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International
Hydrological
Programme

IHP-VIII Thematic Area 4

Water and Human Settlements of the Future

Activities and Outcomes 2014-2015

**International Hydrological Programme
Division of Water Sciences**

THE CONTEXT

“Water and Human Settlements of the Future” is the fourth of the six themes that structure IHP-VIII (2014-2021), which focuses on “Water Security: Responses to Local, Regional and Global Challenges”. According to the UN, within the next few decades more than 60% of the world’s population will live in cities. Urban population has already reached 70% in Latin America and estimates indicate that it continues to increase, challenging the existing infrastructural and institutional water systems. The increase in urban population calls for integrated management of water services in order to provide the necessary water volume for all municipal uses, while dealing with the high volume of wastewater produced. With increasing urbanization, protecting water resources requires a holistic administrative approach to manage natural resources (land, air, and ecosystems) inside and outside urban areas, as well as to the varied sources of risks (namely solid and hazardous wastes, and population and economic growth).

Although urbanization is spreading worldwide, the 2011 International Fund for Agricultural Development (IFAD) Rural Poverty Report estimates that nearly 70% of the developing world’s 1.4 billion extremely poor people live in rural areas, with Sub-Saharan Africa and South Asia of primary concern. In many cases, they lack water services because of the diversity of rural settings combined with the dispersion of the population, frequently under complex geographical conditions. For both urban and rural human settlements the provision of water services requires an important and constant need for investment to create, maintain, upgrade and repair hydraulic infrastructure, taking into consideration the impacts of climate change. As water demand continues to grow in the future, an increasing number of cities will face the challenge of efficiently managing scarcer and less reliable water resources. Realities on the ground and the challenges of future pressures have made it obvious that business as usual is not the way forward.

The objectives of the fourth theme of IHP-VIII on “Water and Human Settlements of the Future” include: exploring new approaches, technologies and system-wide changes towards integrated urban water management, such as flexible and adaptive urban water systems and water sensitive urban design; promoting effective governance and institutional structures of urban water management; and identifying and disseminating best practices for different economic and geographic settings in developed and developing countries.

Water issues in emerging cities and rural settlements in developing countries merit particular emphasis, including special needs and problems in slums or peri-urban areas that are often the most deprived. New approaches to water management in the city of the future have to be developed. Strategies to build resilient urban water systems must adopt a broader perspective recognizing the interdependence of different water systems. Game-changing approaches and technologies that allow optimization of water quality, quantity, and the water and energy footprint in cities need to be explored.





Theme 4 covers five different focal areas:

Focal Area 4.1 – Game-changing approaches and technologies

Focal Area 4.2 – System-wide changes for integrated management approaches

Focal Area 4.3 – Institution and leadership for beneficiation and integration

Focal Area 4.4 – Opportunities in emerging cities in developing countries

Focal Area 4.5 – Integrated development in rural human settlements

The first two years of IHP-VIII coincided with the 2014-2016 biennium of UNESCO. During this period, the International Hydrological Programme (IHP) implemented several activities and projects in different regions of the world to support adaptation to hydrohazards in a changing environment.

HIGHLIGHTS FROM KEY IHP ACTIVITIES (2014-2015)

► North America and Europe

Urban Water of the Americas

In collaboration with the Water Programme of the Inter-American Network of Academies of Sciences (IANAS) and the Global Network of Science Academies, IHP published a book entitled «Urban Water Challenges in the Americas: A perspective from the Academies of Sciences». This book makes a unique contribution in identifying major problems and possible solutions to the management of water resources in the urban areas of 20 countries in the Americas, with chapters on the United States and Canada, Mexico, Central America, the Caribbean and South America. It touches upon issues linked to urban water supply and sanitation management, access to safe drinking water, wastewater management, water-borne diseases in urban areas, adaptation to climate change and models, and concepts for the improved management of urban water. This activity contributed to the establishment of a scientific network in Latin America on the management of urban water and it is expected that the project will be replicated in Africa.



