United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

# HOPE - INITIATIVE

## UNESCO's Hydro Free and FOSS Platform of Experts (HOPE) Initiative

*SC/HYD/HOPE/Report/2013*

# ACKNOWLEDGMENTS

This Report is the product of a cooperative effort and was made possible thanks to the support and advice of many individuals and institutions. The Hydro Free and FOSS[1] Platform of Experts (HOPE) Initiative secretariat would like to thank everyone who contributed to this endeavour.

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The launch of HOPE Initiative in June 2013 and the publication of the HOPE report 2013 were made possible by the UNESCO financial support. We are very grateful for the guidance of individuals, divisions and units within UNESCO, both at headquarters and in the field. Indeed, all achievements, such as the HOPE Initiative launch, the release of the first HOPE kit version and the 2013 HOPE report, would not have been possible without the professional encouragement and support of corporate management. The commitment and vision of Ms. Lidia Brito, Director of the

[1] *FOSS: Free and Open Source Software*

Division of Science Policy and Capacity Building, played a key role in the success of HOPE Initiative launch meeting. Indeed, her dedication was mirrored by the colleagues who worked tirelessly on the development and execution of the HOPE Initiative concept. We also warmly thank the Assistant Director-General for Natural Sciences, Ms. Gretchen Kalonji and the Director of UNESCO Division of Water Sciences, Ms. Blanca Jimenez-Cisneros, for their support.

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Finally, special thanks to all those who attended and participated to the HOPE Initiative launch in UNESCO headquarters.

Youssef Filali-Meknassi
Science programme specialist

# FOREWORD

In cooperation with the United Nations Economic Commission for Europe (UNECE) and with the support of the United Nations Department of Economic and Social Affairs (DESA), the UN-Water Decade Programme on Capacity Development (UNW-DPC) and the UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC), UNESCO has played an official role of support in the International Year of Water Cooperation (IYWC). Indeed, UNESCO was appointed by UN-Water to lead the preparations for both the 2013 IYWC and World Water Day in view of the organization's multi-dimensional mandate and its significant and long-standing contribution to the management of the world's freshwater resources.

The year focused on raising awareness around the following messages:

- Water cooperation builds peace;
- Water cooperation is key to socioeconomic development, poverty eradication, social equity, gender equality and environmental sustainability;
- Water cooperation creates tangible economic benefits;

- Water cooperation is crucial to preserve water resources, ensure their sustainability and protect the environment.

Within this context, the HOPE Initiative fits absolutely in the United Nations IYWC, 2013 (Resolution A/RES/65/154). Indeed, the HOPE Initiative is a project for action; a chance to show how important the cooperation in the water sector is to the international water experts' community. The HOPE Initiative is about uniting voices around the globe in support to Africa.

In fact, the HOPE Initiative is providing a free alternative (kit) to the commercial specialized engineering software in the field of hydrology (e.g. water resources, rivers and groundwater; urban water modelling and GIS, collection systems, water distribution, flooding, wastewater treatment) through the International Hydrological Programme (IHP), an intergovernmental programme of the UN system devoted to water research, water resources management, education and capacity building. As a matter of fact, UNESCO pulls together experts from its different programmes devoted to freshwater resources (IHP and WWAP), its thirty water-related centers (Category I and II Centers), and UNESCO Chairs and UNITWIN networks and creates an unique network of excellence capable of assisting its member states in addressing the complex areas of water management and cooperation. It develops new information and knowledge; it builds capacity and raises awareness at the global level on the challenges and opportunities, from individuals, teachers, project managers, up to decision-makers

and politicians. UNESCO provides also training and ammunition for policy decisions on water related matters for the peaceful and sound management of water resources.

The launch of the HOPE Initiative in June 2013 was timely as the paradigm used by hydrologists to address water quality and management have changed dramatically since the impacts of human activities started to be systematically documented. At the same time, the application of scientific principles to engineering education has been stressed increasingly. These changes will continue, possibly at an accelerating rate, into the next century. Indeed, to solve real and local problems, hydrologists are constantly developing innovative mathematical models to manage water in a more effective way. Models help to explain a system and to study the effects of different components, in order to predict its behaviour in the future or under different conditions. But, for the models to be effective themselves, they should be easy to use and be able to handle massive data sets. However, this requires sophisticated software infrastructure, which may take years to build and expensive to get. Since most these tools are not affordable for low-income and middle-income economies, this increases the digital divide, especially when it comes to the engineering curricula. Thus, a dire need exists for affordable and accessible specialized software in engineering and applied sciences to improve quality education and to contribute to the ultimate aim of Education for All (EFA), which is the sustainable development. Indeed, since water cooperation at national and global levels is essential to achieve sustainable

development and ensure millions of people to have access to this precious resource especially in Africa, these models and software have to be accessible to those having the need to improve the management of water.

Indeed, the HOPE Initiative is responding to these urgent needs stressed by the Information Economy Report 2012, to support the development of a sustainable future in Africa. The HOPE Initiative alternative (kit) to the commercial specialized engineering software has been designed to be used as a free resource for professionals specialized in groundwater, surface water or wastewater and it will benefit undergraduate and graduate students, instructors, regulatory officers, environmentalists, operators and managers of public water supply and wastewater treatment plants and environmental design engineers.

This 2013 HOPE document is divided into five parts: A Specific set of issues, problems and challenges are addressed in the concept note (Part A), which provides an analysis of the spending on computer software and services, reveals the objectives, outcomes, outputs and the planned activities. In the logical progression, comes the report on the launch of the HOPE Initiative, which took place, in June 2013, in Paris, including the proceedings (Part B) and the minutes of the first Steering Committee (SC) meeting and those of the first Consultative Expert Working Group (CEWG) meeting (Part C). Part D contains the first released version of the HOPE Initiative kit (including STOAT and MODFLOW 2005 software) and the list of

partners. The last part (Part E) includes the annexes, and more specifically, the Terms of Reference (ToRs) of the SC and the CEWG, the nomination form and the approved ScoreSheets for the software evaluation.

Finally, the current phase of IHP (2014 to 2021) focuses on “Water security: Responses to local, regional, and global challenges”. Thus, UNESCO-IHP is looking at the results of the HOPE Initiative and stands ready to pledge its full support to the implementation of the outcomes in the future phases of the HOPE Initiative.

Ms. Blanca Jiménez-Cisneros
Director of the Division of Water Sciences
Secretary of the International Hydrological Programme

# CONTENTS



## PART A
## HOPE CONCEPT NOTE

## PART B
## LAUNCH OF HOPE - PROCEEDINGS



## PART C
## LAUNCH OF HOPE - MINUTES OF MEETINGS

## PART D
## HOPE INITIATIVE KIT



## PART E
## ANNEXES



**ACCESS TO THE PHOTO GALLERY**

# ABBREVIATIONS

| | |
|---|---|
| AfDB | African Development Bank |
| AGPL | Affero General Public License |
| AMCOST | African Ministerial Council on Science and Technology |
| AMCOW | African Ministers' Council on Water |
| APEX | Agricultural Policy/Environmental eXtender |
| ASM1 | Activated Sludge Model N°1 |
| AU | African Union |
| AwacaB | Africa Water Resources Capacity Building Programme |
| CC | Creative Commons |
| CEO | Chief Executive Officer |
| CEWG | Consultative Expert Working Group (HOPE) |
| CFA | Cooperative Framework Agreement (NBI) |
| CICOS | International Commission of Congo-Oubangui-Sangha |
| CIH | Hydroinformatics International Centre |
| CSIS | Centre for Strategic and International Studies |
| DHI | Danish Hydrological Institute |

| | |
|---|---|
| DESA | United Nations Department of Economic and Social Affairs |
| DSA | Daily Subsistence Allowance |
| DSS | Decision Support System |
| ECOSOC | Economic and Social Council |
| EFA | Education For All |
| EPA | Environmental Protection Agency (USA) |
| EU | European Union |
| EXB | Extrabudgetary of UNESCO |
| FOSS | Free and Open Source Software |
| FOSSFA | Free and Open Source Software Foundation for Africa |
| FSF | Free Software Foundation |
| GDP | Gross Domestic Product |
| GEF | Global Environmental Facility |
| GER | Renewable Energy Management System |
| GGIS | Global Groundwater Information System |
| GGMN | Global Groundwater Monitoring Network |
| GIS | Geographic Information System |
| GPL | General Public License |

| | |
|---|---|
| GUI | Graphical User Interface |
| HOPE | Hydro Free and FOSS Platform of Experts |
| HRM | Human Resource Management |
| IBAM | Burkinabe Institute of Arts and Trades (University of Ouagadougou) |
| ICT | Information and Communications Technology |
| IDSS | Integrated Decision Support System |
| IGAD | Intergovernmental Authority on Development |
| IGRAC | International Groundwater Resources Assessment Centre |
| IHE | UNESCO-IHE in Delft, formerly International Institute for Hydraulic and Environmental Engineering |
| IHP | International Hydrological Programme |
| IHS | Information Handling Services |
| IPERMIC | Pan African Institute of Studies and Research on Media, Information and Communication (University of Ouagadougou) |
| ISARM | Internationally Shared Aquifer Resources Management Initiative |
| ISSP | Higher Institute in Population Sciences (University of Ouagadougou) |

| | |
|---|---|
| IT | Information Technology |
| IWA | International Water Association |
| IWRM | Integrated Water Resources Management |
| IYWC | International Year of Water Cooperation |
| LGPL | Lesser General Public License |
| LPI | Linux Professional Institute |
| MAMPU | Malaysian Administrative Modernization and Management Planning Unit |
| MDGs | Millennium Development Goals |
| M&E | Monitor and Evaluate |
| MENA | Middle East and North Africa |
| MODFLOW | 3D Finite-Difference Groundwater Flow Model |
| MPL | Mozilla Public License |
| Ms-PL | Microsoft Public License |
| NBI | Nile Basin Initiative |
| NEPAD | New Partnership for Africa's Development |
| Nile-COM | Council of 10 Ministers (NBI) |
| Nile-Sec | Nile Basin Initiative Secretariat |
| Nile-TAC | Nile Technical Advisory Committee |
| NUST | Namibia University of Science and Technology |

| | |
|---|---|
| OECD | Organisation for Economic Co-operation and Development |
| OSS | Open Source Software |
| OW | Office of Water (USEPA) |
| PIDA | Programme for Infrastructure Development in Africa |
| PON | Polytechnic of Namibia |
| PR | Person Resources |
| RBM | Results-Based Management |
| RC-IRBM | Regional Centre for Integrated River Basin Management |
| R&D | Research and Development |
| RP | Regular Programme of UNESCO |
| SADC | Southern African Development Community |
| SANWATCE | Southern African Network of Water Centres of Excellence |
| SC | Steering Committee (HOPE) |
| SCADA | Supervisory Control and Data Acquisition |
| SIGBiogas | Biogas Geographic Information System |
| SIGER | Information System for Renewable Energy |
| SimEau | European Water Treatment Simulator |

| | |
|---|---|
| STOAT | Dynamic Modelling of Wastewater Treatment Plants |
| SWAT | Soil and Water Assessment Tool |
| TBA | Transboundary Aquifers |
| ToRs | Terms of Reference |
| TVET | Technical and Vocational Education and Training |
| TWAP | Transboundary Waters Assessment Program |
| UK | United Kingdom |
| UN | United Nations |
| UNCTAD | United Nations Conference on Trade and Development |
| UNECA | United Nations Economic Commission for Africa |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNESCO-IHE | Institute for Water Education |
| UNEVOC | UNESCO International Centre for Technical and Vocational Education and Training |
| UNGA | United Nations General Assembly |
| UNILC | United Nations International Law Commission |
| UNITWIN | University Twinning and Networking Programme |

| | |
|---|---|
| UN-WATER | UN agencies coordination mechanism on water affairs |
| UNW-DPAC | UN-Water Decade Programme on Advocacy and Communication |
| UNW-DPC | UN-Water Decade Programme on Capacity Development |
| USDA | United States Department of Agriculture |
| USEPA | United States Environmental Protection Agency |
| USGS | United States Geological Survey |
| WITSA | World Information Technical and Services Alliance |
| WRc | Water Research Centre |
| WSIS | World Summit on the Information Society |
| WWAP | World Water Assessment Programme |

# PART A

# HOPE CONCEPT NOTE

United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

# HOPE - INITIATIVE

World Water Day 2013 International Year of Water Cooperation

## HOPE Concept Note

## UNESCO 2012-2013

# CONTENTS

# TABLES

# FIGURES

## A.1. BACKGROUND


Responding to the urgent need for action in Africa stressed by the recommendations of several conferences and reports such as the 4th Annual International Conference on Information and Communications Technology (ICT) for Africa (2012), the 23rd Annual Teaching and Learning Innovations Conference (2010) and the Information Economy Report 2012 by the United Nations Conference on Trade and Development (UNCTAD, 2012). All these conferences and report underlined that the time has now come for Africa to adopt open software to make ICTs accessible to all to support development and help to build a sustainable future, the United Nations Educational, Scientific and Cultural Organization (UNESCO) launched in 2012-2013 the Hydro Free and/or Free Open-source software Platform of Experts (HOPE) Initiative.

Before analysing the role of software, it is important to distinguish between various kinds of software. A starting point is to separate software products from software services. Software products can in turn be divided into application software (programmes that do the work users are directly interested in – e.g. OpenOffice, GIMP, Firefox) and system software (programmes that support application

software – e.g. ReactOS, LDE(X), Calmira). Software services include all services related to the traditional software development lifecycle, including design and implementation, testing and maintenance.

Software differs in how it is developed, distributed, modified and licensed. The most prominent types are proprietary software and Free and Open-Source Software (FOSS). Combinations of the two are also common. The main distinction between both of them is that the source code of FOSS is freely available.

The terms of use for proprietary software are described in end-user licenses that include full restrictions set by the copyright owner (an individual or a company) on use, copying and distribution. These licenses often come with high costs per device or user and the underlying source code is not distributed. The idea behind such proprietary licenses is to ensure that the copyright holder is compensated for the monetary and human resources that have been invested in the development of the code.

In contrary to the common thought, just like proprietary software, FOSS comes with user licenses and relies on intellectual property regulation for protection and legal recourse. However, FOSS licenses specify certain freedoms to use, copy, study, modify and redistribute the software. These freedoms provide a framework for the usage and sharing of intellectual capital in a way that is applicable to many areas of development.

They are different levels of protection for different needs (project, goals, resources, community, etc.). For example, the central idea of the GNU General Public License (GPL) 2.0 license is to prevent cooperatively developed software source code from being turned into proprietary software. All copies, regardless of how much the software is altered, must also use the GPL. However, the MIT Licenses are considered more permissive licenses as they allow the source code to be incorporated into proprietary software under certain conditions [Table 1].

**Table 1. Most commonly used licenses in open source projects, April 2012 (Black Duck, 2013)**

| Rank | License | Share (%) |
|---|---|---|
| 1 | GNU General Public License (GPL) 2.0 | 42.28 |
| 2 | MIT License | 11.51 |
| 3 | Artistic License (Perl) | 7.97 |
| 4 | GNU Lesser General Public License (LGPL) 2.1 | 7.06 |
| 5 | BSD License 2.0 | 6.81 |
| 6 | GNU General Public License (GPL) 3.0 | 6.40 |
| 7 | Apache License 2.0 | 5.51 |
| 8 | Code Project Open 1.02 License | 2.10 |
| 9 | Microsoft Public License (Ms-PL) | 1.90 |
| 10 | Mozilla Public License (MPL) 1.1 | 1.02 |
| 11 | Others | 7.44 |

## A.2. ANALYSIS

According to World Information Technology and Services Alliance (WITSA) and Information Handling Services (IHS) Global Insight Inc., the spending on computer software and services (excluding software embedded in devices) amounted to an estimated US$1.2 trillion in 2011 [Fig. 1], or almost one third of global ICT spending the same year which is equal to about 2% of Gross Domestic Product (GDP).

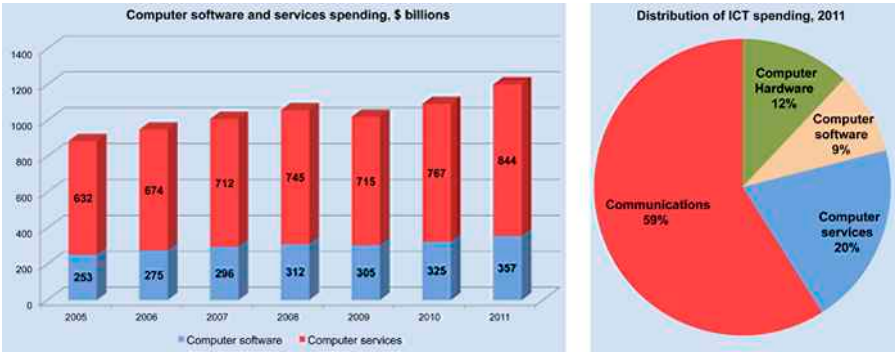



**Figure 1. Global computer and software spending and distribution with ICT spending (UNCTAD, 2012)[2]**

However, developed countries account for the vast share of the expenditure. North America and Europe generated four fifths of the total in 2011. The remaining share is mainly accounted for by Asia-Pacific region, while spending in the developing regions of Africa, Latin America and the Middle East correspond to only 4% [Fig. 2], well below their share of world GDP (10%) (UNCTAD, 2012).

[2] *Note: Data for 2011 are estimates.*

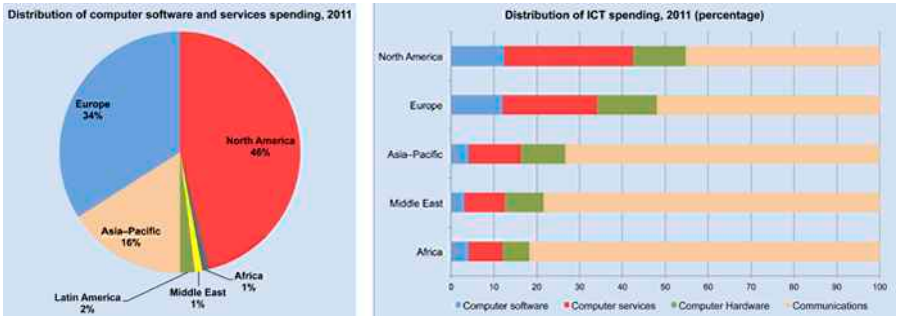



**Figure 2. Global computer and software spending and distribution with ICT spending (UNCTAD, 2012)[3]**

On another hand, an estimated 10 million people are employed in the global computer software and services sector. National shares of this sector range from 0.1% to 2.2% of total employment. The developing countries with the highest proportion of employment in this sector, and for which data are available, are Costa Rica (0.8%), South Africa (0.7%) and India (0.6%) (UNCTAD, 2012).

There is also considerable regional variation in the intensity of FOSS policy activity, according to the Global surveys by the Center for Strategic and International Studies (CSIS, 2010). Europe is the most active region, accounting for close to half (46%) of all initiatives and with a high proportion of approved initiatives [Table 2]. Among developing regions, Asia is the front-runner with more than 80 initiatives, followed by Latin America (57) and Africa (9).

[3] *Note: Regions correspond to those used in the source data (see annex table II.1 of the UNCTAD report).*

**Table 2. Open source policy initiatives, by region, 2000-2009 (CSIS, 2010)[4]**

| | Approved | Proposed | Failed | Total |
|---|---|---|---|---|
| Europe | 126 | 27 | 10 | 163 |
| Asia | 59 | 20 | 2 | 81 |
| Latin America and the Caribbean | 31 | 15 | 11 | 57 |
| North America | 16 | 11 | 10 | 37 |
| Africa | 8 | 1 | — | 9 |
| Middle East | 5 | 2 | — | 7 |

These surveys grouped FOSS policies into four categories, that is Research and Development (R&D), mandates (where the use of FOSS is required), preferences (where the use of FOSS is given preference, but not mandated), and advisory (where the use of FOSS is permitted). The CSIS surveys show whether an initiative has been made at the national, regional or local level and whether it has been accepted, is under consideration or has been rejected. Of the total 354 open source initiatives identified during the period 2000–2009, 69% had been approved, 9% had failed and the rest remained as proposals [Table 2].

