disciplinary state-of-the-art reports.
- "Think" pieces/papers.
- Proceedings of scientific conferences.
- Databases.
- Indicators of potential conflicts, verified through historical evidence.
- Courses, modules and other educational material.

The target audiences are institutions and individuals engaged in the management of shared water resources: governments, donor and funding agencies, educators and professionals at all levels, actual and future decision-makers and the general public.

The project is in accordance with the mandate of WWAP to serve the needs of Member States and to foster co-operation between nations.

The overall objective is to promote co-operation between stakeholders in the management of shared water resources, and mitigate the risk that potential conflicts turn into real ones. The project aims to demonstrate that a situation with undeniable potential for conflict can be transformed into a situation with the potential for negotiation and co-operation. PC→CP's thematic focus is on this very transition — from PC to CP.



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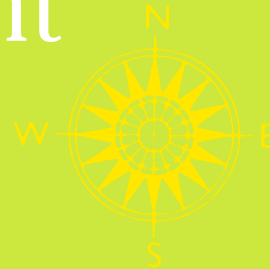
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Transboundary water monitoring and assessment



A EUROPEAN NETWORK FOR SHARING KNOWLEDGE AND EXPERIENCE

The International Water Assessment Centre (IWAC) is a broad European network, which facilitates the work under the United Nations Economic Commission for Europe (UNECE) Convention on Protection and Use of Transboundary Watercourses and International Lakes (Water Convention, Helsinki, 1992).

IWAC supports the UNECE in providing European input into the World Water Development Report, i.e. by reviewing reports, and by contributing to discussions on indicator development, concepts and case studies.

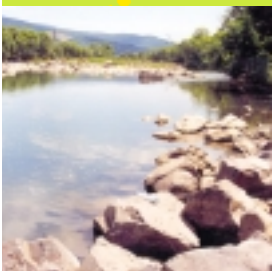
The IWAC network aims at exchanging, sharing and disseminating knowledge, experiences and expertise in the management, monitoring and assessment of transboundary freshwaters. The network consists of representatives from national and international governments, European institutes and NGOs.

An interactive website

The IWAC web portal is the spot for the exchange of knowledge, experience, and expertise. It facilitates discussions on relevant and current issues amongst scientists, experts, managers, policy makers and interested visitors.

Website discussions can serve as the engine for other IWAC activities (seminars, workshops, publications, training). Activities can be carried out by any member of the IWAC network. Several European institutes act as the driving force for strategic planning of activities, while the Dutch Institute for Inland Water Management and Waste Water Management (RIZA) hosts the secretariat and facilitates the work of the network.

It is hoped that IWAC will develop into a thriving community in which all stakeholders in transboundary monitoring and assessment in ECE-countries are represented. The present IWAC community cordially invites all interested scientists, policymakers and other stakeholders to become an active member of the IWAC network.



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Thailand case study: Chao Phraya River Basin



CULTURE, CHANGE AND COMPETITION IN BANGKOK

The Chao Phraya River will be one of the WWAP's pilot case studies to be carried out in preparation for the first World Water Development Report. The Chao Phraya River Basin is 800 km long and comprises a catchment area of 162,000 km², covering one third of the country's territory.

Flooding

The deltaic area is highly susceptible to flooding during the southwest monsoon. Peak river discharge occurs in October, which can coincide with high tides in the Gulf of Thailand, causing serious flooding, damage and social economic losses, such as the 1995 flood. Flood dykes protect the city center and retention ponds are being constructed for temporary storage of urban floodwater and water treatment in the dry season.

Agriculture

The alluvial central flood plains and delta comprise the most productive agricultural land for rice production. Although still the world's largest exporter of rice, agricultural products now contribute only a small part of GDP, but provide food security and sustainable livelihoods for millions of farmers in the basin.

Water supply

The Chao Phraya River is the major source of drinking water for the city of Bangkok, but cannot meet all the increasing demands. Local aquifers are becoming brackish and unsafe for use, and excessive groundwater abstraction is causing land subsidence as high as 10 cm/year in some locations. Important policy decisions on water allocation to industry, agriculture and other sectors are required.

Pollution control

The new Building Control Law will require all wastewater from premises to discharge directly into public sewers. Six central treatment plants with a total capacity of 992,000 m³/day will be completed shortly to improve environmental protection.

Social and economic growth information technology, globalization, economic expansion and rural migration are exerting strong pressures and challenges to Thai culture that will require a more balanced future development.



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Water resource issues and development in Africa



A FOCUS ON REGIONAL ASPECTS

The programme of work in the water sector of the United Nations Economic Commission for Africa (UNECA) focuses on:

- The Implementation of the Africa Water Vision 2025 through coordination of UN system-wide actions as the Secretariat of the Inter-Agency Working Group on Water in Africa. This is being achieved through the following:

- a. Organisation of Subregional Workshops on "Implementing IWRM in Africa".
- b. Providing input into the activities of the Water Cluster of the UN system-wide Initiative on Africa (UNSI), the UN Administrative Coordination Committee Subcommittee on Water Resources (ACC/SWR), the African Task Force on Water, and the World Water Assessment Programme's Focus on Africa.
- c. Organising a Virtual Water Forum on "Water as an Instrument of Regional Integration".
- d. Working with the Economic Commissions of Asia and the Pacific (ESCAP) and Europe (ECE) on developing the MED Project on Groundwater Resources.
- e. Working to set up the Clearing House for Information on Africa's Water Resources.

- Analyses of Transboundary Water issues in Africa.
- Providing Advisory Services such as project formulation and evaluation, Basin studies (i.e. Nile, Zambezi and Lakes Chad and Victoria) and preparing benchmark publications such as the "Integrated Water Resources Management: Issues and Options in Selected African countries".