Related UNESCO Chairs and Category 2 Centres in the region

- UNESCO Chair on Water Access and Sustainability, University of Cincinnati, USA
- International Research and Training Centre on Urban Drainage, Serbia

► Latin America and the Caribbean

Water and Human Settlements in Latin America and the Caribbean

The regional working group on urban water management was launched in 2009 with the participation of some countries of the region, including Mexico, Brazil, and Chile, as well as renowned experts. The group sought to identify the major concerns and issues facing urban water management and planning, and which of them are more relevant to the Latin America and the Caribbean (LAC) region. Since its first meeting, the group has determined the baseline situation and identified urban flooding as a major common concern for LAC countries. The group members agreed to focus their efforts on mapping the risks of urban flooding, and compiling information of ongoing initiatives. To date, the group has consolidated a small but very committed group of countries, and aims to conduct a wider initiative by including new Member States.

In cooperation with the International Telecommunication Union (ITU), IHP provides technical support on water resources to lead the Focus Group on Smart Water Management (FG-SWM). As a tool for water management, Information and Communication Technology (ICT) was the focus of the forum on smart water management organized in Montevideo, Uruguay by ITU and UNESCO in March 2014. The role of ICT in smart management of water was the theme of the first session. Participants discussed ICT and effective water management to develop solutions for global problems, as well as exploring relations between sectors and stakeholders in ICT and effective water management. In June 2015, the IHP Regional Coordination Working Group of Urban Water organized the first meeting of the Urban Water Group of Uruguay in Montevideo, Uruguay. The meeting aimed to create a national counterpart for the Urban Water Group for LAC (GAU/LAC) to strengthen integrated urban water management in Latin America and the Caribbean. It would do so by developing a regional action strategy based on scientific and technical knowledge and exchanging information and experience. The working group had its last meeting in October 2015, incorporating new experts from countries such as Colombia, El Salvador and Paraguay to define the programme's new agenda and priority lines of work. The programme seeks to coordinate and integrate initiatives from different areas under related topics.



Related UNESCO Chairs and Category 2 Centres in the region

- Regional Centre on Urban Water Management for Latin America and the Caribbean, Uruguay
- UNESCO Chair in Water in the Knowledge Society, Instituto Mexicano de Tecnología del Agua, IMTA, Mexico

► Asia and the Pacific



Securing Sustainable Urban Water Management Pathways in the Asia-Pacific Region

Cities in the Asia and the Pacific region, the fastest growing region in the world - reaching 31.4% of world GDP in 2012 - need to develop plans for their water infrastructures and institutions to provide adequate water services to the population while maintaining environmental sustainability. This activity aims to improve knowledge of the current status of urban water systems in the Asia-Pacific region and forge cooperation in acquisition, analysis and database construction for urban water systems using ICT platforms, among others. The UNESCO Office in Jakarta took a lead role in defining urban water management issues in Asia-Pacific in collaboration with the Asia-Pacific Water Forum (APWF). A position paper was prepared and presented during the Seventh World Water Forum. UNESCO Category 2 Centres, especially the Humid Tropic Centre and the Asia-Pacific Centre for Ecohydrology, provided valuable contributions through their existing programmes.

As part of the 23rd meeting of the IHP Regional Steering Committee, UNESCO hosted an international symposium on “Integrated Actions for Global Water and Environmental Sustainability” on 21-22 October 2015 in Medan, Indonesia. The symposium was organized in collaboration with the University of Sumatera Utara and the Tirtanadi Water Company as part of the commemoration of UNESCO’s 70th anniversary. More than 100 participants attended the symposium, which featured more than 40 papers from universities, researchers and governmental institutions from the Asia-Pacific region. A field trip was organized with all participants to the Sibolangit Spring Water, the area which provides water to Medan City. This visit was also part of UNESCO’s water-sensitive urban design project in the area, namely Securing Medan Water Future 2030.