During the past decade, both developed and developing countries invested considerable resources in defining and implementing an

[4] *Note: Regional distribution does not include initiatives from the United Nations or the Organisation for Economic Co-operation and Development (OECD). Multinational initiatives were counted for each region represented.*

enabling environment for FOSS. Efforts have been made towards levelling the playing field for FOSS by various Governments.

In the United Kingdom (UK), for example, the Government has identified the need to reduce costs of public Information Technology (IT) systems and to increase supplier diversity in existing procurement contracts. In response, the Cabinet Office is looking at open standards as a mean of increasing flexibility and efficiency in Government IT spending (GOV.UK, 2012). Malaysia has adopted in 2004 a comprehensive, long-term programme for evolving a parallel open software ecosystem. This effort has helped the Government move significantly towards self-reliance. In 2008, Malaysia Government claimed it had saved US$13 million from open source software adoption and 97% of public sector agencies were using open source software [Fig. 3] (UNCTAD, 2012).

Such examples may inspire African countries, although the approach chosen would need to be adapted to the specific social, economic and political situation.

UNCTAD-WITSA asked on their side associations, through a survey, to identify the main barriers for the growth and development of the software and IT services industry in their respective countries. The largest number of respondents from Africa and the Middle East mentioned that the main factors were [Table 3] (UNCTAD, 2012):

- Limited access to venture capital;
- Lack of government procurement;

- Weak demand among private enterprise; and
- Shortage of qualified people.

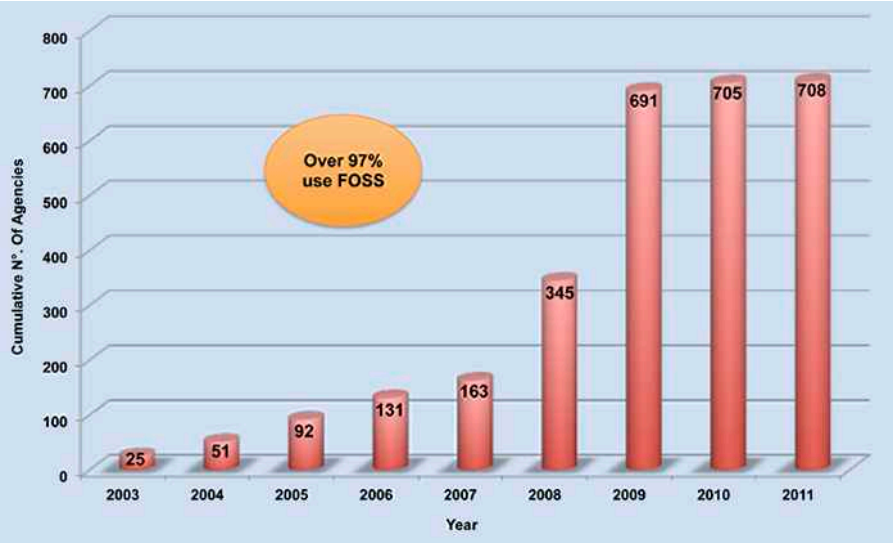



**Figure 3. Implementation of Open Source Software in Malaysian Government Departments – Implemented by Malaysian Administrative Modernization and Management Planning Unit (MAMPU)**

**Table 3. Main barriers to the growth and development of the software and IT services industry (share in percentage of respondents mentioning factor) (UNCTAD, 2012)[5]**

| Barrier | Developed economies | Asia-Pacific* | LAC** | Middle East and Africa | Transition economies | All regions |
|---|---|---|---|---|---|---|
| Limited capabilities in domestic software/ IT services companies | 13 | 38 | 45 | 43 | 50 | 34 |
| Lack of qualified human resources | 63 | 63 | 55 | 43 | 75 | 56 |
| Limited access to venture capital | 63 | 50 | 73 | 86 | 75 | 66 |
| Weak demand among private enterprises for software and IT services | 25 | 25 | 18 | 57 | 50 | 29 |
| Lack of government procurement of software and IT services | 13 | 50 | 45 | 71 | 50 | 44 |
| Limited demand from export markets | 13 | 25 | 18 | 29 | 25 | 22 |
| Inadequate protection of intellectual property rights | 25 | 25 | 27 | 14 | — | 22 |
| High rates of software piracy | — | 13 | 45 | 29 | 25 | 24 |
| Unfavourable general business climate | 13 | 13 | 27 | 14 | 50 | 20 |

[5] *Note: * Excluding West Asia; ** Latin America and the Caribbean. Based on 38 responses*

## A.3. PROS AND CONS

FOSS offers benefits for people in developing countries including facilitating access to and increasing ownership of ICT for Human Development. The FOSS model provides alternative tools and processes with which women and men can create, exchange, share and exploit applications and knowledge efficiently and effectively.

FOSS is also a technology that has transformative power, addresses development challenges and brings positive social transformation. It is more than only a technology transfer, it is appropriation and recreation and allows more specifically:

- Promotion of local learning;
- Lower cost and local value creation (e.g. brings affordable Green Technologies);
- Less dependent on specific technologies and vendors;
- Enable adaptation of software to local needs;
- Address concerns related to national security and long-term availability;
- Provide alternative to the commercials tools;
- Provide opportunities for income generation and employment (e.g. development of creative industries);
- Contribute to the idea of Science for All (Brito, 2013);
- Contribute to Education for All (EFA) Goals through at least Goal 3 by promoting learning and life skills for young people

and adults and Goal 6 by improving the quality of education; and

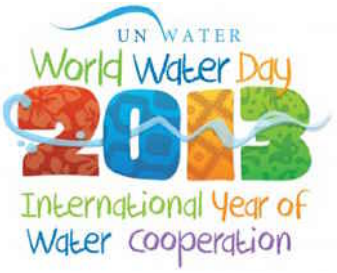
- Contribute to Millennium Development Goals (MDGs) through at least Goal 7 by ensuring environmental sustainability and Goal 8 by developing a global partnership for development.

However, still many buyers attach importance to the reputation of the brand names of proprietary software vendors and it is not uncommon that public and private sector software users associate price with importance, thus avoiding lower cost solutions.

At the same time, a dire need exists for affordable and accessible specialized software in engineering, as most of software applications are not affordable for low-income and middle-income economies, it increases the digital divide, the gaps and barriers the world, especially when it comes to the engineering curricula.

To solve real and local problems, hydrologists are constantly creating innovative mathematical models to manage water in an effective way. But for the models to be effective themselves, they should be easy to use and be able to handle massive data sets. However, this last step requires sophisticated software infrastructure, which may take years to build and expensive to get.

## A.4. OVERALL OBJECTIVES [OUTCOME][6]




Member States/Institutions (Universities, Colleges, Water Departments)/People (Water professionals, Students, etc.) are developing (innovation)/using Free and FOSS in the effective management of water resources in their respective countries.

HOPE fits absolutely in the United Nations International Year on Water Cooperation (IYWC), 2013 (Resolution A/RES/65/154). Indeed, HOPE is a Project for action, a chance to show how important the cooperation in the water sector is to the international water experts' community. HOPE is about uniting voices around the globe in support to Africa.


Through the International Hydrological Programme (IHP), an intergovernmental programme of the UN system devoted to water research, water resources management, education and capacity building, UNESCO contributes to these overall objectives by creating an UNESCO's HOPE [OUTPUT], which will provide a free alternative (kit) to the commercial

[6] *For more details, see annex 3 "The RBM Logical ScoreCard"*

specialized engineering software [OUTPUT] in the field of hydrology (e.g. water resources, rivers and groundwater; urban water modelling and Geographic Information System (GIS), collection systems, water distribution, flooding, wastewater treatment).

And thus, through its institutional capacity building activities, UNESCO will strengthen water sector organizations and develops professional training and research to provide assistance in setting up and maintaining national and regional knowledge networks. As a matter of fact, UNESCO pulls together experts from its different programmes devoted to freshwater resources (IHP and WWAP), its thirty water-related centers (Category I and II Centers), and UNESCO Chairs and UNITWIN networks and creates an unique network of excellence capable of assisting its member states in addressing the complex areas of water management and cooperation. The aim is to stimulate cooperation in research and development of Hydro Free and FOSS to increase scientific outputs, and to enhance their dissemination.

HOPE is also a new approach to research that is more integrative, international and solutions-oriented. It links high-quality focused scientific research to new policy-relevant interdisciplinary efforts for global sustainability based on scientific evidence needed to provide essential targets for societies.

## A.5. HOW?

HOPE is a Free and FOSS platform, targeting experts that can assist African water authorities, teachers, university lecturers and researchers to elaborate water management models.

The UNESCO's HOPE is a set of organizations (e.g. universities, institutes, centers) and practitioners committed to open development through the use of ICTs. The UNESCO's HOPE features are four core resources: People (including knowledge - Hu/W), Tools (material, information – H/W), Procedures (S/W) and Management[7].

## A.6. VISION

The HOPE Initiative will be contributing to the Africa Water Vision for 2025: Equitable and Sustainable Use of Water for Socio-Economic development (United Nations Economic Commission for Africa, African Union Commission, African Development Bank, 2003) [8] [Meaning: Increasing numbers of people are enjoying Dignity, Peace, and Prosperity; and the equitable and sustainable use of water is one of the contributing elements to attaining this vision].

[7] *Hu/W: Human Resources; H/W: Hardware; S/W: Software*

[8] *The common Africa Water Vision provides focus for initiatives in the sector. This is necessary for various initiatives to work in a synergetic manner, complementary to each other contributing to the same overall impact (vision) of dignity, peace and prosperity.*

## A.7. OUTCOMES (= MISSION)

Member States/Institutions (Universities, Colleges, Water Departments)/People (Water professionals, Students, etc.) are developing (innovation)/using Free and FOSS in the effective management of water resources in their respective countries.

## A.8. OUTPUTS

These efforts and commitments will reinforce the determination of the African Union Member States to accelerate the translation into action, at the national, sub-regional and regional levels of the African Water Vision 2025 and the Sharm El Sheikh commitments on Water and Sanitation. The establishment of UNESCO's HOPE contributes to the dissemination of innovative practices in the area of Greening. Technical and Vocational Education and Training (TVET); preparing people for green jobs [OUTPUT] that particularly contribute to preserving the environment while improving human well-being and social equity.

In particular, the HOPE main outputs are:

OUT-1: Appropriate platform (HOPE) infrastructures and/or facilities for hosting Free and FOSS for water management are in place, operational, well maintained, and their correct use actively promoted [Hardware];

OUT-2: Policies: procedures, rules and regulations for the development, contribution/selection and acceptance, maintenance and use of Free and FOSS for water management;

Plus: A collection of suitable Free and FOSS for water management is in place and actively promoted [Software];

OUT-3: People in the water sector in Africa have increased awareness, knowledge and skills in the use of Free and FOSS for water management [Human ware];

OUT-4: The HOPE Initiative is efficiently and effectively managed [Management].

## A.9. INPUTS

Partner institutions provide expertise and guidance, such as capacity building workshops and technical assistance. The UNESCO's HOPE network and communities of practice provide linkages to leading technologists, from government Chief Executive Officer (CEO) to field-based innovators, to consult and consider pressing development challenges.

UNESCO's HOPE partners bring many technology solutions to the table and facilitate, at this stage, the application of these tools, from ideation[9] to incubation. The platform as a support for users plays an important role as a practical instrument for development as its free and open aspirations make it a natural component of development

[9] *The capacity for or the act of forming or entertaining ideas*

efforts in the context of the Millennium Development Goals (MDGs) in the African countries.

The main activities (= INPUTS) are:

ACT-1: Procure new infrastructures/facilities and/or expand/renew/agree on use of existing ones; and operate and maintain these as necessary [Hardware];

ACT-2: Develop, adopt and operate appropriate policies for Free and FOSS for water management [Software];

ACT-3: Organize appropriate awareness and training programmes for effectively using Free and FOSS for water management [Human ware];

ACT-4: Undertake planning, Human Resource Management (HRM), Person Resources (PR), mobilization of funding, implementation of programmes, and projects; and Monitor and Evaluate (M&E) implementation of HOPE [Management].

## A.10. HOW TO JOIN THE INITIATIVE?

If you feel that your software /module /application /plug-in in the areas of water resources, rivers and groundwater, urban water modelling, GIS, collection systems, water distribution, flooding, wastewater treatment, etc., is:

1- Consistent with this Free and/or FOSS above philosophy and;

2- Your product meets the criteria of the HOPE Initiative to receive the HOPE certification label and to be part of HOPE kit,

*Please contact us:*

**THE HOPE TEAM**

Work Phone: +264 61 2917210

Fax: +264 61 2917220

E-mail: admin@hope-initiative.net

## A.11. PROJECT MANAGEMENT RESOURCE[10]

Resources are absolutely essential for the project management team to have at their disposal if they wish to be able to successfully complete a project and attain a level of results that are considered satisfactory. Following the project management knowledge and rules, the hope project team (team leader) proposed the below structure for the resources and the project management and is expected to include a steering committee, a Consultative Expert Working Group (CEWG) and an operational expert group[11] (Annex A.1.)

[10] *See Annex A.2.*

[11] *To appoint the CEWG, UNESCO will follow the internal administrative procedures for awarding contracts for goods, works and services. UNESCO will place also no restriction upon the procurement of goods and services from any member country.*

## A.12. REFERENCES

Black Duck, (2013). Top 20 Open Sources Licenses. [http://www.blackducksoftware.com/resources/data/top-20-open-source-licenses> (accessed 06/03/2014).

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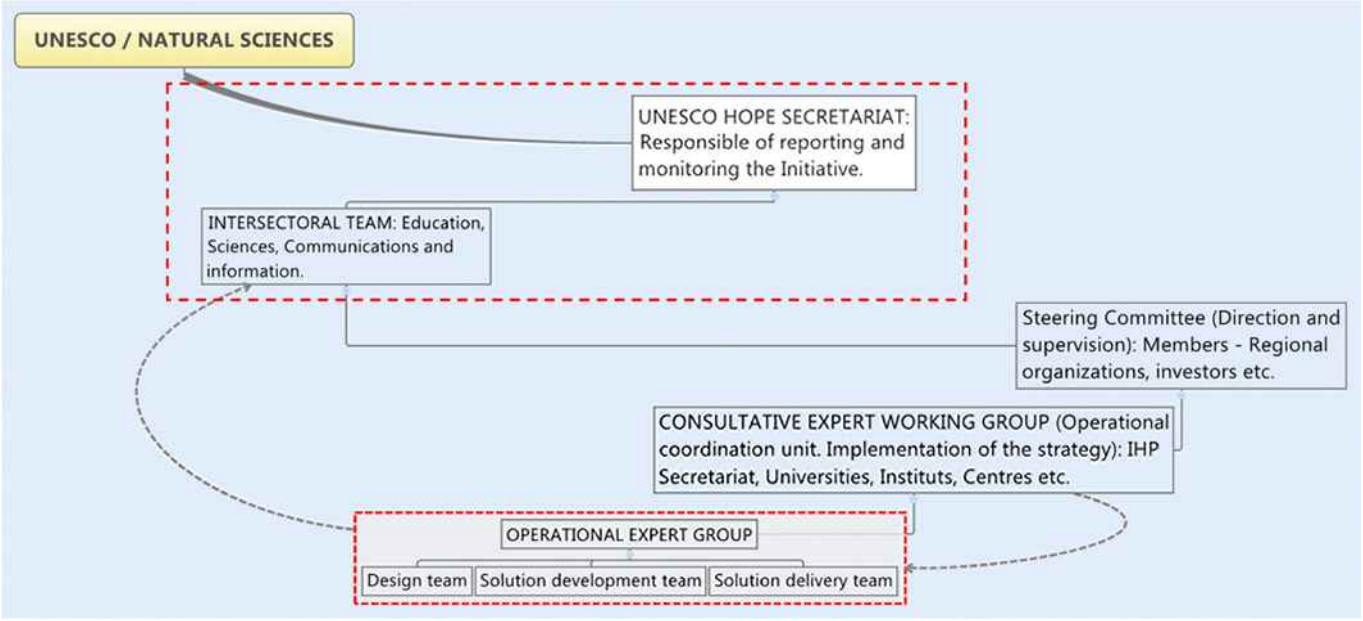
United Nations Economic Commission for Africa, African Union Commission, African Development Bank, 2003. Africa water vision for 2025: equitable and sustainable use of water for socioeconomic development. Vision Summary, pp1-2. [PDF]

## ANNEX A.1. THE PROJECT MANAGEMENT HISTOGRAM



# ANNEX A.2. THE PROJECT MANAGEMENT TEAM

**STEERING COMMITTEE (SC)** (Direction and supervision):

1. African Ministers' Council on Water (AMCOW);
2. United Nations Educational, Scientific and Cultural Organization (UNESCO);
3. Regional Centre for Integrated River Basin Management (RC-IRBM) / Africa Water Resources Capacity Building Programme (AwacaB);
4. NEPAD Southern African Network of Water Centres of Excellence (NEPAD SANWATCE);
5. The chair of the CEWG;
6. United Nations Economic Commission for Africa (UNECA).

**CONSULTATIVE EXPERT WORKING GROUP (CEWG)** (Operational coordination unit. Implementation of the strategy):

1. Abdulkarim HUSSEIN SEID, Nile Basin Initiative- Uganda;
2. Paul BARLOW, U.S. Geological Survey;
3. Cicero BLEY, International Hydroinformatics Centre (CIH);
4. Yvonne BONZI, University of Ouagadougou-Burkina Faso;
5. Yves COMEAU, Polytechnique Montreal;
6. Jeremy DUDLEY, Water Research Centre (WRc);
7. Alex GAKURU, Creative Commons;
8. Tom GERIK for Texas A&M University and Texas A&M AgriLife Research;

9. Raghavan SRINIVASAN represented by Allan JONES, Texas A&M AgriLife Research;
10. Evans IKUA, Linux Professional Institute;
11. Neno KUKURIC, International Groundwater Resources Assessment Centre (IGRAC);
12. Damas Alfred MASHAURI, Polytechnic of Namibia (PON);
13. Markus STARKL, University of Vienna (Co-Chairs of IWA Sanitation and Water Management in Developing Countries group);
14. Rao Y. SURAMPALLI, U.S. Environmental Protection Agency;
15. Imre TAKÁCS, Dynamita.

**UNESCO HOPE SECRETARIAT** (Team leaders are responsible for reporting, monitoring and evaluating the projects):

1. Abou AMANI, FU/NAI (Kenya);
2. Alice AURELI, SC/HYD/GRA (France);
3. Cecilia BARBIERI, FU/WIN (Namibia);
4. Borhene CHAKROUN, ED/BLS/TVE (France);
5. Jaco DU TOIT, FU/NAI (Kenya);
6. Youssef FILALI-MEKNASSI, FU/WIN (Namibia);
7. Ernesto FERNANDEZ POLCUCH, FU/MTD (Uruguay);
8. Lucilla MINELLI, SC/HYD (France);
9. Davide STORTI, CI/KSD/ICT (France);
10. Léna SALAME, SC/HYD/WSD (France);
11. Wright ALAPHIA, FU/WIN (Namibia).