Overall, the emphasis of ECA is on the regional aspects of Africa's under-utilised water resources for the socio-economic development of the continent and the achievement of the targets set out in the Framework for Action of the African Water Vision 2025.



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Losing ground to desertification



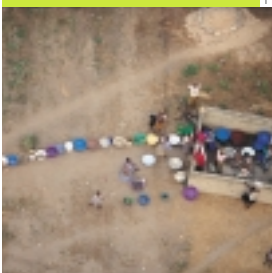
A RESULT OF BOTH CLIMATIC AND HUMAN FACTORS

Desertification is a land degradation process that happens in virtually all regions of the world due to climatic and human-induced factors. It occurs slowly, as different areas of degraded land spread and merge together, rather than through "advancing desert". Patches of degraded land erupt separately, sometimes as far as thousands of kilometers away from the nearest desert. Gradually the patches spread and join together, creating desert-like conditions. Therefore, it is comparable to a slowly but clearly progressing "skin disease" over our planet, certainly an ugly word for an ugly process.

To look at desertification without taking into consideration the utilization of water, especially in countries that are agriculture-based, would be futile. The intricate balance between available water resources, soil and climatic conditions are the essential criteria which make life in fragile ecosystems possible. Therefore, the issue of sustainable water resource management is central to the UNCCD (United Nations Convention to Combat Desertification) and is being addressed at national, sub-regional and regional levels by country parties.

As a global environmental problem that affects both developed and developing countries, desertification provides one of the most graphic examples of how poverty anywhere endangers prosperity and sustainability on a global scale.

- A third of the earth's surface is threatened by desertification, an area of over 4 billion hectares.
- Since 1990, some 6 million hectares of productive land are being lost every year due to land degradation.
- Every year twelve million people die as a result of water shortages or contaminated drinking-water.
- Desertification threatens the livelihoods of 1 billion people and could shortly make 135 million people homeless.
- Desertification generates every year income losses totaling US\$42 billion.



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The Convention on Biological Diversity (CBD)



PROGRAMME OF WORK FOR INLAND WATERS BIOLOGICAL DIVERSITY

Objectives of the CBD:

- Conservation of biological diversity,
- Sustainable use of its components, and
- Fair and equitable sharing of benefits arising out of the utilization of genetic resources.

Primary framework of action:

Ecosystem approach: A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.

The programme encourages:

- Adoption of **integrated land and watershed management approaches** for the protection, use, planning, and management of inland water ecosystems.
- Adoption of **integrated watershed, catchment and river basin management strategies** to maintain, restore or improve the quality and supply of inland water resources and the economic, social, hydrological, biological diversity and other functions and values of inland water ecosystems.
- **Monitoring and assessment of** the status, and trends and threats on inland waters, to indicate their condition in functional as well as species terms.

- **Environmental impact assessments** of water development projects.
- Promotion of **effective collaboration** among ecologists, planners, engineers and economists.
- **Transboundary cooperation.**
- Involvement of local, and indigenous communities in the development of management plans and in policy-making, planning and implementation.
- **Identification of stressed rivers, the allocation and reservation of water for ecosystem maintenance, and the maintenance of environmental flows** as an integral component of appropriate legal, administrative and economic mechanisms.

The Convention on Wetlands (Ramsar) is the lead partner of the CBD for implementation of the PoW for inland waters biological diversity.

CBD and the WWAP:

WWAP can assist Parties to the CBD by providing a basis for the formulation and implementation of policies for the conservation and sustainable use of inland water ecosystems, including:

- Meeting basic needs.
- Securing the food supply.
- Protecting ecosystems and maintaining ecosystems integrity.
- Sharing water resources.
- Managing risks.

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CBD

Water and natural disaster reduction



DECREASING LOSSES OF LIFE AND PROPERTY

The effects of water-related hazards such as floods or drought on vulnerable communities is on the rise. The impacts of these hazards on a socio-economic system cause natural disasters. Natural disasters of hydro-meteorological origin represent a little over three-quarters of all natural disasters.

The implementation of the Strategy is premised on the establishment of partnerships between governments, non-governmental organizations, UN agencies, the scientific community and the media, as well as other relevant stakeholders in the disaster reduction community.

Core concepts:

Disaster Reduction involves measures designed to avoid (prevention) or limit (mitigation and preparedness) the adverse impact of natural hazards and related environmental and technological disasters.

Disaster Prevention involves the outright avoidance of the adverse impact of natural hazards and related environmental and technological disasters.

Disaster Mitigation involves measures taken to limit the adverse impact of natural hazards and related environmental and technological disasters.

Disaster Preparedness involves measures taken in advance to ensure effective response to the impact of disasters.

They therefore cause a significant portion of the socio-economic losses due to natural disasters every year. During the 1990s, there was a ten per cent annual increase in the socio-economic loss generated by disasters worldwide. Current projections for the future indicate that, without aggressive disaster reduction interventions, the economic cost of disasters will account for an increasing part of countries' Gross Domestic Product (GDP) especially as related to developing countries.

The United Nations has established the International Strategy for Disaster Reduction as a global framework for action with a view to enabling all societies to become resilient to the effects of natural hazards and related technological and environmental disasters, in order to reduce human, economic and social losses.

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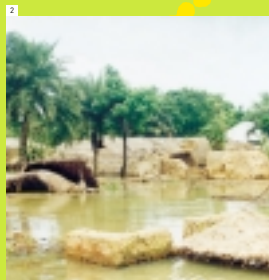
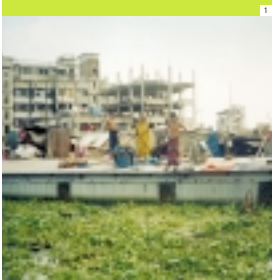
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