Related UNESCO Chairs and Category 2 Centres in the region

- UNESCO Chair in Water and Environment Management for Sustainable Cities, Sharif University of Technology, Iran
- Regional Centre on Urban Water Management (RCUWM), Iran

► Africa



Mobilization for the Implementation of the RESIHYST-Africa Initiative in Central Africa

During the International Hydrological Decade (1965-1974), the French Research Institute for Development (IRD) collected hydrological data from over a hundred experimental basins in West and Central Africa to establish guidelines and charts for the design of hydraulic structures in the region. These guidelines and tools continue to be used, although the hydrological and surface conditions have in the meantime changed considerably under the combined effects of desertification and high climate variability. The continuing use of these tools to design hydraulic structures undoubtedly has a negative impact on the sustainability of these structures, which require frequent repair. The objectives of the Review of Hydrological norms for Climate Change Resilient Hydraulic Infrastructures in Africa (RESIHYST-Africa) are therefore to strengthen the capacity of hydrological and meteorological services in order to monitor, collect and analyze hydrological and rainfall data; secondly, to collect, update and create operational hydrological databases in each country as well as a regional database; thirdly, to gather and digitalize rainfall data from different stations for operational databases; and finally to obtain an ECCAS (Economic Community of Central African States) and an ECOWAS (Economic Community of West African States) directive on hydraulic structure design tools. IHP's activity in this framework is to strengthen capacity building of hydrological and meteorological services relating to hydrological and rainfall data, and sensitizing policy makers to the urgent need

to fund and implement the RESIHYST-Africa initiative in Central Africa.

The implementation of this activity was undertaken by a sub-regional workshop in Central Africa. Participating in the workshop were IHP Focal Points, heads of hydrometeorological services and stakeholders in charge of water infrastructure and transport from ECCAS countries (Burundi, Cameroon, Congo, CAR, DRC, Chad and Sao Tome and Principe), academics from Cameroon, Chad and Congo, representatives of the Executive Secretariat of ECCAS and experts from the Global Water Partnership Central Africa. The meeting focused on the presentation of the history and the detailed project of RESIHYST-Africa, as well as on issues related to data collection, the establishment and operationalization of IHP National Committees and their full participation in the implementation of the initiative, as well as potential funding opportunities.

► Arab States

Gender Mainstreaming in Integrated Water Resources Management in Rural Areas in the Arab Region

Most of the countries in the Arab region have limited water availability. Water scarcity in the region is expected to intensify in the future, especially in the field of agriculture. According to the water security strategy of the Arab region as approved by the Arab Water Ministerial Council, the region needs to secure 550 billion m³ of water in the year 2025. The agricultural sector consumes about 80% of the available water resources with an estimated 60% wasted or lost in surface irrigation systems. In rural areas, women and young people are highly involved in the agricultural sector. It is essential to promote integrated water resources management in rural areas. Accordingly, IHP developed an initiative to enhance knowledge on gender issues in IWRM application in rural areas by exchanging best practices and raising awareness on the importance of public participation in water resources management.

In collaboration with the UNESCO Chair on Water, Women and Decision-making of Morocco, the UNESCO Office in Cairo (UCO) supported the preparation of a comprehensive technical study on gender mainstreaming in the implementation of IWRM in rural areas, including agriculture, sanitation and water reuse in Morocco. The study incorporated field surveys of two rural areas as well as the analysis and preparation of technical input and policy advice on best practices for gender mainstreaming. Public interaction workshops were also organized.

In addition, UCO helped organize a session on gender mainstreaming in IWRM as a side event to the 3rd Arab Water Forum in Cairo, Egypt on 9-11 December 2014 in collaboration with the Arab Water Council. More than 30 participants attended the session with case studies presented from Morocco, Egypt, Sudan and Jordan. With support and collaboration from UCO, the Centre of Arab Women for Training and Research (CAWTAR) in Tunisia conducted a detailed study of gender and water resources in two rural areas. The study analysed Tunisia's gender equality policies and legislation, and recent progress after the 2011 revolution in terms of solidifying gender equality and promoting female participation in the political life of the country. Through surveys, site visits, and community meetings, the study also provided a thorough assessment of the gender aspects of the day-to-day management of scarce water resources in Gendoubeh and Qairawan. Several factors were found to increase difficulties for women, who bare the primary responsibility for water supply. The factors included distance to supply points, service interruptions and lack of delivery points near or at residences. Engagement in development and water management decision-making remain male-dominated due to the excessive work schedule of women in rural areas. Families use inadequate and non-monitored wells, and improvements in their lives are associated with the accessibility to water. A socio-economic analysis was conducted using a two-step approach – a "Behaviour and view assessment" and a "Knowledge and expectation assessment" - leading to the identification of several key recommendations.