# ANNEX A.3. THE RESULTS-BASED MANAGEMENT (RBM) LOGICAL SCORECARD

**The RBM Logical ScoreCard**

**HOPE: UNESCO Hydro Open-Source Software Platform of Experts Initiative**

| | RESULTS CHAIN - DESCRIPTION | PERFORMANCE INDICATORS AND/OR SOURCES OF VERIFICATION |
|---|---|---|
| 5 | **Impacts (=Vision)**<br>***The Africa Water Vision for 2025**: Equitable and Sustainable Use of Water for Socio-Economic development (Africa Water Vision, pp2, Economic Commission for Africa, African Union, African Development Bank)**<br><br>[Meaning: Increasing numbers of people are enjoying **Dignity**, **Peace**, and **Prosperity**; and the equitable and sustainable use of water is one of the contributing elements to attaining this vision]. | At least **ONE** Case in any Member State in which the enjoyment of **Dignity**, **Peace**, and **Prosperity** recognises the equitable and sustainable use of water as a contributing element AND also acknowledge using OSSWWM |
| 4 | **Outcomes (= Mission)**<br>Member States/Institutions (Universities, Colleges, Water Departments)/People (Water professionals, Students, etc.) are developing (innovation)/using Open-Source Software in the effective management of water resources in their respective countries. | **M1:** OS Software: The numbers of OSSWWM in use in Member States, increase from **M11** in 2013 to at least **M12** by 2015 (**M12> M11**).<br><br>**M2:** Users: The numbers of Member States/Institutions/persons using OSSWWM increase from **M21** in 2013 to at least **M22** by 2015.<br><br>**M3:** Expansion of platforms for OSSWWM by at least ONE other initiative/institution (or MS supported expansion of the HOPE initiative) by the end of 2015. |
| 3 | **Outputs**<br>**OUT-1**: Appropriate Platform infrastructures and, or facilities for hosting open-source software for water management (the HOPE Platform) are in place, operational, well maintained, and their correct use actively promoted ***[Hardware]*** | **OD1-1:** At least ONE coherent collection/configuration of infrastructure, hosting the initial set of OSSWWM in place and operational by the end of 2013.<br>**OD1-2:** Availability and utilization of the infrastructure amounts to at least 90%. |
| | **OUT-2**: Policies: procedures, rules and regulations for the development, contribution/selection and acceptance, maintenance and use of the open-source software for water management (OSSWWM); Plus: A collection of suitable OSSWWM is in place and actively promoted ***[Software]***. | **OD2-1:** The initial set of relevant policies is agreed upon by the end of 2013.<br><br>**OD2-2:** The initial collection of suitable OSSWWM (made up of at least 3 different/related) is in place by the end of 2013. |
| | **OUT-3**: People in the water sector in Africa have increased awareness, knowledge and skills in the use of open-source software for water management (the HOPE Platform). ***[Human ware]*** | **OD3:** The numbers of people/institutions with the necessary increased awareness, knowledge and skills in the use of open-source software for water management increase from **O31** in 2013 to at least **O32** by 2015. |
| | **OUT-4**: The HOPE initiative is efficiently and effectively managed. ***[Management]*** | **OD4:** HOPE is managed within plans and budgets on an annual basis beginning in 2013. |
| 2 | ***Activities***<br>**ACT-1**: Procure new infrastructures/facilities and/or expand/renew/agree on use of existing ones; and operate and maintain these as necessary ***[Hardware]***.<br><br>**ACT-2**: Develop, adopt and operate appropriate policies for open-source software for water management ***[Software]***.<br><br>**ACT-3**: Organize appropriate awareness and training programmes for effectively using OSSWWM ***[Human ware]***.<br><br>**ACT-4**: Undertake planning, HRM, PR, mobilization of funding, implementation of programmes, and projects; and monitor and evaluate (M&E) implementation of HOPE. ***[Management]***. | |
| 1 | ***Inputs / Resources***<br>• Facilities and materials;<br>• Funding from national and international sources; and procedures and methods;<br>• Appropriate knowledge and skills of staff in UNESCO, government, private sector, civil society and development partners. | |

**The common Africa Water Vision provides focus for ititiatives in the sector. This is necessary for various initatives to work in a synergetic manner, complementary to each other contributing to the smae overall impact (vision) of dignity, peace and prosperity.*

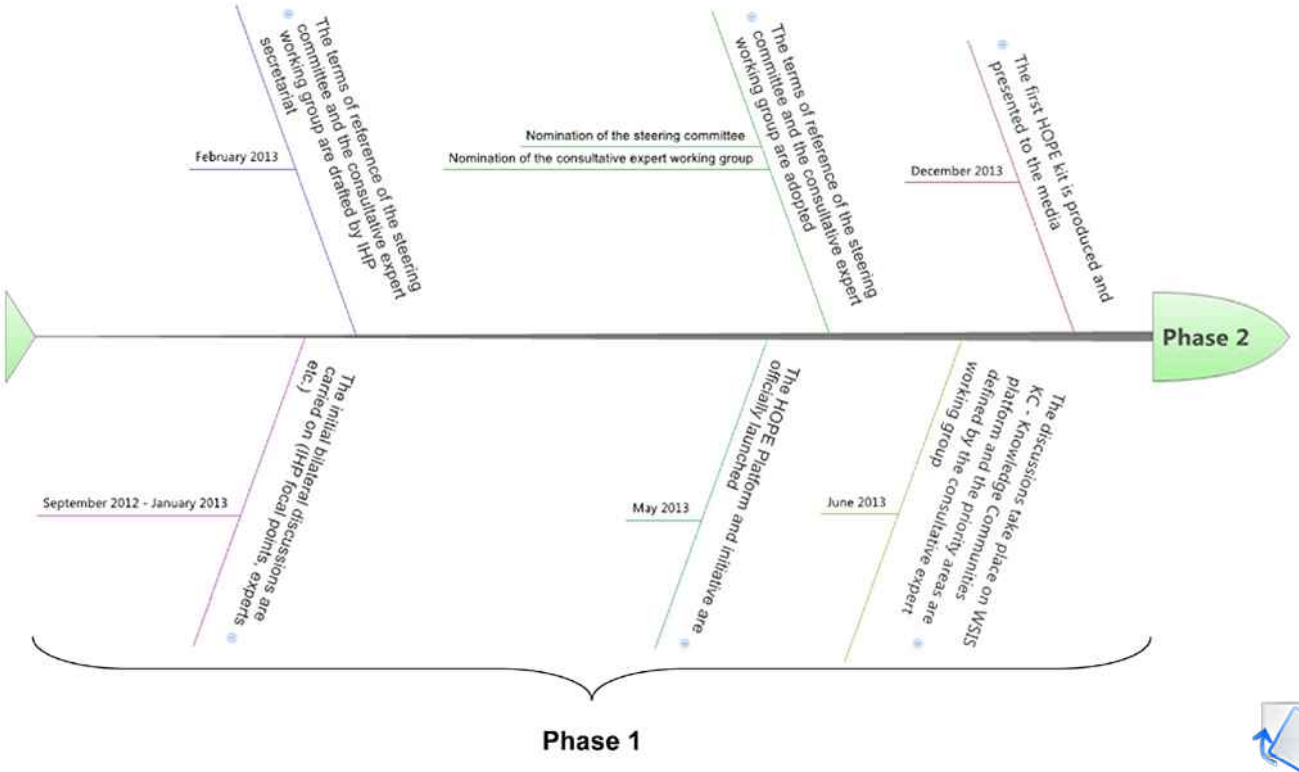
## ANNEX A.4. EXPECTED RESULTS AND WORK PLAN

| | | | Expected results | Work Plan [ACTIVITIES] |
|---|---|---|---|---|
| **PHASE 1** | | | ✓ UNESCO's Hydro Free and FOSS Platform of Experts (HOPE) is established | 1- Initial bilateral discussions would take place with the partners (e.g. IHP focal points, experts)<br>2- The Terms of Reference (ToRs) of the SC and the CEWG are drafted<br>3- A meeting is organized for the official HOPE Initiative launching<br>4- The ToRs of the SC and the CEWG are adopted<br>5- The SC and the CEWG are nominated<br>6- Open discussions take place on WSIS KC - Knowledge Communities platform and priorities areas are defined |

| | | | Expected results | Work Plan [ACTIVITIES] |
|---|---|---|---|---|
| PHASE 1 | | | ✓ An initial kit of Free and/or FOSS in the field of water management is released | 7- UNESCO appoints a consultant(s) to identify initial package of Free and/or FOSS in the field of water management according to the HOPE's platform guidance<br>8- The kit is validated by UNESCO's HOPE, produced on a DVD format and presented to the member states |
| | PHASE 2 | | ✓ The use of the Free and/or FOSS package in the field of water management is promoted | 9- UNESCO appoints consultants to deliver capacity building workshops<br>10- UNESCO distributes the kit through capacity building demonstration workshops |

| | | | Expected results | Work Plan [ACTIVITIES] |
|---|---|---|---|---|
| | PHASE 2 | | ✓ HOPE portfolio is enhanced according to users requirements in terms of Free and/or FOSS | 11- UNESCO distributes and collects questionnaires during the capacity building demonstration workshops |
| | | | ✓ The HOPE portfolio and services, including customized capacity building workshops, are developed and updated | 12- UNESCO appoints a consultant(s) to develop and update the HOPE portfolio and services |
| | | PHASE 3 | ✓ Chemical and physical data at national or regional level are collected and used during the demonstration workshops | 13- UNESCO identifies pilots project with African water authorities partners for data collection and use<br>14- UNESCO appoints consultants to deliver capacity building workshops using national/ local data |
| | | | ✓ HOPE Platform of Support for users is launched | 15- UNESCO launched an online Platform of Support for users |

## WORK PLAN AND TIMELINE FOR PHASE I



# ANNEX A.5. BUDGETING TOOLS AND RESOURCES

This project is funded for 2012-2013 by the UNESCO Regular Programme (RP) under the Intersectoral Platform Priority Africa (US$130,000).

However, the team leaders will keep seeking for other opportunities through either the RP and further to enhance through Extrabudgetary (EXB) resources from new partners.

# ANNEX A.6. PROGRESS

## SURVEY

**UNESCO HOPE Secretariat** invited the experts/users to participate in an assessment survey (Click here to access the survey) designed to gauge their opinions on how to provide Member States excellence in the area of Free and FOSS in hydrology. This survey concerns their recent interactions with specialized software in hydrology and will help the team leader to lead the discussions on the platform on the subject. The results will be presented during the official launching meeting.

## HOPE'S ADVOCATES PROGRAMME

The Regional Advocates is an authorized messenger or representative serving in a leadership capacity in the HOPE project. Regional Advocates are in charge of disseminating information on the HOPE project through interactions (seminars, workshops etc.), phone calls and emails, facilitating communication using the tools provided by UNESCO (e.g. a PowerPoint presentation) among different stakeholders (e.g. Ministries, campus users, professors, students, researchers, staffs, etc.). The Hope Advocates Initiative is an effort to help new users and reach out to new potential contributors.

[Click here to view their contributions, Dr. Markus Starkl [Europe] - Dr. Imre Takács [Europe and America] - Prof. Yvonne Bonzi [Africa] - Prof. Damas Alfred Mashauri [Africa].

**COMMUNICATION SUPPORT**

UNESCO developed three communication supports:

- A web page: http://www.hope-initiative.net/;
- A Facebook page: http://www.facebook.com/UNESCO.HOPE.Initiative; and
- A twitter account: @HOPEInitiative1, in which all information related to the projects are published.


HOPE-Initiative
@HOPEInitiative1
UNESCO's Hydro Free and FOSS Platform of Experts (HOPE) Initiative
HOPE - INITIATIVE .net
for Africa
UNESCO's Hydro Free and FOSS Platform of Experts Initiative.
Update Page Info
Liked
Following
151

# PART B

# LAUNCH OF HOPE PROCEEDINGS

United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

# HOPE - INITIATIVE

World Water Day 2013 International Year of Water Cooperation

## LAUNCH OF HOPE - PROCEEDINGS

**JUNE 25-27, 2013**

**UNESCO**

**Launch of UNESCO's Hydro Free and FOSS Platform of Experts (HOPE) Initiative**

25-27 June 2013 / UNESCO Paris, France

# CONTENTS

# PROGRAMME

## STEERING COMMITTEE (SC) MEETING

*(IN-CAMERA SESSION / RÉUNION À HUIS CLOS)*

**TUESDAY 25 JUNE 2013, ROOM 2.005 (FONTENOY)**

**SESSION I**

09H30-10H45 Introduction of the SC members:

- ✓ **Mr. Bai-Mass TAAL**, African Ministers' Council on Water (AMCOW)
- ✓ **Mr. Olusanjo SANJO BAMGBOYE,** Regional Centre for Integrated River Basin Management (RC-IRBM)
- ✓ **Mr. Nico ELEMA**, NEPAD Southern African Network of Water Centres of Excellence (NEPAD SANWATCE)
- ✓ **Mr. Stephen DONKOR**, United Nations Economic Commission for Africa (UNECA)
- ✓ **Ms. Gretchen KALONJI**, United Nations Educational, Scientific and Cultural Organization (UNESCO)
- ✓ **Mr. Youssef FILALI-MEKNASSI** (UNESCO)
  - o Objectives
  - o Overall Project Status
  - o Schedule/Milestones
  - o Financial Status

10H45-11H15 Coffee break / Pause café

**TUESDAY 25 JUNE 2013, ROOM 2.005 (FONTENOY)**

**SESSION I (contd.)**

11H15-13H00 Chairman / Président de séance:

**Ms. Lucilla MINELLI** (UNESCO)

Presentation of the ToRs

- ✓ Steering Committee ToRs
- ✓ Consultative Expert Working Group ToRs
- ✓ Initiating the discussion regarding the Terms of Reference for Software Selection and inclusion in the HOPE kit

DISCUSSION / DEBAT

13H00-14H30 Lunch / Déjeuner

**SESSION II**

14H30-16H00 Chairman / Président de séance:

**Mr. Davide STORTI** (UNESCO)

Adoption of the ToRs

- ✓ Steering Committee ToRs
- ✓ Consultative Expert Working Group ToRs
- o Concerns and Recommendations
- o Management Action Items
- o Other Business Tabled
- o Next Meeting

16H30-17H00 Conclusion

## KICK-OFF MEETING

*(PUBLIC EVENT / RÉUNION OUVERTE AU PUBLIC)*

**WEDNESDAY 26 JUNE 2013, ROOM XI (FONTENOY)**

| OPENING CEREMONY / CEREMONIE D'OUVERTURE | |
|---|---|
| 09H00-09H30 | Registration / Accueil – Inscription des participants |
| 09H30-10H20 | Welcome remarks<br>✓ **Ms. Gretchen KALONJI** (UNESCO)<br>✓ **Mr. Bai-Mass TAAL** (AMCOW)<br>✓ **Mr. Olusanjo SANJO BAMGBOYE** (RC-IRBM)<br>✓ **Mr. Nico ELEMA** (NEPAD SANWATCE)<br>✓ **Mr. Stephen DONKOR** (UNECA) |
| 10H20-11H00 | Keynote speeches<br>✓ **Ms. Alice AURELI** (UNESCO)*: Water Security: Responses to Local, Regional, and Global Challenges* [PDF] (20 min)<br>✓ **Mr. Borhene CHAKROUN** (UNESCO): *UNESCO skills development programmes for water sector* [PDF] (20 min). |
| 11H00-11H15 | Coffee break / Pause café |

**WEDNESDAY 26 JUNE 2013, ROOM XI (FONTENOY)**

| **SESSION I** | |
|---|---|
| 11H15-13H00 | Chairman / Président de séance:<br>**Ms. Alice AURELI** (UNESCO)<br>✓ **Mr. Youssef FILALI-MEKNASSI** (UNESCO): *Hydro Free and FOSS Platform of Experts (HOPE)* [PDF] (15 min)<br>✓ **Mr. Alaphia WRIGHT** (UNESCO): *Hydro Free and FOSS Platform of Experts - RBM Logical ScoreCard* [PDF] (15 min)<br>✓ **Mr. Ernesto FERNÁNDEZ-POLCUCH** (UNESCO): *Data analysis from the assessment survey on Free and FOSS in hydrology* [PDF] (15 min)<br>✓ **Mr. Allan JONES** (Texas A&M AgriLife Research): *Integrated Decision Support System (IDSS): Free, Integrated Software and Data Bases* [PDF] (20 min)<br>✓ **Mr. Tom GERIK** (Texas A&M University and Texas A&M AgriLife Research): *Integrated Decision Support System (IDSS): Model components –APEX - SWAT* [PDF] (20 min)<br>✓ **Mr. Imre TAKÁCS** (Dynamita): *Engineering software: Experience with reconciling commercial and open source drivers* [PDF] (20 min) |
| 13H00-13H30 | Questions & Answers |
| 13H30-14H30 | Lunch / Déjeuner |

**WEDNESDAY 26 JUNE 2013, ROOM XI (FONTENOY)**

| **SESSION II** | |
|---|---|
| 14H30-15H50 | Chairman / Président de séance:<br>**Mr. Abou AMANI** (UNESCO)<br>✓ **Mr. Paul BARLOW** (U.S. Geological Survey): *Open-Source Software from the U.S. Geological Survey for Water-Resources Applications* [PDF] (20 min)<br>✓ **Mr. Rao Y. SURAMPALLI** (U.S. EPA): *EPA Research Data and Software* [PDF] (20 min)<br>✓ **Mr. Jeremy DUDLEY** (WRc-STOAT): *Treatment software – WRc's STOAT and Techneau's SimEau* [PDF] (20 min)<br>✓ **Mr. Abdulkarim HUSSEIN SEID** (Nile Basin Initiative Secretariat, Uganda): *The Nile Basin Decision Support System: A Software Framework for Water Resources Management* [PDF] (20 min) |
| 15H50-16H10 | Coffee break / Pause café |

**WEDNESDAY 26 JUNE 2013, ROOM XI (FONTENOY)**

**SESSION II (contd.)**

16H10-17H10

- ✓ **Ms. Laura DEL VAL ALONSO** (IGRAC): *Global Groundwater Information System (GGIS): A groundwater solution to HOPE* [PDF] (20 min)
- ✓ **Mr. Cicero BLEY Jr** (International Centre on Hydroinformatics): *Quality Assurance in Open Source: Building Trust Through Certification and Accreditation* [RAR] (20 min)
- ✓ **Mr. Alex GAKURU** (Creative Commons): Creative Commons - *Open Future of Sharing* [PDF] (20 min)

17H10-17H30 Questions & Answers

## CONSULTATIVE EXPERT WORKING GROUP MEETING

*(IN-CAMERA SESSION / RÉUNION À HUIS CLOS)*

**THURSDAY 27 JUNE 2013, ROOM 2.005 (FONTENOY)**

| | |
|---|---|
| **SESSION I** | |
| 09H30-10H30 | Chairman / Président de séance:<br>**Ms. Lena SALAME** (UNESCO)<br>Presentation of the ToRs<br>✓ Steering Committee ToRs<br>✓ Consultative Expert Working Group ToRs<br>DISCUSSION / DEBAT |
| 10H30-11H00 | **Mr. Davide STORTI** (UNESCO): *The WSIS KC online collaborative platform hosted by UNESCO* (30 min) |
| 11h00-11H20 | Coffee break / Pause café |
| **SESSION I (contd.)** | |
| 11H20-13H00 | Adoption of the ToRs<br>✓ Consultative Expert Working Group ToRs<br>✓ Software Selection and inclusion in the HOPE kit ToRs<br>o Nomination of the Consultative Expert Working Group Chairman<br>o The way forward<br>o Concerns and Recommendations<br>o Management Action Items<br>o Other Business Tabled<br>o Next Meeting |
| 13H00-14H00 | Lunch / Déjeuner |

## B.1. WELCOME COMMENTS

**Welcome comments**

**Ms. Gretchen KALONJI**

**Assistant Director-General of Natural Sciences - United Nations Educational, Scientific and Cultural Organization (UNESCO)**

Ms. Gretchen Kalonji delivered the welcome address. She sincerely thanked all present, the United Nations Educational, Scientific and Cultural Organization's (UNESCO) key partners and distinguished contributors, for their participation in the public kick-off of the HOPE Initiative. Ms. Kalonji highlighted the reasons why HOPE is an exciting and important initiative for UNESCO and concluded by offering a compelling idea for HOPE as it sets its agenda.

Ms. Kalonji welcomed everyone present to the event, noting that many have come from so far to contribute to an exciting event. She gave particular thanks to HOPE's key partner institutions and their representatives: Mr. Bai-Mass Taal from the African Ministers' Council on Water (AMCOW), Mr. Olusanjo Sanjo Bamgboye from the Regional Centre for Integrated River Basin Management (RC-IRBM); Mr. Nico Elema from the NEPAD Southern African Network of Water Centres of Excellence (NEPAD SANWATCE) and Mr.

Stephen Donkor, recently from United Nations Economic Commission for Africa (UNECA), now transitioning to the International Commission of Congo-Oubangui-Sangha (CICOS). She also gratefully acknowledged the many distinguished contributors to the event.

Ms. Kalonji drew attention to the diverse reasons why HOPE is an exciting and important initiative:

1. UNESCO has a broad mandate for Education, Science, including Engineering, Natural and Human and Social Sciences, Culture and Communications and Information. As in many organizations, it is sometimes a challenge to get the various parts in UNESCO working collectively together on important projects that are intrinsically interdisciplinary. HOPE represents a wonderful example of the collaboration of UNESCO's sectors;

2. In the scientific domain of UNESCO's work, water is a particularly strong achievement. HOPE's direct engagement in this area has the potential to further expand UNESCO's specialization;

3. UNESCO has a rich network of networks in the area of water. They include at least 25 networks of UNESCO-affiliated Water Centres around the world, numerous UNESCO Water Chairs at Universities, the International Hydrological Programme (IHP) hosted by UNESCO and UNESCO-IHE Institute for Water Education in Delft. A strong consequence is that work in Free and Open Source Software (FOSS) in water resources has the potential to be

enriched by the networks and in turn, optimize the utility of these network of networks;

4. UNESCO has a very clear, keenly felt desire to integrate the educational components of science with capacity building and research. This initiative offers a great opportunity for developing capacity for FOSS creation, an important goal in its own right, for the broader goals in the water domain;

5. Finally, HOPE benefits from really great partners. It promises to be a very powerful platform for contribution in Free and/or FOSS for the water domain.

Ms. Kalonji welcomed the opportunity for the experts present at the meeting to collectively brainstorm, help set the agenda and put forward ideas towards the success of HOPE.

In conclusion, she offered an idea for adoption by HOPE. Noting firstly, that universities and indeed, higher educational institutions in general offer the opportunity to explore creative approaches to integrating research and software development into the curriculum of water-related subjects and that secondly, the typical Civil and Environmental Engineering student does not engage too much in the way of Information Technology (IT), she envisaged the creation of an international student design competition for FOSS in the water domain. Student teams from far-fledged institutions across multiple continents can contribute to vital software design in FOSS for the water domain. It could provide a really powerful and collaborative

experimental activity, popularizing and providing prominence to the key elements of the HOPE Initiative.

Ms. Kalonji closed by thanking participants for their active collaboration in the meetings and expressed that she was looking forward to learning more about participants' deliberations.

## B.2. INTRODUCTORY REMARKS

**Introductory Remarks**

**Mr. Bai-Mass TAAL**

**Executive Secretary - African Ministers' Council on Water (AMCOW)**

**Member of the Steering Committee of HOPE**

In his introductory remarks, Mr. Bai-Mass Taal reflected on the prospective synergies between AMCOW and HOPE in advancing the common goal of the African Water Vision of 2025. He welcomed the serendipity of the HOPE Initiative in enjoining two of the four priorities in the Programme for Infrastructure Development in Africa (PIDA) identified by the African Union Summit of Heads of State and Government, namely transboundary waters and information technology, for the acceleration of economic growth rates in Africa. He expressed gratification at the pioneering work in Free and FOSS

and concluded by pledging the support of AMCOW to the success of HOPE.

Mr. Taal presented a profile of the AMCOW, represented by all fifty-four water Ministers of Africa. AMCOW is primarily engaged in policy dialogue and programme coordination, based on priorities for water and sanitation in Africa. The Council's work is anchored in the Abuja Declaration and the Africa Water Vision of 2025.

Reflecting on HOPE's goals, Mr. Taal felt that AMCOW has a big role to play. The area of Free and FOSS development in the water domain is relatively new to water policy makers and water engineers and offers a promising opportunity to Africa. He expressed belief that the initiative will support AMCOW's work in the achievement of the eight Pillars of the African Water Vision.

Mr. Taal shared that at the African Union (AU) Summit in Kampala, African Heads of State concluded that Africa will need to move its average, annual growth rate from 4-5% to 12% in order to effectively tackle poverty. Four programmes were identified to help achieve this:

1. Infrastructure;
2. Energy;
3. Water, especially transboundary water; and
4. IT.

The HOPE Initiative brings together two of the four identified programmes. Mr. Taal expressed optimism that by working with

partners from all over, the capacity of Africans to engage in and develop Free and FOSS as pioneers in order to serve broader goals in water policy and economic growth at national levels will be strengthened.

He thanked UNESCO for bringing forward this initiative with commitment and seed funding, acknowledging the effort it took to arrive at this stage of development. He expressed excitement to be part of HOPE and pledged the support of AMCOW to the work of UNESCO and the HOPE Secretariat for the success of the initiative.

**Introductory Remarks**

**Mr. Olusanjo Sanjo BAMGBOYE**

**Regional Centre for Integrated River Basin Management (RC-IRBM) / African Water Resources Capacity Building Network Programme (AwacaB)**

**Member of the Steering Committee of HOPE**

In his remarks, Mr. Olusanjo Sanjo Bamgboye highlighted the recent, successful collaboration between AwacaB and UNESCO in the development of resources for water management at different educational qualification levels. He sees HOPE's goal of creating a Platform of Experts as an extension of this capacity building collaboration and an exciting development. He expressed confidence that anyone involved in capacity building would

appreciate the initiative. He looked forward to the development of Free and FOSS resources, particularly as it would allow for adaptation to regional and local needs.

Mr. Bamgboye noted that water resource development is a knowledge- and skills-based sector, one that is fundamental to the creation of experts in the domain. He described Africa as being at an elementary stage of water resource development. AwacaB has been engaged in mapping water experts and facilities on the continent as part of a capacity building exercise, in order to facilitate the delivery and development of water resources. HOPE's offer of a Platform of Experts fits in neatly with AwacaB's activities and is of great interest to it.

In the last year, with the support of UNESCO, AwacaB developed a modular curriculum in water management at the technician, technologist and post-graduate levels. These resources are in the process of dissemination to all higher-education institutions on the continent to support common knowledge in the Water sector.

Mr. Bamgboye observed that water management models are usually developed for temperate regions and have clear limitations when applied to tropical regions of Africa. He emphasized the need for more region- and local-specific adaptations of most models. In this regard, he sees HOPE's advocacy of Free and FOSS as creating the opportunity for these developments. Users will go beyond simply adopting available software packages to improving on these

packages with applications, informed by local information and deep knowledge of the environment.

Mr. Bamgboye expressed that, particularly for these reasons, he was happy to be associated with HOPE.

**Introductory Remarks**

**Mr. Nico ELEMA**

**Programme Manager - NEPAD Southern African Network of Water Centres of Excellence (NEPAD SANWATCE)**

**Member of the Steering Committee of HOPE**

Mr. Nico Elema presented a profile of his organization and expressed belief that there is a good fit between the mandate of the NEPAD Southern African Network of Water Centres of Excellence (NEPAD SANWATCE) and HOPE's agenda in advancing the development of Free and FOSS in research and government policy.

In reflecting on the evolution of the NWCE, Mr. Elema expressed confidence that the Centres can have a symbiotic relationship with the HOPE Initiative. He shared the background to the creation of the NEPAD SANWATCE. A few years earlier, AMCOW and the African Ministerial Council on Science and Technology (AMCOST) had decided on the establishment of these networks across the five

regions of Africa. At present, these networks have already been established in South and West Africa.

The Centres of Excellence are institutions of research and universities that collaborate and work together within the water sector with the primary objective of research for policy impact. The research agenda is developed from listening closely to government needs and facilitating and directing scientific research within the water sphere in order to create policy-impact tools. In a recent development, AMCOW has requested that the NEPAD SANWATCE creates a Human Capacity Development Programme, aimed at youth development in the water sector over the next few years.

Bearing this in mind, Mr. Elema expressed belief that in an important respect, the NWCE can provide support to the HOPE Initiative, to act as the stepping-stone for curriculum development in Free and FOSS within the African continent.

He expressed strong support for HOPE and said he looked forward to its development over the next few years.

## Introductory Remarks

**Mr. Stephen DONKOR**

**Former United Nations Economic Commission for Africa (UNECA)**

**Member of the Steering Committee of HOPE**

Mr. Stephen Donkor is an expert on Water Resources. Currently, he is transitioning from UNECA to CICOS based in Kinshasa, DR Congo. In his remarks, Mr. Donkor drew attention to the water landscape of Africa and how the fate of millions in Africa rest on the efficient and sustainable use of natural resources, particularly water. In recognition of this, the African Water Vision of 2025 was developed under the auspices of the African Union. He concluded his speech optimistically with the prospect of HOPE galvanizing developments in the intersection of natural resource development and the burgeoning area of Information and Communications Technology (ICT), thereby bolstering the growing recognition of Africa not as the hopeless but the rising continent.

Mr. Donkor described Africa as a continent of striking contrasts, especially with respect to the availability and use of natural resources. The socio-economic fates of millions of Africans are directly linked to the efficient and sustainable use of Africa's natural

resources, particularly water. The most abundant of her resources, however, water and sun, remain largely untapped.

Mr. Donkor provided context to the creation of the African Water Vision 2025. Twelve years ago, UNECA, together with the African Development Bank (AfDB), and under the political leadership of the African Union, developed the Vision, which has since served as the major policy document for Water Resources Management, after adoption by the AU Summit in 2004. This common vision has proven to be vital in efforts at meeting the Millennium Development Goals (MDGs) and the major outcomes of the Global Summits on Sustainable Development.

He outlined major initiatives that are underway to create a comprehensive water resources knowledge base in Africa, the most promising of which is the Pan African Water Monitoring and Evaluation system of the AMCOW and the new Monitoring Environment and Security in Africa of the African Union, developed with support by the European Union.

He expressed belief that the UNESCO HOPE Initiative can provide a vital contribution in providing Free and FOSS for Water Resources Analyses and build the capacity of African stakeholders to innovate and leap frog the current constraints of data collection and analyses in support of effective decision making. HOPE, he said, portends innovation in the application of ICT to the management of Africa's largely untapped water resources.

He aired the hope that HOPE will not only galvanize activity from the traditional knowledge centres such as universities and research institutes but also create interest in water management from the burgeoning ICT communities of practice in Africa. One key indicator of success will be development or adaptation of Integrated Water Resources Management (IWRM) software by a youthful and vibrant segment of the African population.

In conclusion, he thanked UNESCO-IHP for taking the initiative in lowering the barrier for obtaining accurate information for the management of Africa's water resources for its socio-economic development as envisaged in the African Water Vision 2025.

## B.3. KEYNOTE SPEECH

**Keynote speech**

***"Water Security: Responses to Local, Regional, and Global Challenges"***

**Ms. Alice AURELI**

**Chief of Section, Groundwater Resources and Aquifer Systems - UNESCO-International Hydrological Programme (IHP)**

Ms. Alice Aureli provided an overview of the International Hydrological Programme (IHP), part of a larger UNESCO Water Family and Network. She briefly traced the evolution of the IHP and shared the programme's emphasis on water security at the local, national and global levels. Ms. Aureli drew attention to the high level challenges facing the planet and highlighted a few global initiatives that attempt to address these challenges. She highlighted HOPE's potential in being part of the solution. She concluded her presentation with a call for the realization of two critical objectives in water management.

Ms. Aureli began her presentation with an overview of the IHP. She described the IHP as the only global intergovernmental scientific programme on water resources in the UN system. The Programme draws its plans and agenda from global, regional and national priorities identified by Member States. She expressed her privilege

at hosting the UNESCO-IHP Secretariat, which she says provides one pillar to HOPE as it examines education capacities for water management at all levels, taking into particular account UNESCO's common priorities of Africa and gender equality issues.

In terms of its evolution, the IHP has grown from a focus on the hard sciences of hydrology modelling in the 1970's to an increasing attention to the Integrated Science, Policy and Society approach. In addition, there is a growing emphasis on governance and social aspects of science. An important challenge, she stressed, was to break the paradigm lock between science, management and society.

There is growing acknowledgement that humans are changing the global water system in critical ways without, regrettably, adequate knowledge of the water system and its response to change. Furthermore, there is recognition that global change is more than global climate change. It includes natural plus human and social dimensions, many global in scope. She expressed the view that, more than any other agency, UNESCO, with its multi-disciplinary mandate, is uniquely equipped to tackle this complex and inter-related set of challenges.

IHP's Member States in June 2012 have identified water security as a central topic in the next phase of the IHP starting in 2014. In addition, the UNESCO IHP definition of water security was included in the UN-WATER (UN agencies coordination mechanism on water

affairs) brief on water security published in 2013. Ms. Aureli expanded on the new phase of the IHP, built around three axes:

Axis 1 – Mobilizing international cooperation to improve knowledge and innovation to address water security challenges;

Axis 2 – Strengthening the science policy interface to reach water security at local, national, regional and global levels; and

Axis 3 – Developing institutional and human capacities for water security and sustainability.

The programme was created to address many of the global challenges facing the planet. Ms. Aureli highlighted a few:

1. The global water system is deeply stressed. A change to one part reverberates throughout the ecosystem. An important consideration, and perhaps less well known, is that 80% of future stress will come from water in particular, and population and development, not climate change.
2. Water-related hazards in many parts of the world are intensifying and increasing in numbers. There is a pressing need to develop advanced risk management on water hazards in order to secure human life and ensure sustainable socio-economic development and poverty alleviation.
3. Most of the water resources in the world are in Transboundary Aquifers (TBA) and yet very little is known of them. Sharing of water will increasingly become an issue or challenge around the world.

4. Worldwide dependency on groundwater is increasing in relevance, but many countries still lack coherent policies and strategies for the management of aquifers and groundwater resources. There are inadequate legal settings and institutional arrangements to address this challenge.

5. Global changes brought on by climate change, urbanization, ozone depletion, population growth, expansion of infrastructure, migration, land conversion and pollution, are altering the Earth and the way it functions. The world needs to consider its water footprint.

6. Global initiatives have been developed to address many of these challenges:

- TBA management, in particular cooperation with legal and institutional issues, will be one of the important preoccupations of the new phase of IHP. The Internationally Shared Aquifer Resources Management Initiative (ISARM) is working to provide a global inventory of transboundary aquifers and guidelines for the management of groundwater resources shared between two or more States;
- ICT and software have been used as tools to increase preparedness and can contribute to studies on droughts and floods worldwide;
- The IHP has supported the United Nations International Law Commission (UNILC) with technical advice. The results of this activity have been crystallized in various United Nations General Assemblies (UNGA) resolutions a such as

the UNGA Resolution 63/124 on the law of transboundary aquifers;

- The Global Groundwater Information System (GGIS), administered by IGRAC, is mapping groundwater and TBA resources around the world: UNESCO is doing its best in fundraising and cooperating with countries, as well as with regional bodies such as Southern African Development Community (SADC) and AMCOW to improve knowledge of the 40 TBAs in Africa; and
- UNESCO is working seriously to map river and groundwater basins of the world, acknowledging that mapping is a crucial tool for decision makers.

Ms. Aureli identified HOPE as a Project for action, a chance to show how important the cooperation in the water sector is to the international water experts' community. High-quality education capacities in water management developed and reinforced through innovative use of ICTs, can be boosted through HOPE's project objectives. HOPE will provide an alternative to the commercial specialized engineering software in the field of hydrology.

She concluded her presentation with a call to the world community to achieve two important objectives - political attention on the value and importance of water; and significant national and regional financial investment to establish the physical and social frameworks for water management.

**Keynote speech**

***"UNESCO skills development programmes for water sector"***

**Mr. Borhene CHAKROUN**

**Chief of the Technical and Vocational Education and Training Section (TVET) of UNESCO**

In his presentation, Mr. Borhene Chakroun summarized UNESCO's Strategy for TVET and activities as well as he proposed an approach for skills development in the water sector. He highlighted key considerations for TVET in the water sector, with particular emphasis on concerns for developing regions. In addition, he identified challenges for TVET in the water sector, including for the promotion of Free and FOSS.

At the outset of his presentation, Mr. Chakroun highlighted three important and reverberating issues that inform the development of TVET in the water sector:

1. How is the labour market for the sector being analysed? How are occupations and skills demand being mapped? Mr. Chakroun emphasized the importance of these related issues for the development of training programmes for technicians and other occupations for the sector;

2. Context matters - He drew attention to the need for skills for varying contexts and workplaces, be they in small communities, informal settings, small or big enterprises, Africa or Europe;

3. Partnerships matter - This is particularly relevant for TVET where the combination and involvement of different stakeholders such as universities, Ministries of Water Management, Education and Labour and the private sector are vital in directing the agenda and driving investments.

Mr. Chakroun structured his presentation in three parts, highlighting:

- UNESCO Strategy for TVET (2010–2015);
- UNESCO activities on skills development for the water sector;
- An approach for skills development for the water sector.

The UNESCO Strategy for TVET (2010-2015) supports Member States to meet demand in the labour market through skills development. It is comprised of three Core Areas:

- Provision of upstream policy advice and related capacity development;
- Conceptual clarification and monitoring of skills; and
- Acting as a clearing house and informing the global debate.

Mr. Chakroun also presented some general highlights of TVET's Actions in Monitoring and Evaluation, raising nuanced concerns for each action:

1. Conceptualization of TVET: How to develop a typology of skills for the sector; how to identify the specific skills required for different settings from a bottom-up approach; how to evaluate and monitor; what common understandings exist when referring to non-cognitive skills; and why workplaces are requiring skills such as entrepreneurial or learning-to-learn skills.
2. TVET Indicators and Statistics: How to build national capacities to produce and use these statistics and indicators; and how to diffuse or harmonize them at regional and international levels?
3. Review TVET normative instruments: Responsive revisions of normative instruments to changes in education or the labour market.
4. Qualifications Frameworks at national and regional levels: This is especially important in the water sector. What types of qualifications are required? How do we recognize them? What types of quality assurance programs are in place? How do we ensure recognition and portability of certificates across boundaries?

A few general challenges raised by Mr. Chakroun are highlighted in this summary. A key challenge for TVET in the water sector in the developing world is the serious skill shortage in the water industry, reflected in the high demand for skilled workers, technician and engineers as well as the lack of materials and resources to build capacity for skills development. He expressed the desire that HOPE will support the building of these resources for the sector,

particularly in how to use Free and FOSS. A second challenge, one that is particularly relevant for TVET, is the involvement of the private sector in skills development, when the reality is that the private sector may be weak and often lacking representatives in developing regions. Next, there needs to be better understanding of the learning process both in formal and informal contexts. Finally, he made the call to advocate for occupations and training, even in vital sectors such as agriculture, which are less popular with youth.

The structure of a TVET Programme in the water sector must take into account the following:

- Relation to the labour market, its structure and actors;
- Content: curriculum, certification, quality, evaluation;
- Settings and infrastructure: Formal/non-formal/informal, School/workplace/life;
- Actors development (particularly teacher/trainer and management development);
- Location of decision making / decentralization; and
- Finance.