The project resulted in enhancing and sharing knowledge on the status of gender and water resources

management practices. It also brought about an overview of previous and ongoing initiatives relevant to the topic in Morocco and Tunisia, and concrete steps towards developing policy recommendations on gender and water resources in the two countries.



► Global Initiatives

Water, Megacities and Global Change

The international conference “Water, Megacities and Global Change” co-organized by IHP on 1-4 December 2015 at UNESCO Headquarters in Paris brought together professionals working on the unique and challenging issues related to water in cities with populations of over 10 million inhabitants. With 388 participants and twenty nationalities, the conference was one of the major events organized by UNESCO during the United Nations Conference on Climate Change (COP21). Monographs of a selection of emblematic megacities of the world will be published in English and French in 2016 on Paris, London, Istanbul, Lagos, Mumbai, Beijing, Manila, Tokyo, Chicago, New York, Mexico and Buenos Aires. The conference raised awareness on water security and developed new policies adapted to global change. It also enabled the sharing of information on water-related problems with a view to identifying state-of-the-art solutions that can inform and guide emerging public policies. UNESCO and Local Governments for Sustainability (ICLEI) will establish a network of megacities for experience-sharing on climate change adaptation strategies for water services, as well as setting up an IHP taskforce.

A workshop was also co-organized in Paris on 3-5 December 2015 by IHP, the W-Smart association (Water Security Management Assessment Research and Technology) and SIAAP (the public sanitation company that treats wastewater for 9 million people in the Parisian Region - Syndicat Interdépartemental pour l’Assainissement de l’Agglomération Parisienne). During this workshop, more than forty international experts shared their experiences and reviewed projects involving smart water networks to establish guidelines on best practices for sustainable management of water in human settlements.

The Global Water Pathogen Project

The Global Water Pathogen Project (GWPP) aims to create, publish and disseminate an updated version of the current benchmark reference book on water-related disease risks and intervention measures entitled “Sanitation and Disease: Health Aspects of Excreta and Wastewater Management” (Feachem et al. 1983). This reference book has not been updated in more than thirty years. Supported

by an online knowledge platform (www.waterpathogens.org), this publication will be available in French, English and Spanish, both in printed and electronic format. The initiative is in partnership with the Michigan State University and in synergy with the Sanitation Guidelines of the World Health Organization. GWPP is funded through a grant from the Bill and Melinda Gates Foundation. The project involves 113 experts (47% women) from forty one countries.



IHP is the only intergovernmental programme of the United Nations system devoted to water research and water resources management, as well as education and capacity building. Since its inception in 1975, the programme has evolved from an internationally coordinated hydrological research programme into an all-encompassing, holistic programme to: mobilize international cooperation in order to improve knowledge and innovation to address the challenges related to water security; strengthen the science-policy interface to achieve water security at the local, national, regional and global levels; and facilitate education and capacity development to improve the management and governance of water resources. Today, IHP facilitates an interdisciplinary and integrated approach to sustainable watershed and aquifer management, including the social and economic dimensions of water.

As part of the current Eighth Phase of IHP (IHP-VIII) centred on “Water Security: Responses to Local, Regional and Global Challenges”, IHP defined Water Security as: “The capacity of a population to safeguard access to adequate quantities of water of acceptable quality for sustaining human and ecosystem health on a watershed basis, and to ensure efficient protection of life and property against water-related hazards – floods, landslides, land subsidence and droughts.”

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