There is scope to explore the various ways in which HOPE and TVET can leverage each other's agendas and platforms. For instance, HOPE can support the development of curricular resources for the promotion of Free and FOSS in the water sector. UNESCO International Centre for Technical and Vocational

Education and Training (UNEVOC), a TVET international network, offers HOPE a platform for the articulation and promotion of its agenda on water. Importantly, water can be advanced as a vital component for TVET's Sustainable Development and Greening agenda.

## B.4. PRESENTATIONS

**Session 1**

**Chairman: Ms. Alice AURELI**

**Chief of Section, Groundwater Resources and Aquifer Systems - UNESCO-International Hydrological Programme (IHP)**

***"Hydro Free and FOSS Platform of Experts (HOPE)"***

**Mr. Youssef FILALI-MEKNASSI**

**Science Programme Officer - UNESCO Windhoek Cluster Office**

Mr. Youssef Filali-Meknassi, Science Programme Specialist for UNESCO Windhoek Cluster Office (Angola, Lesotho, Namibia, South Africa and Swaziland) provided first, an analysis of the software situation with an emphasis on the developing countries and then, he introduced the HOPE Initiative.

Indeed, according to World Information Technology and Services Alliance (WITSA) and Information Handling Services (IHS) Global Insight, the spending on computer software and services amounted globally to an estimated $1.2 trillion in 2011, or almost one third of global ICT spending for the same year. So, that corresponds to about 2% of gross domestic product (GDP), whereas some of the African countries don't spend even that for the entire Science Technology and Innovation area. Worldwide, the sector has shown solid growth, except in 2009 due to the global financial crisis, and proved more resilient than other ICT-sector segments. According to 2011 data, developed countries account for the vast share of the expenditure. In fact, North America and Europe generated four fifths of the total spending. The remaining share is mainly accounted by East, South and South-East Asia, while spending in the developing regions of Africa and the Middle East corresponded to only 2%, well below their share of world GDP (10 per cent). Mr. Filali-Meknassi concluded that these data reveal a great potential for increasing the size of the computer software and IT services use in developing regions.

Mr Filali-Meknassi also presented the main barriers for the growth and development of the software and IT services industry as:

- The access to venture capital;
- The lack of government procurement of software and IT services;

- The lack of reliable data that can be used as a basis for informed policymaking;
- The number of Open Source Policy Initiatives adopted by governments. Indeed, Europe is the most active region, with 46% of all initiatives and 51% of approved initiatives. Among developing regions, Asia is the front-runner (81 initiatives) followed by Latin America (57) and only 9 in the case of Africa.
- The shortages of qualified people.

Mr. Filali-Meknassi made clear that UNESCO can play a key role in stimulating the change and in the development of capacity through the IHP. Indeed, this programme has 18 water-related centres under the auspices of UNESCO (category 2), one centre of Category 1 and 29 water-related UNESCO Chairs.

Then, Mr. Filali-Meknassi explained why Free and FOSS is a good choice for the developing countries. In fact, a dire need exists for affordable and accessible specialized software in engineering field. Indeed, as most of software applications are not affordable for low-income and middle-income economies, the digital gaps increase, especially when it comes to the engineering curricula. Moreover, the main in favor reasons of the development of Free and FOSS are:

- Promotion of local learning;
- Lower cost and local value creation (e.g. brings affordable Green Technologies);

- Less dependent on specific technologies and vendors;
- Enable adaptation of software to local needs;
- Address concerns related to national security and long-term availability;
- Provide alternative to the commercials tools;
- Provide opportunities for income generation and employment (e.g. development of creative industries); and
- Contribute to the idea of Science for All.

While the most important reason against the development of Free and FOSS is that many buyers attach importance to the reputation of the brand names of proprietary software vendors. In this regard, he highlighted that UNESCO by being the umbrella of the HOPE Initiative can make people more comfortable on using Free and FOSS.

In fact, HOPE is a Free and FOSS platform, targeting experts that can assist African water authorities, teachers, university lecturers and researchers to elaborate water management models.

HOPE is a set of organizations (e.g. universities, institutes, centers) and practitioners committed to open development through the use of ICTs. The UNESCO's HOPE features are four core resources: People (including knowledge - Hu/W), Tools (material, information – H/W), Procedures (S/W) and Management.

The overall objectives of HOPE are that the Member States/Institutions (Universities, Colleges, Water Departments)/People (Water professionals, Students, etc.) are developing (innovation)/using Free and FOSS in the effective management of water resources in their respective countries.

Furthermore, Mr. Filali-Meknassi highlighted the four outputs of the initiative and finished his presentation by explaining the three distinct activities of HOPE.

***"Hydro Free and FOSS Platform of Experts - RBM Logical ScoreCard"***

**Mr. Alaphia WRIGHT**

**Director of the UNESCO Office in Windhoek and Representative to Namibia, Angola, Lesotho, South Africa and Swaziland**

Mr. Alaphia Wright is Director of the UNESCO Office in Windhoek and Representative to Namibia, Angola, Lesotho, South Africa and Swaziland. As he was unable to attend the Conference, his presentation was delivered by Mr. Filali-Meknassi, Science Programme Specialist for UNESCO Windhoek Cluster Office. Mr. Wright created the one-page Results-Based Management (RBM) Logical ScoreCard (see Annex 3). The presentation focused on the structure and merits of this project management tool. The details of the RBM Logical ScoreCard for the HOPE Initiative were highlighted.

The RBM Logical ScoreCard is a one-page synthesis of key logic features of a project, including its outputs, outcomes and impacts (=results). It is essentially a single table with a fixed structure, applicable for any project. It is particularly useful in providing a visual executive summary of a project for RBM purposes. Mr. Filali-Meknassi walked conference participants through the RBM Logical ScoreCard for HOPE.

The table is divided into two columns. The first column describes the project's vision, outcomes and outputs; the second column identifies performance indicators for the project.

The first line describes the vision. The HOPE Initiative does not need to have its own vision per se; rather the initiative holds onto the shared Africa Water Vision 2025 in meeting the goal of equitable and sustainable use of water for socio-economic development. In this respect, the initiative sets out to contribute to the achievement of the said Africa Water Vision via the appropriate use of Free and FOSS for water management.

The four outputs of the project were then presented, namely:

OUT-1: Appropriate platform (HOPE) infrastructures and/or facilities for hosting Free and FOSS for water management are in place, operational, well maintained, and their correct use actively promoted [Hardware];

OUT-2: Policies: procedures, rules and regulations for the development, contribution/selection and acceptance, maintenance and use of Free and FOSS for water management;

Plus: A collection of suitable Free and FOSS for water management is in place and actively promoted [Software];

OUT-3: People in the water sector in Africa have increased awareness, knowledge and skills in the use of Free and FOSS for water management [Human ware];

OUT-4: The HOPE Initiative is efficiently and effectively managed. [Management].

Three major activities were highlighted:

ACT-1: Procure new infrastructures/facilities and/or expand/renew/agree on use of existing ones; and operate and maintain these as necessary [Hardware];

ACT-2: Develop, adopt and operate appropriate policies for Free and FOSS for water management [Software];

ACT-3: Organize appropriate awareness and training programmes for effectively using Free and FOSS for water management [Human ware];

ACT-4: The HOPE Initiative is efficiently and effectively managed [Management].

The second column highlights quantitative and qualitative performance indicators for each of the elements in the impacts (Vision), outcomes (Mission) and outputs in the first column.

Placed at the bottom of the ScoreCard is a description of the inputs and resources committed to the success of the project.

In conclusion, Mr. Filali-Meknassi re-iterated the importance of the tool in delivering a synopsis of the project and its specific deliverables. It is a straightforward way to attract the attention of senior managers / executive managers to a specific project and keep focusing on performance and project's achievement of outputs, outcomes and impacts. This ScoreCard ensures that a project's processes, outputs and services contribute to the achievement of clearly stated expected accomplishments and objectives. It is focused on achieving results and improving performance, integrating lessons learned into management decisions and monitoring of and reporting on performance; thus also providing an authoritative basis for accountability.

***"Data analysis from the assessment survey on Free and FOSS in hydrology"***

**Mr. Ernesto FERNANDEZ-POLCUCH**

**Programme Specialist for UNESCO Montevideo Regional Office**

Mr. Ernesto Fernandez-Polcuch presented the findings of a survey on the use of Free and FOSS in hydrology in Africa carried out within the framework of the HOPE Initiative. At the outset, the researchers acknowledged that the number of respondents in the survey was too small to make sufficient meaningful inferences. Mr. Fernandez-Polcuch thus addressed those questions that were brought up. His conclusions were based on the direction that one of the survey findings appeared to point to, namely that open source software was in common use in the hydrology community, and that a significant diversity of software packages was in use. Mr. Fernandez-Polcuch urged greater participation in this survey so that a clearer picture may emerge of the user community in hydrology software.

Mr. Fernandez-Polcuch preceded his presentation with several comments. He saw his participation in this project as a furthering of South-South cooperation, and in line with UNESCO's objectives. Furthermore, while the project was aimed at Africa, he maintained that the concepts and its principles were equally applicable to Latin America, as well as other regions in the world. As such, he was

interested in finding ways in which the basic concepts could be expanded to other regions.

The survey comprised three parts, each of which focused on the following:

1. Identifying the users;
2. Identifying the experiences of the users in the different types of software; and,
3. General questions.

One observation that Mr. Fernandez-Polcuch made was that even among the relatively small number of 40 respondents to the survey – 11 completed, and the remaining, partial responses – 26 different specialized software packages were found to be in use. Further, respondents mentioned other software, which they may not have used, but were at least aware of. In all, 35 different types of software applications were mentioned, pointing to a diversity of supply. All the software mentioned were free software, Open Source Software (OSS), commercial software, or some combination of the three.

Mr. Fernandez-Polcuch concluded that the existence of a wide dispersion of hydrology software also meant the non-existence of a monopoly of any one product that was preferred by all users. This implies the existence of gaps, and an opportunity for discussions within the framework of the HOPE Initiative.

Mr. Fernandez-Polcuch went on to list all the software mentioned by the respondents in the survey, while noting that two of them were developed in Africa.

As an extension of the survey, Mr. Fernandez-Polcuch saw an opportunity to identify software of high quality, and for users to share their experiences in their use. Specifically, he had in mind the idea of crowdsourcing for user experiences using a “Wiki-type” approach.

Next, while most of the information gleaned from this part of the survey did not surprise, of special concern to him was the finding that 82% of the respondents in the survey were men, leading him to wonder if the hydrology software field was itself male-dominated and/or –oriented. This has implications for HOPE in terms of realizing UNESCO’s priority of gender equality. Finally, Mr. Fernandez-Polcuch presented a user profile that the survey revealed. He found that one third of the users came from the field of research and development, while 20% were from the education sector. Importantly, more than 40% of the respondents used FOSS.

In conclusion, the survey revealed that the community of FOSS users is not an ephemeral or marginal community but a mainstream one. He felt this justified further studies, as well as continued involvement in the HOPE Initiative. However, Mr. Fernandez-Polcuch stressed the need for greater participation in this survey so that a clearer picture may emerge regarding this community and its needs.

In conclusion, he addressed the question of the involvement of entrepreneurs from Africa in this project, and called on conference participants to provide feedback on how this survey may be improved.

***"Integrated Decision Support System (IDSS): Free, Integrated Software and Databases"***

**Mr. C. Allan JONES**

**Researcher at the Texas A&M University Agrilife Research, USA**

**Member of the Consultative Expert Working Group of HOPE**


The presentation of Mr. Allan Jones was on the Integrated Decision Support System (IDSS), which are all free and open source software, databases, training materials, and user aids that go along with it. However, he focused on two of this software – Soil and Water Assessment Tool (SWAT) and Agricultural Policy/Environmental eXtender (APEX) – because they are more closely associated with hydrology and water quality. Mr. Jones detailed many of the features of SWAT and APEX, and then illustrated their work in a project his team was involved in in Ethiopia. He rounded off his presentation by stressing the integrated and holistic nature of the System.

Mr. Jones explained that the IDSS was not a single software package, but a collection of models; it is integrated in the sense that they are designed to work together.

SWAT, which is widely used around the world, is a hydrologic model that works at the level of river basins, though it can be adapted to work both on smaller scales as well as on a continental scale, such as when it was used for the entire continent of Africa. The APEX model is designed to work at the farm/small-scale watershed level.

There are also other models such as FARMSIM, which is an economic model at the family and nutritional level. Yet other models in the IDSS are NUTBAL and PHYGRO. All the above models are freely available.

Returning to SWAT and APEX, Mr. Jones stressed that these were biophysical models, which can be used in a variety of spatial scales, as well as over a variety of temporal scales. He cited the example of SWAT's use in Brazil to illustrate the extensiveness of its use. Additionally, while APEX is widely used at the farm level in the US, he expressed the hope that its use at that level could be expanded globally.

Mr. Jones then provided a brief overview of the training that his agency provides. To amplify the point of access by his institution, he pointed to the availability of the models themselves, training materials, databases, user tool kits, global databases, regional

databases, and over 1300 peer-reviewed publications/abstracts. Additionally, face-to-face training is provided.

Annual international and regional SWAT conferences provide for knowledge sharing and build capacity for training, though Mr. Jones added that it is hoped that these conferences would expand to include a focus on APEX as well.

The research issues that Texas A&M undertake are in the areas of crop management, conservation policies, climate change, blue and green water supplies, water quality and soil erosion, droughts and floods, bioenergy, mixed crop-livestock systems, grazing lands, animal nutrition, and farm families.

The last four of the research areas mentioned above have been growing in importance in the last few years.

Finally, Mr. Jones expounded in some detail on the workings of SWAT and APEX in a project that his team had been involved with in Ethiopia, to show the integrated nature of the models that his team develops.

***"Integrated Decision Support System (IDSS): Model components – APEX - SWAT"***

**Mr. Tom GERIK**

**Director of the Texas A&M AgriLife Research, USA**

**Professor at the Texas A&M University, USA**

**Member of the Consultative Expert Working Group of HOPE**

At the outset, Mr. Tom Gerik stressed the importance of software credibility, data quality, and open-ness of software to facilitate collaboration among users. In his presentation, he described how models are a platform of science, and how they create understanding of how water, natural resources, agriculture, and land use all interact with each other. He went on to describe the models and components of APEX and SWAT, providing a comparison of their simulation capabilities.

Mr. Gerik prefaced his session with several qualifications. First, while user credibility of the FOSS software that his team has developed is of great importance, he felt that having the UNESCO seal of approval would be a step forward in engendering more widespread use of the software. This was over and above the credibility that his team already enjoys at home, noting that both the United States Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) use these software extensively.

Mr. Gerik added that the close collaborative ties his team has with scientists from all over the world has resulted in them helping to make improvements in the model code as well as in the structure of the models. Indeed, model developers are even now developing new algorithms for SWAT independently. Because of this benefit, Mr. Gerik and his team do their part to maintain the cohesiveness of this international group at the workshops conducted during international SWAT conferences.

Linked to the point above, Mr. Gerik stressed the importance of data and databases. Data is not only needed to drive the models, but also to test, calibrate, and validate the models. He felt that there was a need to think about developing databases and data systems, and then sharing the information, without which these models would not work.

Primarily due to his team's understanding that they rely on users - mainly from academia - for further developments of their models, Mr. Gerik is a strong proponent of keeping models developed by Texas A&M open so that all may continue to benefit from the knowledge and contributions coming from around the world.

Mr. Gerik stressed that the models he presented are a platform for science. Specifically, they exist to understand how water, natural resources, agriculture, and land use all interact with each other. Mr. Gerik also maintained that their models were management oriented, and, echoing his colleague Mr. Allan Jones, was an integrated system. For example, he started by looking at water. Models are first

developed by looking at surface hydrology and the impact on erosion. Within the models are aggregated other models in order to simulate the processes. Different models have their capabilities, and users make use of their capability to decide on the processes and which different types of models to use.

Among the model components that Mr. Gerik outlined that were simulated by SWAT and APEX were weather, hydrology, reservoir/stream dynamics, erosion (wind & water), air quality, carbon, nutrients (N, P), salinity, pesticides, crop/plant growth, tillage, grazing, manure management, and economics. Of these, the important ones, according to Mr. Gerik are weather, soils, crop/land management, and sub-area characteristics.

In the conclusion of his presentation, Mr. Gerik provided a data sheet detailing the differing simulation capabilities of SWAT and APEX. However, he added that these were not to be viewed as the strengths or weaknesses of either model. Instead, they were different ways to simulate different processes, and sometimes even on different scales. He stressed that each model is selected for use depending on the appropriateness of a given situation.

***"Engineering software: Experience with reconciling commercial and open source drivers"***

**Mr. Imre TAKACS**

**CEO of Dynamita, France**

**Member of the Consultative Expert Working Group of HOPE**

Mr. Imre Takacs is an environmental engineer and entrepreneur currently developing process modelling tools in wastewater treatment. His presentation was on SUMO, a wastewater treatment package that he is currently developing. He pointed out important gaps that exist in the models currently in use, gaps that he has endeavoured to close with the SUMO software, guided by the objectives of the HOPE Initiative. In his conclusion, he identified three barriers to access to wastewater treatment software, both within the software and without. He also proposed solutions for removing those barriers.

Mr. Takacs described SUMO as a new commercial model - a new generation of software in the field of wastewater treatment in one important way, and that is, it is placed in between a commercial model, and a free and open source one. The key point is that the professional content is open source and more easily accessible to its intended primary users - engineers.

Mr. Takacs prefaced his presentation with a fuller explanation of wastewater treatment. Wastewater process simulation takes into account that the treatment of wastewater is not only about converting wastewater to clean water, but also entails:

1. The removal of pollutants such as nitrogen and phosphorus, which cause environmental damage when households and industry discharge them into rivers;

2. The retention of valuable nutrients in water; and

3. Working towards technologies that minimize energy use or even potentially generate it.

Mr. Takacs acknowledged that there may, however, be different needs that exist in Africa requiring more robust and basic solutions. These, he said, are still possible with software that addresses the three functions in wastewater treatment he had outlined.

Mr. Takacs also felt that when making software available, it was important to make a distinction between process knowledge and process source code on the one hand, which are important to engineering, and the numerical engine and graphical front end on the other, which are important to computer scientists. To illustrate this distinction, he highlighted one feature of SUMO to make the point that non-computer scientists – engineers – conversant with Excel could simply input data into a spreadsheet in SUMO to obtain the information that they require, in a presentable format.

One of the challenges for the field of specialized software in wastewater treatment that Mr. Takacs identified in his presentation was that in an environment of commercial, free, or free and open source packages, even companies that produce commercial packages typically give discounts of 90-95%, particularly to educational institutions. Additionally, he expressed the opinion that the usability of many open source packages needed to improve if they were to become widespread in use. Finally, because many packages were developed in the US or Europe, they may be missing some of the technology that is of greater relevance to Africa. Mr. Takacs was of the opinion that if software was designed with greater allowance for flexibility, as he intends with SUMO, then those technologies could be easily inserted into the model either by the developers or by users themselves.

Mr. Takacs proceeded to identify several barriers to access that were built into software packages:

1. There have been gaps in knowledge transfer;

2. Open source code can be quite complicated and thus, daunting;

3. Some companies deliberately do not document some of the knowledge or knowhow so as to gain or maintain their market position; and

4. The cost of software, though he concedes that this is not a pressing problem.

Mr. Takacs concluded by re-iterating some of the points he raised throughout his presentation, summed up by the general theme of software accessibility. Specifically, he felt that knowledge transfer was of utmost importance and can be facilitated by conducting training courses, developing manuals containing full, clear and detailed descriptions of code, or by formatting of code that is easy for the user to follow. In other words, open source software needs to and can be made to be easy to use. Finally, developers need to distinguish between the needs of engineers who use the software from their own needs as developers.

## Session 2

**Chairman: Mr. Abou AMANI**

**Programme Specialist for UNESCO Nairobi Regional Office**

***"Open-Source Software from the U.S. Geological Survey for Water-Resources Applications"***

**Mr. Paul BARLOW**

**United States Geological Survey (USGS), Massachusetts, USA**

**Member of the Consultative Expert Working Group of HOPE**

In this session, Mr. Paul Barlow, a specialist in groundwater hydrology and groundwater software, presented an overview of the types of open source software developed by United States Geological Survey (USGS) and made available on the web, as well as those policies governing the use of their software which he feels are useful to the HOPE Initiative. He drew attention to USGS's software that is relevant to groundwater hydrology, with a particular focus on MODFLOW (3D Finite-Difference Groundwater Flow Model). He concluded by identifying the various challenges faced by USGS.

Mr. Barlow began by stating that the water sector is the largest of the seven sectors in the USGS in terms of the funding it received as well as its number of personnel.

After surveying the types of open source software for water resources by USGS, Mr. Barlow noted that, in line with the USGS mission, most software is made available for use in the public interest and for the purposes of the advancement of science. Upon approval for use and distribution by the USGS Director, software is made available on the USGS website. Of particular interest is that USGS software can be used, copied, modified, and distributed without any fee or cost. The source codes of software are simultaneously made available; executable runfiles are typically also provided.

While making disclaimers that exist for the USGS's legitimate protection, Mr. Barlow pointed to user rights, and in particular, that users may charge fees for distribution, as well as warranties and services provided in connection with the software.

Mr. Barlow emphasized that groundwater modelling is an important focus of the USGS. To underline this importance, Mr. Barlow recounted an internal survey by the USGS last year pointing to over 200 groundwater projects underway, mostly in the US. The types of groundwater software fall into the following categories:

1. Groundwater Flow, Transport, and Geochemical Reactions, including Groundwater/Surface-water interactions;

2. Variably-Saturated Flow and Transport;

3. Hydrograph-Separation and other Streamflow-Based Programs; and

4. Analysis of Aquifer Tests and Slug Tests.

Among the more popular USGS groundwater software available on their website are MODFLOW, initially released in 1984, and related programs such as MODFLOW-2005, MODFLOW-NWT, MODFLOW-USG – developed in collaboration with consultants in the private sector – and MODPATH. Mr. Barlow added that MODFLOW is no longer only used to look at groundwater flow, but to simulate several other processes. MODFLOW is now widely used by the groundwater community.

Mr. Barlow provided a brief explanation of the typical distribution format for groundwater models, and then made some groundwater links to USGS surface-water models.

In concluding, Mr. Barlow identified four challenges to the USGS software development and distribution program, specifically that:

1. Limits on personnel time and funding can sometimes affect the amount of time that can be spent on software enhancements and bug fixes, user support, and training;

2. Legacy codes developed by researchers who have since retired can be difficult to maintain if there are no current USGS scientists who are familiar with the code;

3. Some software languages are not widely used; maintaining code written in those languages can be difficult. In addition, the USGS sometimes does not have the expertise or time to assist users to compile USGS software on their specific systems; and finally that,

4. The USGS cannot control the misuse of its software.

***"Environmental Protection Agency (EPA) Research Data and Software"***

**Mr. Rao Y. SURAMPALLI**

**United States Environmental Protection Agency (USEPA), USA**

**Member of the Consultative Expert Working Group of HOPE**

Mr. Rao Surampalli began by identifying the premise of his presentation, captured in EPA's mission statement, that is, to protect human health and environment. Specifically in relation to this conference, Mr. Surampalli reasoned that the context for the HOPE Initiative was sustainable water resources management, and that it included both water quality, as well as water quantity for various uses such as drinking, industry and such like. The question for this conference is what software is to be used – and made available – for the various uses of water. Both the identified premise and context are reflected in the EPA's research mission, which is to conduct leading edge research and foster the sound use of science and technology so as to fulfil EPA's primary mission of the protection of human health and the environment. He then highlighted a comprehensive list of the most important free software made available by the EPA on its website.

Mr. Surampalli began his presentation by providing an overview of the structure of the EPA, the relationship between the federal agency and its 10 regional and state offices, as well as their roles, specific jurisdictions and functions.

Water research is one of the biggest and most important research areas in the EPA. Mr. Surampalli emphasized that the EPA's research activities were underpinned by the question of the sustainability of solutions that were being sought, primarily their economic viability, acceptance by the people, and their ecological and environmental credibility.

After outlining the various research areas that the EPA offices, laboratories and centres are engaged in, and the various software that they have developed and made available, Mr. Surampalli narrowed in on the most important related software, namely in the areas of:

- Drinking water;
- Groundwater;
- Surface water: Estuaries, lakes, oceans, and rivers;
- Wastewater: Publicly owned treatment works and water pollution;
- Water pollution: Point sources of water pollution;
- Watersheds.

Mr. Surampalli proceeded to provide specific examples of software in the areas listed above.

In conjunction with water research, and as an additional measure that the EPA has undertaken to ensure the sustainability of safe water supply, Mr. Surampalli touched briefly on his agency's mandate in homeland security research, specifically the threat to water safety.

Mr. Surampalli concluded his presentation by re-stating that the EPA has research data that it has accumulated over a period of 30-35 years; useful monitoring data collated on a day to day basis that can be used as background data; free software, as well as some source code, including many that he had not presented.

***"Treatment software – WRc's STOAT and Techneau's SimEau"***

**Mr. Jeremy DUDLEY**

**Water Research Centre (WRc)**

**Member of the Consultative Expert Working Group of HOPE**

Mr. Jeremy Dudley began his presentation with an outline of the evolution of WRc over its 85-year history. He then shared information about two available open-source software programs for wastewater treatment, while briefly discussing some of the limitations of open-source and commercial packages. He introduced the free software programs of

the Water Research Centre (WRc) for wastewater and clean water treatment, STOAT (Dynamic Modelling of Wastewater Treatment Plants) and SimEau (European Water Treatment Simulator). He provided a brief analysis of the take-up of these programs in Africa and shared his thoughts about the needs of Africa. He rounded off his discussion with an expression of his hopes for HOPE.

Mr. Dudley traced the evolution of WRc from a government-owned company when established 85 years ago, to a private company providing innovative water, waste and environmental consultancy today. It focuses on research for the privatized water companies in the United Kingdom (UK). The WRc team provides consultancy and research services to support water industry, regulators, government and technology developers. Its services include:

- Wastewater and Sludge Treatment;
- Resource Management;
- Sewerage Operations;
- Carbon Accounting;
- Energy Efficiency;
- Odour Management;
- Technology Development and Instrumentation.

He described two available free and/or open source packages for wastewater treatment: SeTS and Modelica Wastewater Library. According to him, SeTS is not user-friendly, not supported and now,

not even available on the web. Modelica is offered as an expensive commercial software package, but it also comes in a free version. FOSS packages are often not user-friendly, and he believes this explains why people turn to commercial packages that have longer, proven histories.

Commercial software packages often claim to be open-source, but what they mean is that one can change the actual kinetic models - that is, add a new reaction scheme - but one cannot generally add a genuinely new treatment process or hydraulic change. Furthermore, users have to pay the vendors for customization of changes. In addition, to preserve their commercial secrets, many of the commercial models may not document what their models do in open literature.

Both WRc's software offerings, STOAT and SimEau are free but not open-source packages. Both programmes, however, allow new process models to be added at the source code level, provided they make use of the water quality parameters that are currently represented. The implication to be highlighted here is that changes more appropriate for African conditions can be added to the program. However, Mr. Dudley has found that this is not as easily achieved as it may sound. He identified a critical shortage of skills in the area of mathematical modelling and the engineering skills to adapt a program for its needs. This, he said, is not about a limitation of tools but a limitation of personnel.

Mr. Dudley described the two free software packages offered by WRc. STOAT is a free wastewater treatment software package. It supports most major sewage treatment processes. It has also been validated in ring tests done in activated sludge models. This programme includes a correction for temperatures of up to 40°C. It has been used in the hot climate countries of Malaysia, Singapore and the United Arab Emirates. While he is not aware of results on STOAT published for Africa, the basic model, the Activated Sludge Model N°1 (ASM1), has been used widely, certainly in South Africa, so it would appear that the underlying mathematical models have been validated and used at least in South Africa.

SimEau is the clean, or drinking, water treatment modelling programme, available as a free download. It was developed in collaboration with the Technical University of Delft, with part funding from the European Union (EU) Fifth Framework project, Techneau. It has an open framework, intended for users to utilize anything of interest to them to add to their software. With a standard Graphical User Interface (GUI) system, it is a user-friendly system. It is used more as an academic than an engineering tool.

Mr. Dudley responded to the concerns raised at the kick-off meeting of software packages that need to be adaptable to African needs. He acknowledged that there is a vast range of conditions: climatic, vegetation, population, and water resources in Africa and suggested that there is a need for different technologies for the water sector for different locations.

In conclusion, Mr. Dudley outlined WRc's hopes for the HOPE Initiative. He hoped that:

1. With the availability of tools, there will be better provision of cost-effective clean water and wastewater treatment for Africa;

2. There will be availability of modelling tools to allow improvements in provision;

3. SimEau will be taken over by African engineers to provide appropriate water treatment process models for Africa;

4. STOAT will provide better support for African treatment systems; and

5. There will be open user-added models for new treatment systems.

In response to a question on whether WRc would consider a capacity building partnership, perhaps with HOPE, in the training of African engineers in the use of the software, he shared that WRC offers its own training course in the UK as a commercial offering, but outside of the UK, where the expense of course provision is less affordable, WRc has offered its training notes to interested parties to run their own training course.

***"The Nile Basin Decision Support System: A Software Framework for Water Resources Management"***

**Mr. Abdulkarim HUSSEIN SEID**

**Nile Basin Initiative Secretariat (Nile-Sec), Uganda**

**Member of the Consultative Expert Working Group of HOPE**


In his presentation, Mr. Abdulkarim Hussein Seid briefly described the geography of the Nile, as well as provided a comprehensive overview of the software architecture and key features of the Decision Support System and the Water Resources Planning and Management Software Programme developed to support cooperation among the 11 riparian States sharing the Nile River. Further, he described the hybrid licensing arrangements that enabled both proprietorial and community-owned open-source software to be used and expanded to responsively meet the needs of the many stakeholders along the Basin. He concluded with a note on the relevance of the Nile Basin Decision Support System to HOPE.

The Nile is the longest rivers on the planet. Making up about 10% of the land area of the African continent, it is shared by 11 countries. The Nile Basin Initiative (NBI) was formed in 1999 with the vision: "To achieve sustainable socio-economic development through equitable utilization and, benefit from, the common Nile Basin water resources". Many water management programmes have been

implemented over the years. Mr. Hussein Seid presented on the centerpiece Decision Support System (DSS) - a common, computer-based platform for communication, information management, and analysis of Nile Basin water resources. Expanding on this, he explained that coupled with human resources development and institutional strengthening, the DSS will provide a framework for sharing knowledge, understanding river system behaviour, evaluating alternative development and management schemes, and supporting informed decision making from a regional perspective.

The DSS is conceived as a water resources software framework jointly developed by Nile Basin riparian states. It is an elaborate model of water management with a comprehensive analytical framework, integrating the following three components in an user-friendly GUI:

- Information management system (database, Geographic Information System (GIS), data processing tools for example);
- Water Resources Modelling system; and
- Analytic tools (optimization, benefit-cost analysis, multi-criteria analysis for example).

Collaborative development and learning is enabled by major tools in the DSS, including the Model Linking and Nesting Tool, Indicator Tool, Multi-Criteria Analysis Tool and Scenario Management Tool. The latter is considered an especially powerful, value-add feature in

that it enables users to create different types of scenarios, involving infrastructure (such as the building of a dam), operations scenarios and management scenarios to help with water management decision-making. Users also have the flexibility to add and exchange scripts, create and add modules, test new approaches, link-up models across teams, and add new modelling software – without affecting the core of the DSS.

Mr. Hussein Seid emphasized the key features of the DSS. It is a generic system that can be applied at different scales and in any river basin. A flexible architecture allows users to expand DSS. All user added modules belong to the community.

The development of the Nile Basin DSS involved many partners. Each of the cooperating partners of the NBI has specific roles and responsibilities. For example, the Nile Basin States identify requirements for the DSS and review and approve design; the World Bank is the administrator of the multi-donor Nile Basin Trust Fund and is responsible for procurement support and technical advice, the Danish Hydrological Institute (DHI) is the main holder of the Intellectual Property Rights of the DSS and is responsible for system development and testing, as well as training and finally, Aurecon, a South African company that had participated in building applications for case studies.

Software licensing for the DSS is a hybrid arrangement. The DHI and the NBI Secretariat have a license agreement. In turn, the Nile Basin Initiative Secretariat (Nile-Sec) has distributed and is in the

process of completing distribution of most of the original 150 licenses to Nile Basin States. Because of the expansion of interest and need, the Nile-Sec is in the process of acquiring an additional 300 licenses and introducing two public domain modelling tools to the DSS.

Among its many roles, the Nile-Sec as the custodian of Nile Basin DSS also provides technical support and manages all community activities, including Helpdesk functions and user training.

In conclusion, Mr. Hussein Seid shared his thoughts on the relevance of the NBI DSS to the HOPE Initiative. He said that the DSS already shares in the HOPE vision and believed that it is implementing some part of it through the promotion of “relatively” free software systems in water management in Africa.

***"Global Groundwater Information System (GGIS): A groundwater solution to HOPE"***

**Ms. Laura DEL VAL ALONSO**

**International Groundwater Resource Assessment Centre (IGRAC)**

**Member of the Consultative Expert Working Group of HOPE**

The focus of Ms. del Val Alonso's presentation was the GGIS – the only initiative to systematically collect groundwater data globally. She explained the rationale for why groundwater, as a strategic resource, needs to occupy a more visible position on global agendas and the rationale for the GGIS platform. She proceeded with a description of its components, functionalities, key features and the project's future activities. The presentation concluded with a proposal of how the GGIS can contribute to HOPE.

Ms. del Val Alonso provided a brief description of IGRAC and its mandate. IGRAC is the groundwater centre of UNESCO. Its mission is to facilitate global groundwater knowledge exchange and dissemination. She identified regional assessment of groundwater resources as one of its main activities, and the development of on-line tools to facilitate this process as the backbone of its mandate.

She drew attention to the multiple impacts on groundwater as a strategic resource resulting mostly from global and not just climate

change effects: reduced recharge, seawater intrusion into aquifers, contraction of freshwater lenses on small islands and the increased demands from population growth, such as food demand and land use change. She highlighted the critical importance of groundwater data gathering as a necessity for the assessment of the current state of groundwater resources and for a reliable prediction of its change in the future. Mapping of this important resource on a regional and global scale, as part of the assessment, is the first step towards informed resources management and development of climate change adaptation strategies.

The GGIS was developed for this express purpose. In a stark articulation, Ms. del Val Alonso identified the premise of the project as, “we cannot manage what we do not measure”. Described as an interactive and transparent portal, the GIS-based GGIS makes available to the groundwater community, information to support decisions on groundwater management. The objective of this programme is to produce relevant, accessible and understandable information to assess quantitative status and facilitate management of risks affecting global groundwater resources.

The GGIS platform is made up of three components:

1. Global Overview: Information about groundwater resources at country level;

2. Meta Information Module: Tool to search documents, organizations, people, by region / country;

3. Global Monitoring Network: Tool allowing countries to engage and upload groundwater monitoring data and proxy data like precipitation.

The GGIS is a public view system, intended for various categories of stakeholders, including both professionals and the general public. It is free though not open source software. The GGIS is simple to use and completely publicly accessible. Ms. del Val Alonso expressed the opinion that these features make the GGIS an ideal complement to HOPE's agenda in the groundwater area.

Ms. del Val Alonso shared future plans of the GGIS. These include the merger of the three components into a more powerful application. Other developments in the immediate future include partnerships with two global projects to assess transboundary groundwater resources – the Global Environmental Facility (GEF) - Funded Transboundary Waters Assessment Program (TWAP) and the Transboundary Assessment Governance. The derived synergies from these initiatives will boost the capabilities of the GGIS, especially content-wise, without sacrificing the core principles of being a GIS-based, on-line portal, while promoting flexibility and participatory engagement by countries who share in the ownership of the data and the success of the project. It will allow for searches and comparisons by parameters, variables, indicators and monitoring data between country and aquifer. Other plans include an extension of its web-based services for data-ready countries.

Ms. del Val Alonso outlined several reasons why the GGIS is a strong and compatible partner to HOPE. She mentioned that the GGIS is already present in Africa, where it has conducted two training workshops on the use of the system to the Intergovernmental Authority on Development (IGAD) and the SADC region countries. It provides complementary software to the HOPE kit, a central database for the collection and management of scarce groundwater data, especially relevant for countries without online GIS-based groundwater data portals. Countries own the data, deciding if they update, upload or make the data online and accessible. As a knowledge-sharing platform, it provides incentive for regional cooperation. Finally, IGRAC's commitment guarantees long-term sustainability of the GGIS.

In conclusion, Ms. del Val Alonso conveyed a message, a recommendation from the recent Bonn Declaration on Global Water Security – "Expand monitoring, through traditional land-based environmental observation networks and state-of-the-art earth-observation satellite systems, to provide detailed observations of water system state", noting that this is a challenge not only in Africa but globally.

***"Quality Assurance in Open Source: Building Trust Through Certification and Accreditation"***

**Mr. Cicero BLEY Jr.**

**Regional Energy Superintendent of ITAIPU Binacional**

**Coordinator of Hydroinformatics International Centre (CIH), Itaipu**


Mr. Cicero Bley gave a brief overview of the Hydroinformatics International Centre (CIH), its major focal areas, its platform for the development of FOSS in Freshwater Management, specifically the technologies and tools used, and its capacity building through training and accreditation.

The CIH was established six years ago, a collaboration between UNESCO and the IHP to develop FOSS in freshwater management. It is sponsored by a network of stakeholders, including the governments of Brazil and Paraguay, ITAIPU Binacional – a power generation plant located between Brazil and Paraguay, the National Commissions of IHP of Brazil and Paraguay, the Itaipu Technological Park Foundation, and the Latin American and Caribbean Regional Office. It is located in the Itaipu Technological Park, cohabiting with universities and centres of reference on water.

Mr. Bley described the CIH team as being made up multi-sectoral specialists, hydrologists and GIS Experts who work on the

development of IT tools in four areas of Water and Territorial Management:

- Water and Technology;
- Water and Management;
- Water and Energy;
- Water and Community.

The Centre is primarily engaged in two areas of Water Management:

1. Watershed Management – According to Mr. Bley, FOSS is especially suited for use in this area because of the low cost tools it provides. He suggested that there is no need for expensive, commercial software in this area; commonly available software, such as Google Maps, can be just as effective. Specialized software can then be layered in, providing the advantages of detail as needed and allowing for an analysis that moves from global to local and vice versa.
2. Hydrology Modelling – More developed software, even open source software, would be more appropriate to obtain desired results for modelling. CIH has developed a model of Itaipu that allows one to view all the basin and reservoirs to allow for scenario modelling.

Mr. Bley described the main areas of technology development in the CIH as consisting of applications, map services, databases. Specific

tools include relational/geospatial database, geo-referenced maps, FOSS and free cartography.

Working from a sustainable resource management approach, Mr. Bley highlighted a few of CIH's notable areas of engagement:

1. Renewable Energy – The CIH has created open source software for the development of different forms of renewable energy. These include the Biogas Geographic Information System (SIGBiogas), Information System for Renewable Energy (SIGER) in Latin America and Caribbean and the Renewable Energy Management System (GER).
2. Energy forests - Mr. Bley expressed a strong commitment to energy forests. Because of the high deforestation rates in Brazil in recent decades, the CIH has proposed a decentralized approach to forest management to the Brazilian government. It has introduced forest modelling in the region, based on GIS and open source software, to promote the growth of new eucalyptus forests.
3. Agriculture - In land use, the CIH has developed open source software for a No-Till Simulator for quality assurance.
4. Social Movements – The CIH has engaged with the National Register of Recyclables Materials Pickers, developing one special product for them (pickers being among some of the most economically disadvantaged people in the country). The CIH has also assisted in land claims of small farmers.

Finally, Mr, Bley highlighted the CIH's capacity building program that provides certification and accreditation and its commitment to

providing quality assurance in training. It runs courses in universities, including e-learning courses. Courses include Territorial Management for Water and FOSS, Energy Biogas, Renewable Energy, and Watershed Management. It also runs a popular Web Radio for the diffusion of knowledge.

**"Creative Commons - *Open Future of Sharing"***
**Mr. Alex GAKURU**
**Regional Coordinator of Africa - Creative Commons**
**Member of the Consultative Expert Working Group of HOPE**

Mr. Alex Gakuru is deeply committed to the Free and/or Open Source Software culture, and is a member of the Free and Open Source Software Foundation for Africa (FOSSFA). In his presentation, he highlighted the legal issue of Intellectual Property, specifically the three areas of Copyright Licensing. He advanced the view that culturally, Africa has always had a unique balance between private property and commons or public property. He provided a case study to illustrate how this cultural facet continues to influence the legal sphere, including laws on water resources. He identified a few developments in FOSS and their impact on work and business models. His presentation concluded with a brief description of Creative Commons – its mission and its licenses.

Mr. Gakuru began his presentation with an acknowledgement of UNESCO as a pioneer of convergence of domains, including science and culture as well as open resources. He proceeded to highlight a feature of African culture - the unique balance between private property and commons or public property, with public property taking precedence over private property. As he phrased it, “Culture intervened against individualistic extremism”. The Kenya Water Act or the constitution of the Kenya Water Institute reflects these influences. The Institute uses over twenty software programs, a combination of FOSS and proprietary software, through development partnerships and as part of an evolving ecosystem. He suggested that HOPE might have an interest in the Institute as a case study of an older cultural reality intersecting with the modern legal regime of Intellectual Property.

Mr.Gakuru’s presentation focused on Intellectual Property, specifically copyright in these three areas:

- Computer code copyright;
- Multi-media/content copyright; and
- Computerized Data copyright.

He drew attention to the perception that copyrights are less a reward for the actual creator than deterrence from use of resources, or if used, done so at risk. Among the general public, there appears to be a greater awareness of restrictions rather than the permissions of copyright.

He also presented these common considerations for choice of licenses:

- Who do you want to use the material, and when?;
- Are you choosing the right license?;
- Do you have the rights to license the material? Are you using anyone else's material?;
- Are you sure? You cannot change your mind (or not easily).

Against the backdrop of a legalistic focus on copyright restrictions, digital technologies are revolutionizing the way creative works are made, distributed and used. The value of accessible material and collaborative learning and developing is receiving greater appreciation. In the space between the extremes of the "All Rights Reserved" and "Public Domain" spectrum, Creative Commons has created a licensing intervention.

Mr. Gakuru proceeded to profile Creative Commons. The organization provides resources that anyone can legally copy, modify and reuse. It has helped grow a public commons of knowledge and culture. It also provides an online tool for managing one's copyright. Its vision is nothing less than realizing the full potential of the Internet and stems from the realization of two universal human rights:

1. "Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without

interference to seek, receive and impart information and ideas through any media and regardless of frontiers." Article 19, Universal Declaration of Human Rights

2. (1) "Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits." (2) "Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author." Article 27, Universal Declaration of Human Rights

Creative Commons provides a choice of four license elements that can be utilized in any combination. These represent restrictions that copyright owners may want to put on how people can use their material:

- Attribution – Credit the author;
- Noncommercial – No commercial use;
- No Derivative Works – No remixing;
- ShareAlike – Remix only if you let others remix.

He also added that Creative Commons is not:

- Anti-copyright – It is another rights management tool;
- The public domain – It just gives certain permissions in advance;

- Anti-commercial – Some material can be used commercially, for example one can charge for “premium” services or embedded advertising; and finally;
- Right for every situation – It is entirely voluntary, and may not be best solution for all creators.

In conclusion, Mr. Gakuru expressed the desire for HOPE to provide the interface between culture and science. His desire for Free and FOSS in hydrology is to enhance the following features for Africa as part of an evolving reality:

- Commons Property with Free Use Rights/Licenses;
- Special Rights grant commercial use NOT ownership;
- Collective Resource Development Processes;
- Collective Benefit/Reward Schemes–“Cost Recovery”;
- Opportunities for Innovative New Business Models.

# PART C

# LAUNCH OF HOPE

# MINUTES OF MEETINGS

United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

# HOPE - INITIATIVE

## LAUNCH OF HOPE - MINUTES OF MEETINGS

**JUNE 25-27, 2013**

**UNESCO**

# CONTENTS

# C.1. MINUTES OF MEETING OF STEERING COMMITTEE (SC), JUNE 25, 2013

**Date:** June 25, 2013

**Time:** 09h30 – 17h00

**Place:** UNESCO Paris – Fontenoy

**Chairpersons:** Ms. Lucilla MINELLI (International Hydrological Programme [IHP] UNESCO) / Mr. Youssef FILALI-MEKNASSI (Science Programme Specialist for UNESCO Windhoek Cluster Office)

**Attendees:**

- Mr. Bai-Mass TAAL, Executive Secretary - African Ministers' Council on Water (AMCOW)
- Mr. Olusanjo SANJO BAMGBOYE, Regional Centre for Integrated River Basin Management (RC-IRBM) / Africa Water Resources Capacity Building Programme (AwacaB)
- Mr. Nico ELEMA, Programme Manager - NEPAD Southern African Network of Water Centres of Excellence (NEPAD SANWATCE)
- Mr. Stephen DONKOR, former United Nations Economic Commission for Africa (UNECA)
- Ms. Gretchen KALONJI, Assistant Director-General of Natural Sciences - UNESCO

- Mr. Ernesto FERNANDEZ-POLCUCH, Programme Specialist for UNESCO Montevideo Regional Office
- Mr. Davide STORTI, Communications Sector - UNESCO
- Ms. Lucilla MINELLI, IHP UNESCO
- Mr. Damas Alfred MASHAURI, Polytechnic of Namibia (PON) (Observer)
- Ms. Lidia BRITO, Director of Science Policy and Capacity Building Division -UNESCO

## C.1.1. WELCOME

1.1 The Chair, Ms. Lucilla Minelli, welcomed every member, thanking them for making themselves available for the inaugural meeting of the Steering Committee (SC) of the UNESCO HOPE Initiative. She also extended a welcome to Ms Gretchen Kalonji, Assistant Director-General of Natural Sciences (UNESCO) to the meeting.

1.2 Ms. Kalonji, formally welcomed every SC member and expressed her gratitude to them for taking time out of their busy schedules to be present for this and the open meeting the next day, as well as for their involvement in a very exciting initiative – HOPE. In her introduction, she expressed the view that water is an area of strength for UNESCO. She also outlined three important components of HOPE: i) marshalling all its extended networks in the field of water management such as the 25 water Centres around the

world, UNESCO Water Chairs, IHE, IHP and mobilize the network even more effectively; ii) being active in the Open Source movement; and iii) a component that UNESCO takes very seriously - Priority Africa, that along with Priority Gender Equality, the two overarching objectives of UNESCO meet in this initiative. A further advantage is that the initiative enables cross-sectoral collaboration with UNESCO colleagues in Communications and Information. She expressed her desire both to learn more and lend support to the Committee's work in the greatest way possible.

### C.1.2. REPORT BY CHAIR

*Highlights*

3.1 To a question from Ms. Kalonji, the Chair provided some background to the launch of the program, explaining that while the initiative was approved for the biennium of 2012-2013 to begin in June, 2013, this was the first meeting of the SC of HOPE, mainly because funding was received in December 2012.

3.2 However, discussions on the initiative began earlier in 2012. A webpage was developed and has been ready since September 2012.

3.3 A meeting had originally been planned for May but the period being a busy one for members who teach in universities and so could not be available, a further short delay resulted and the inaugural meeting was postponed to June, 2013 at a time when all members indicated their availability.

3.4 The Chair highlighted that HOPE does not have a vision in itself but as with all water projects in Africa, will contribute to the Africa Water Vision for 2025.

3.5 Four outputs for the project were set up:

3.5.1 Appropriate platform (HOPE) infrastructures and/or facilities for hosting Free and Free and Open Source Software (FOSS) for water management are in place, operational, well-maintained and their correct use actively promoted [Hardware];

3.5.2 Policies, procedures, rules and regulations for the development, contribution/selection and acceptance, maintenance and use of Free and FOSS for water management;

Plus: A collection of suitable Free and FOSS for water management is in place and actively promoted [Software];

3.5.3 People in the water sector in Africa have increased awareness, knowledge and skills in the use of Free and FOSS for water management [Human ware]; and

3.5.4 The HOPE Initiative is efficiently and effectively managed [Management].

3.6 The agenda of this meeting is for the committee to discuss and adopt the Terms of Reference (ToRs) of the SC and to begin the review of the ToRs of the Consultative Expert Working Group

(CEWG) that will meet on June 27th. A proposal for the selection of software will also be presented at the meeting for the SC's input before submission to the CEWG on June 27th.

3.7 June 26th is the official launch date of the HOPE Initiative. Several meetings have already taken place in Africa and in the world, to publicize and sensitize people to the initiative.

3.8 A document in the program highlights activities for the HOPE program, including one major deliverable for the end of this year.

3.9 The objective for this year is to have people agree on a kit for the end of the year as a pilot project.

3.10 Financial Status – The total Budget for the three phases is US$300,000.

3.10.1 US$130,000 was released through the UNESCO Emergency Fund for Phase 1.

3.10.2 US$20,000 was spent on the HOPE Ambassadors program. This initiative engaged certain professors in Africa and in some other countries attending important meetings in the water sector to promote the HOPE Initiative in their presentations. Five ambassadors were selected. One of the program outputs is a presentation delivery.

3.10.3 The three-day meeting from June 25-27 cost approximately US$40,000. Most of the communications, such as the webpage, etc., were prepared at UNESCO for "free".

3.10.4 The remaining balance of approximately US$45-50,000 is for use up to the end of 2013, primarily for setting up a HOPE Free and FOSS kit.

## C.1.3. QUESTIONS

4.1 A broad question was asked about the role of the SC members in setting up a Platform of Experts, particularly the role of the role of a non-technical, policy person in the SC. Further, the question was raised of HOPE's tie-in to policy and the specific tools that will be developed to yield policy. Other questions were raised on general features of Free and FOSS and HOPE that will assist SC members to make active contributions.

4.2 The questions generated an animated discussion. In addition to directly addressing questions raised, some members shared their perceptions of their roles, their knowledge and understanding of the advantages and disadvantages of Free and FOSS, as well as its potential for human development in Africa. Responses are organized along themes and summarized here.

*Policy-Relevance*

4.2.1 An United Nations Conference on Trade and Development - World Information Technical and Services Alliance (UNCTAD-WITSA) study identified that the FOSS industry has not developed in Africa to the same extent as in other parts of the world. The study identifies lack of government procurement in FOSS as a barrier – a policy

issue. Africa is lagging in policy development for the promotion of FOSS for the public sector.

4.2.2 HOPE is a whole-package solution that brings together other UNESCO program elements such as Technical and Vocational Education and Training (TVET), capacity building, the HOPE kit, so as to foster job creation.

4.2.3 AMCOW and African Ministerial Council on Science and Technology (AMCOST) had made a decision several years ago to place Centres of Water Excellence in universities. Part of the mandate of the universities is to understand water issues better and provide policy responses. Members can have a role in integrating water issues with Free and FOSS through such centres.

4.2.4 Free and FOSS provides opportunities for the younger generation in occupational areas such as programming, engineering, injecting local adaptation and software development.

4.2.5 Students can be motivated not just to use but to create software.

4.2.6 HOPE provides the opportunity to involve the young Information Technology (IT) community in Africa in the water sector.

4.2.7 To have accurate information is the first level of water management. Free and FOSS can facilitate the move from

policy to field more easily, finding ways to leapfrog development, e.g. in Congo, one cannot directly monitor all water stations but can use satellite technology to obtain and calibrate information.

4.2.8 HOPE can address water management issues beyond hydrology, such as processes.

4.2.9 Water management has a strong research component. It allows for the formation of a community for the use and localization of FOSS for indigenous solutions.

4.2.10 HOPE addresses a series of nested challenges: water, youth involved in coding, and ability to code opening doors to university / work in universities in the water domain. HOPE allows for a broader role to unleash the capacity of youth to code, become entrepreneurial and put it in education. It is being strategic about water.

4.2.11 Most hydrological programs come to a halt because of software issues. HOPE can help address the systemic weakness of cost constraint, itself a policy issue.

*Members' Roles*

4.2.12 One member suggested that members can ask how they can support an initiative like HOPE in their roles outside of this program. One is to promote the value of HOPE wherever they can through their interactions.

4.2.13 Water is the first area of integration with Free and FOSS. HOPE relies on existing structures and institutions within Africa for integration and promotion.

*HOPE / Free and FOSS Features and Developments*

4.2.14 FOSS provides legal rights to use, adapt and redistribute the software. One major benefit lies in learning how these software work. In FOSS, users do not only use Apps but have access to source code that will allow modification of the software, possibly creating new Apps that better fit their needs. It builds capacity for coding.

4.2.15 Free is not free of cost but rather, it is an investment made with freedom.

4.2.16 With FOSS, one pays for service, not for the license. Financial investment comes in the support, training and customization of software.

4.2.17 There was recognition that FOSS is a powerful tool. The key in FOSS is “freedom”. One can have both Microsoft and Ubuntu on the same computer.

4.2.18 When governments require modification for software procured from proprietary vendor, they have no choice but to go back to the vendor. FOSS provides for a diversity of supplier services and offer governments choice of vendors, who may compare and work on solutions from source code. It raises the possibility of more and even better solutions from

vendors. Governments are not bound to one vendor as with proprietary software usage.

4.2.19 Unlike with proprietary software where one may be forced to upgrade to higher versions, FOSS is updated as one uses it. There is no need to re-purchase the product.

4.2.20 There is a lot of untapped indigenous knowledge on Water in Africa. The common software in the market does not engage this knowledge. FOSS can allow for local applications.

4.2.21 Free and FOSS can provide more alternatives for water solutions.

4.2.22 FOSS can allow for adaptation to different languages, even local ones.

4.2.23 The strength of FOSS lies in community – it is a community of both users and developers. Unlike with proprietary software where only one entity reviews the software, with FOSS a whole community reviews it critically and shapes it.

4.2.24 Free and FOSS allows for greater diffusion of technology.

4.2.25 FOSS gives visibility to community and software. It creates and strengthens the virtuous cycle of software development and usage.

4.2.26 FOSS was described as a “kinder” technology.

4.2.27 At the government level, it is not always easy to verify security of information in a reliable manner because of the single vendor scenario. With FOSS, governments can go to more than one vendor for verification of security.

4.2.28 FOSS provides for freedom in that it levels the playing field, providing real opportunity for choice.

4.2.29 There is a clear view of standards with FOSS. Users can visibly link input to outputs. In addition, they can develop new ways of linking inputs or link different components.

4.2.30 HOPE provides opportunities for use for both the water specialist and the IT specialist.

4.2.31 One challenge to FOSS adoption was highlighted – resistance to change. Billions of dollars have been pumped into proprietary software. People doubt the value of a good if free, believing they pay for convenience and support.

4.2.32 A UNESCO label on a Free and FOSS kit can help overcome this resistance.

4.2.33 HOPE Platform of Experts enables people who want to join to do so; it does not exclude the proprietary software industry.

4.2.34 Hardware imposes less and less of a constraint in the adoption of software. Cross-platform frameworks are constantly evolving, enabling the development of codes across

different devices. It is also in the competitive interest of vendors to be able to develop software across platforms. As an example, Open Source software can run on Windows.

4.2.35 There is interest in providing Free and FOSS to the HOPE program from a large vendor based in the Netherlands. The Vendor will provide services.

4.2.36 Except for wastewater management, FOSS is available for all other fields of water management. These applications are not well-known.

5. Terms of Reference (ToRs) of the SC

5.1 The ToRs for the SC were reviewed and adopted (see Annex 4), after some discussion.

5.2 The Committee felt it was important to add a new item to the mandate, namely, “Stimulating IT entrepreneurship for R&D of water management tools based on FOSS solutions.”

5.3 The Committee also fine-tuned the Specific Activities of its ToRs to state that it would: i) identify priorities for resource allocation within the initiative; ii) pursue opportunities to secure adequate funding for the implementation of the initiative; and iii) provide guidance to achieve the sustainability of the initiative.

5.4 Members also agreed that to preserve institutional memory, a term rotation of membership of the committee should retain at least 50% of previous membership.

5.5 It was clarified that quorum would be established by 50% plus 1 of the attendees.

6. Terms of Reference of the CEWG

6.1 The ToRs of the CEWG was reviewed by the SC and referred to the CEWG for final approval and adoption following a lengthy discussion and a few amendments.

6.2 An amendment was introduced to identify the CEWG ToRs document as being “utilized” by the CEWG. It can propose amendments but the Committee does not own or maintain the document.

6.3 The CEWG’s role is identified as serving “as a technical advisory board that counsels and informs the SC on the implementation of the HOPE Initiative.” (Note: Please see Minutes of CEWG Meeting for clarification of this relationship. The CEWG will provide information on a continual basis and provide advice when it is sought.)

6.4 This item was also added under Role – “The CEWG provides alternative ideas to the commercial specialized engineering software in the field of hydrology.” (Note: Please see Minutes of the Meeting of the CEWG Meeting for that committee’s clarification of the phrase.)

6.5 The CEWG’s Mandate was refined with the following additions (in italics). “The CEWG will provide the technical and scientific assistance and guidance necessary to the development and

implementation of an action plan related to the use of Free and FOSS that can assist water authorities, teachers, university lecturers and researchers, young IT entrepreneurs, among other stakeholders in Africa, to elaborate on water management models."

6.6 The core mandate of the CEWG was identified as two-fold: i) Advise the SC through the UNESCO-HOPE Secretariat on specified activities, and ii) Work with and support the UNESCO-HOPE Secretariat in delivering specified outputs.

6.7 In terms of composition, an amendment made explicit the following change - the CEWG will consist of 16 members, reflecting the experience and expertise to address the challenges set out in the Africa Water Vision for 2025. Further, in order to address issues, the Chair may establish task teams or sub-working groups whose membership is not limited to CEWG members.

6.8 Renewal of membership is subject to a collegial decision taken by the SC and is not to exceed two terms.

6.9 Yet another amendment allowed for membership of the CEWG to be held by both organizations and individuals.

6.10 Nominations of new CEWG members shall be compiled by the HOPE Secretariat and forwarded to the SC.

6.11 The Chair of the CEWG is also an ex-officio member of the SC, whose mandate includes working with the UNESCO-HOPE Secretariat in setting the agenda, convening statutory meetings,

ensuring their proper conduct and reporting the CEWG's recommendations to the SC.

6.12 A CEWG meeting will be valid with a quorum of two-thirds of its members. Quorum for decisions was identified as 50% of the attendees, plus 1 member.

7. Selection of Software

7.1 An initial review of the ToRs for the Selection of Software held.

7.2 SC members felt that this document properly falls under the purview of the CEWG. That said, members of the SC will review the document and provide further, individual feedback via email to the UNESCO HOPE Secretariat.

The meeting ended at 18h30

Minutes Taken By Faviola FERNANDEZ (Conference Rapporteur)

Paris, June 25, 2013

# C.2. MINUTES OF MEETING OF THE CONSULTATIVE EXPERT WORKING GROUP (CEWG), JUNE 27, 2013

**Date:** June 27, 2013

**Time:** 09h30 – 14h00

**Place:** UNESCO Paris – Fontenoy

**Facilitators:** Ms. Lena SALAME (Water Sciences Division - UNESCO) and Mr. Davide STORTI (Communications and Information Sector - UNESCO)

**Attendees:**

- Mr. Youssef FILALI-MEKNASSI, Science Programme Specialist - UNESCO Windhoek Cluster office
- Mr. Abdulkarim HUSSEIN SEID, Nile Basin Initiative Secretariat (Nile-Sec), Uganda
- Mr. Paul BARLOW, United States Geological Survey (USGS), Massachusetts, USA
- Mr. Cicero BLEY Jr., Coordinator of Hydroinformatics International Centre (CIH), Itaipu
- Ms. Yvonne BONZI, University of Ouagadougou-Burkina Faso
- Mr. Jeremy Dudley, Water Research Centre (WRc)

- Mr. Alex GAKURU, Regional Coordinator of Africa - Creative Commons
- Mr. Allan JONES, representing Mr. Raghavan Srinivasan, Texas A&M University Agrilife Research, USA
- Mr. Damas Alfred MASHAURI, Polytechnic of Namibia (PON)
- Mr. Rao Y. SURAMPALLI, United States Environmental Protection Agency (USEPA), USA
- Mr. Imre TAKACS, CEO of Dynamita
- Ms. Laura DEL VAL ALONSO, representing Mr. Neno Kukuric, International Groundwater Resource Assessment Centre (IGRAC)
- Mr. Ernesto FERNANDEZ-POLCUCH, Programme Specialist for UNESCO Montevideo Regional Office
- Ms. Lena SALAME, Water Sciences Division - UNESCO
- Mr. Davide STORTI, Communications and Information Sector – UNESCO
- Mr. Tom GERIK, Director of the Texas A&M AgriLife Research, USA / Professor at the Texas A&M University, USA

**Absent with Apologies:**

- Mr. Yves COMEAU; Polytechnique Montreal
- Mr.Evans IKUA, Linux Professional Institute
- Mr. Markus STARKL, University of Vienna (Co-Chair of International Water Association (IWA) Sanitation and Water Management in Developing Countries group)
- Mr. Raghavan SRINIVASAN, Texas A&M University Agrilife Research
- Mr. Neno KUKURIC, IGRAC

## C.2.1. WELCOME AND INTRODUCTIONS

1.1 Mrs Salamé welcomed all attendees and introduced herself. She is a lawyer, a trained negotiator and mediator, working in the Water Sciences Division in UNESCO. She would be the facilitator of the CEWG meeting.

1.2 She invited all participants to introduce themselves.

1.3 Mrs Salamé identified the agenda for the meeting. She would facilitate the first two parts: (a) review of the pending points of the CEWG Terms of Reference (ToRs). This document had been reviewed by the SC and highlighted parts were intended for review by the CEWG; and (b) review of the List of Criteria for the Selection of Software; The third part of the agenda, (c) a presentation of the World Summit on the Information Society (WSIS) would be facilitated by Davide Storti.

## C.2.2. REVIEW OF CEWG TERMS OF REFERENCE

2.1 General questions on the phrasing of terms in the Mandate were raised. The first was of the phrase “elaborate water management models”. It was clarified that this was intended to mean “use and develop” tools specifically as they relate to open source codes. The second was on “testing” of software. The assumption was that developers would have already tested their software before these are submitted for selection. As the discussion proceeded, it emerged that more than just about phrasing, both questions related as well to the mandate and responsibilities of the CEWG, as they relate to the governance structure of the Project Management Team. It was clarified that the CEWG’s role is to advise on software models and testing. If testing of software were ever needed, it would be done by contract.

2.2 It was agreed that the Terms of Reference document identify that the Action Plan is developed by the UNESCO HOPE-Secretariat. The CEWG is more an advisory rather than a hands-on committee.

2.3 One aspect of the relationship between the SC and the CEWG was clarified. The CEWG will be providing information at all times but will provide advice on technical aspects of the project as and when requested or needed.

2.4 The sentence “The CEWG provides alternative ideas to the commercial specialized engineering software in the field of

hydrology" was moved to the last paragraph of the section on Mandate. After much discussion, it was rephrased as "The CEWG will also advise on the identification and implementation of appropriate Free and FOSS and its management that would provide alternatives to the commercial engineering software in the field of IWRM." It was felt that the rephrased sentence provided better clarity on the role of the CEWG and the intended meaning of "alternative ideas".

2.5 A few members discussed the adoption of the term "Sustainable" before Water Resources Management or Integrated Water Resources Management (IWRM). It was finally agreed that the differences were semantic and that IWRM would be used.

2.6 It was also clarified that implementation of the HOPE project will be carried out by the HOPE Secretariat.

2.7 Clarification was sought on the term "best practices" from the sentence "The CEWG will also advise on the identification and implementation of best practices". It was clarified that "best practices" was a reference to the "best" software, Free and FOSS or commercial, for an area. A suggestion was made to replace the term with "appropriate software". Mr. Filali-Meknassi stressed that the term "Free and FOSS" has to be reflected, as it is the focus of the HOPE Initiative.

2.8 With regard to the twice a year meeting of the CEWG, Mr. Surampalli observed that it may be difficult to resolve complex

issues through conference calls. In his experience, even in his country (USA), there are always problems with connection and communication. Face-to-face meetings better enable participants to resolve complex issues. Ms. Bonzi wondered if at least one of the two meetings could be face-to-face meetings. Mr. Filali-Meknassi acknowledged the validity of both points but clarified that the phrase describing the frequency and mode of meetings needed to remain as it was (i.e. face-to-face or teleconference) as budget constraints may preclude even one face-to-face meeting per year. The CEWG will, however, have twice a year meetings. Mr. Barlow suggested that the group uses Webex, a teleconferencing facility, for meetings. The group agreed to change the phrase “conference call” to “teleconference”.

### C.2.3. SELECTION OF SOFTWARE

3.1 In the interest of time, the CEWG agreed to focus on the criteria for selection of software and table, setting aside the text in the document for personal reading and consideration.

3.2 Mr. Takacs offered a template of a table to the group as an example that can be adapted for use as the HOPE table template. The table is created in Excel, with columns showing the different software that exists for an area and the rows showing preferred or desired features, such as whether the software is free or open source or some combination of it. A colour code of five colours is

utilized to show availability, non-availability or availability with exceptions of features.

3.3 The CEWG considered the different criteria. Questions, suggestions, and considerations that emerged in the discussion are reflected here.

3.3.1 The suggestion was made that “Testing” or “proven to do what it says it does” needs to be an explicit criteria. The question was raised if “Organization’s History and Experience” would imply that there has been product testing; as well that completed testing may be implied in the mention of publications on the software. The proposed phrasing “Has the software been adequately tested” introduced a grey area in that software can be tested for one area and not another, e.g. nutrients but not bacteria. The CEWG considered adding “for its intended purpose”. It finally agreed to the phrasing of the criterion as “Has the software been tested and shown to be reliable for the intended purpose?”

3.3.2 Several questions were raised about data:

3.3.2.1 Mr. Jones asked if “data availability” should be included as a criterion. He raised the possibility of having a good model for which there is no availability of data. He stressed that a model needs to match input data and testing data. He elaborated on this with an example. One can have a hydrology model for minute-by-minute weather data but

without minute-by-minute data, the model would be ineffective. Both he and Ms. Del Val Alonso cautioned that HOPE may wish to flag the need for input data to the user when it promotes a model. Ms. Del Val Alonso also reminded the meeting that the models are for use in Africa, where data availability is not fully known.

3.3.2.2 Two other possibilities of criteria were raised. “Is the model appropriate for the available data?” and “Can the model be adapted to the available data?”

3.3.2.3 Mr. Hussein Seid suggested that perhaps it should be left to the user to determine if data is available for a particular model since it would be difficult for UNESCO to determine this on an a priori basis.

3.3.2.4 Mr. Jones raised the consideration that software can be applied to different situations at different levels of data. He said it would not be ideal to rule out a model from the HOPE kit just because one of the features is not available. Having four out of five features may be good.

3.3.2.5 Mr. Gakuru proposed that rather than think in terms of a checklist, the CEWG thinks in terms of guidelines for selection. The phrase “Selection Criteria for Software – Guidelines for CEWG” was proposed.

3.3.2.6 Mr. Fernandez-Polcuch wondered if, in the discussion on data, there is a conflation of two issues: one is appropriate software (quality) and the other appropriate for the user (available data). He suggested the possibility of commissioning someone to write a guideline for users on how to select software that is technically appropriate; users decide if they have the data and if models are appropriate for their needs.

3.3.2.7 Mr. Filali-Meknassi clarified that UNESCO can only provide training on software for which data is available. This condition would need to be made explicit.

3.3.2.8 Ms. Del Val Alonso pointed out that there are two considerations with regard to data – data for testing the code and data for testing the model. Both need to be taken into account.

3.3.3 Mr. Gakuru wondered if the data should be available on an open license. Mr. Filali-Meknassi clarified that because UNESCO works with governments, data is quite often not open.

3.3.4 The CEWG returned to the discussion of the criterion “Has the software been tested and proven to be reliable for its intended purpose?” A point was raised that Free and FOSS is likely to be new, so it would have difficulty meeting this criterion. A counter-point was raised that Free and FOSS

would still have undergone some testing in its development phase, even if not widely published.

3.3.5 A clarification was sought on the intended meaning of the criterion “Are the data… safe?” The CEWG agreed that “safe” will be replaced with “secure”, taking into account the need for data back-up issues. It was also split into a separate criterion from the original one, which combined it with data availability.

3.3.6 It was also noted that server and data back-up may be less a software issue than a procedural guideline issue.

3.3.7 Ms. Del Val Alonso suggested adding, perhaps in the summary description of the software, the platform in which the software is available i.e. as an Internet download or accessible only via internet.

3.3.8 The CEWG then considered the criterion “What is the organization’s history and experience?” They acknowledged the legitimacy of the concern but noted as well that a company may not have a long history but its developers / personnel may have considerable experience and have recognition. Furthermore, with FOSS, there may be less emphasis on company and more with user community. There was agreement to keep the criterion in, as it would be one of many criteria for eligibility for inclusion in the HOPE kit. An additional

criterion was added. “Has the software been used and accepted by the water resources modelling community?”

3.3.9 Mr. Surampalli suggested that the list of criteria was flexible and the CEWG can always re-visit the list, especially as it comes across new software and new ideas.

3.3.10 Ms. Del Val Alonso suggested continuing with the creation of an extensive list and proposed using the list as a base for the questionnaire or form that every person who is proposing software can fill out. This can help the CEWG to compare when evaluating the software.

3.3.11 Two additional considerations were raised: i) “What level of support is available for the software?” This may refer to any of various channels such as a helpdesk of a company, an agency or a user community. ii) “Can the software to be considered be used in conjunction with other software?” Many projects use two or more software together and some are more compatible with each other than others. This does not imply that they were coded to work together.

3.3.12 Mr. Gakuru suggested changing “price” of software to “cost”. The latter is a broader concept and takes into account the fact that FOSS may be free but may have maintenance costs i.e. cost related to use as opposed to just cost of license and software. It was also suggested that cost can include the

length of time taken in development as this can be quite varied.

3.3.13 Mr. Gakuru also suggested that in addition to cost, the list includes value or benefits. Mr. Surampalli suggested that benefits should take into account technical features.

3.3.14 Another suggestion was to consider the modularity of the software.

3.3.15 Mr. Hussein Seid suggested considering the diversity of types of problems that the model addresses, as a proxy indicator of the benefits of the software. Mr. Gerik expanded on the latter point with an example. He shared that hydrology models these days tend to factor in effects of climate change.

3.3.16 Mr. Bley stressed that it is important that the software is “customizable”, especially since the focus is on FOSS. This was different from being “flexible”. Ms. Del Val Alonso expanded on this with the explanation that the former refers to the capacity for the customization of codes and addition of modules, whereas the latter refers to the question of how flexible the code is in adapting to the circumstances in the field or in testing.

3.3.17 The discussion then turned to training and training support. An important consideration was the availability and quality of documentation and training support material.

3.3.18 Mr. Dudley distinguished between software manual (the documentation about the software internals) and the user guide. Some software is easy to use so only the user guide may be needed, whereas others are so complex that the manual is required. The CEWG agreed to leave the word “documentation” in as it was broad enough to cover the different types of documentation.

3.3.19 Since the project is for Africa, hardware, Information and Communications Technology (ICT) infrastructure and internet access (both availability and cost) are important considerations for inclusion as criteria.

3.3.20 Ms. Bonzi and Mr. Jones raised concerns about trainees, trainee learning curves, training material and trainers/training capacity. Mr. Filali-Meknassi clarified that UNESCO provides training for trainers and only if there is sufficient demand for it.

3.3.21 A caution was also sounded that users and developers may have different demands of UNESCO and it would be prudent to consider that the agency may not have the capacity to meet the different demands.

3.3.22 The criterion “What processes are included?” was considered. Because the word “processes” may not be self-evident in meaning, it was agreed that processes would be

identified as “Physical, Chemical, Biological and Unit processes”.

3.3.23 Operating System may be an important consideration. The operating systems for FOSS may be different and this needs to be reflected in the evaluation of software. It was agreed that the criterion “Which operating systems are supported?” will be added to the ScoreSheet (Annex 3).

*Table*

3.4 Mr. Barlow proposed that as the table is a very important part of the CEWG’s work, it be expanded into a template and distributed to all members.

3.5 Mr. Filali-Meknassi confirmed that this was indeed the plan. He confirmed three items with the CEWG:

- It would be more useful for the tables to be related to areas and sub-areas in the water domain;
- Where he had been thinking of using a 1-10 scale for example to distinguish software during evaluation, adopting a colour code means looking for another way of differentiating software. He offered to think further on the matter in search of a solution. One suggestion was to use shades of colour. Mr. Gerik proposed using colour plus pattern to accommodate people with visual disabilities;

- Mr. Filali-Meknassi would send the template out to members of the CEWG to fill out known software and their criteria/features, within the areas of their expertise.

3.6 The domain areas needed to be defined. The CEWG examined the relevant section of the African Water Vision 2025 and concluded that it identified challenges but not areas. It was also all-encompassing in terms of coverage of water management issues. The CEWG decided to develop a list of areas instead.

3.7 The final approved list included these 23 areas:

1. Wastewater Treatment;
2. Drinking Water;
3. Groundwater;
4. Water Quality;
5. Climatic Data (Rainfall, Temperature, Wind speed, Evaporation, Precipitation etc.);
6. Energy;
7. Sewerage;
8. Irrigation;
9. Surface Water;
10. Watershed Management;
11. Data Management;
12. River Basin Planning;
13. Estuaries;
14. Salinity;

15. General Use Software (python or data management for eg of floater output, graphics etc.);
16. Droughts;
17. Floods;
18. Climate Change;
19. Water Demand, Use and Allocation;
20. Water Re-use;
21. Rainwater Harvesting;
22. Water Distribution;
23. Water Governance.

3.8 The CEWG considered thinning the list. A question was raised if there were priority areas for Africa from the list or if the SC could provide direction for which areas to focus on. Mr. Filali-Meknassi will follow up with the SC on this matter.[12]

3.9 Two suggestions were made to thin the list. Mr. Dudley suggested that the CEWG can possibly delete water re-use and energy from the list on the basis that they are concepts for combining outputs from different software tools or put another way, components of how to use tools rather than having tools in their own right. Mr. Gerik suggested that if the CEWG members could not think of three or four software models for an area, they can possibly remove the area from the list.

3.10 Mr. Gakuru wondered if it was possible to change the starting point for the development of the table. Instead of areas, he asked if

[12] *The new approved list is attached (click here).*

it was possible to have a table that identified desired coding features identified from the best thinking of the CEWG and then ask developers to create codes / models for them.

3.11 Mr. Filali-Meknassi reminded the group that according to the Terms of Reference, if there is no available expertise for an area, the CEWG membership can either be expanded or the CEWG can create a sub-committee with ex officio members.

3.12 Where CEWG members' expertise are not primarily in the area of water resources management, it was proposed that for instance, Mr. Gakuru, could be the liaison with the FOSS community in Africa and beyond, to source for expertise and information as needed. Mr. Gakuru indicated that he was more than happy to play this role, stating that he sees the initiative as a big opportunity for Africa.

3.13 Mr. Gerik observed that it would be interesting to see the aggregate of all the tables and models in order to identify for instance, which models have cross-areas of coverage.

## C.2.4. PRESENTATION ON THE WORLD SUMMIT ON THE INFORMATION SOCIETY (WSIS) – MR. DAVIDE STORTI

4.1 The third part of the meeting consisted of a presentation on the WSIS community by Mr. Storti.

4.2 Mr. Storti introduced himself. He works in the Communications Sector of UNESCO, primarily on FOSS, which is an important area

for UNESCO and its Member States. One of his roles is to provide UNESCO colleagues with tools for communication and information sharing. He worked with Mr. Filali-Meknassi on the development of an online community site for HOPE, on the WSIS Knowledge Communities site: http://www.wsis-community.org/. WSIS is a knowledge sharing portal developed with the purpose of facilitating information gathering and exchange, and common development of ideas and projects among the multi-stakeholder team through collaborative and community oriented online tools. It was developed within the framework of the WSIS.

4.3 He described the various features and functionalities of the community site:

- It is based on ELGG - an open source software;
- It provides space for communities of different kinds to discuss issues. There exist already groups such as Education for People with Disabilities, Gender, Open Educational Resources;
- Communities vary in size;
- Everything going on in the project such as discussions and announcements can be shown on the community space;
- It allows for sharing of files, links, videos, and discussions; members can also invite others to discussions;
- It replaces mailing lists;

- One can receive notifications of activity on the community site via email;
- It allows for the creation of sub-communities;
- It has collaborative wiki-like document features;
- It allows for the creation of directories, areas, sub-areas for management of lists;
- Membership can be open or closed;
- Membership can be visible or non-visible, though Mr. Storti's advice is to keep part of the community's activities public so that others may be informed of activities and engage.

4.4 Mr. Storti provided his contact information for the support and use of the HOPE community as needed.

4.5 A few questions were asked:

4.5.1 To the question if this was the site to put information on the evaluation of different types of software, Mr. Storti said it was possible to store documents of massive size. One can also provide a link to a different site.

4.5.2 Mr. Storti will look into placing a Creative Commons disclaimer as part of the Terms of Use of the community site.

4.5.3 As to whether there was a Smartphone application for it, Mr. Storti said the best thing they had come up with was direct access to discussions via email while mobile, without the need

to log in to the site. Replies via email are automatically published to the site.

4.5.4 In response to a question, he clarified that “community” refers to a group of people who want to share or discuss certain issues. For example, he had worked with experts creating policy guidelines on a common document for a conference. The Open Educational Resources community numbers close to 3000, with some participants more active than others. As this is a small consultative group, he envisaged that there will be active participation by all members.

4.5.5 Teleconference facilities can be provided through Webex. This facility allows for the sharing of presentations, files and participation through voice, text and even electronic voting. He shared that UNESCO is in the process of re-negotiating its license with Webex. He had already agreed with Mr. Filali-Meknassi that Webex will be available for member use for up to 20 members, without additional charges from Webex. Webex, he clarified, is web-based. It is sometimes used in combination with a Webex telephone line. One attendee pointed out that this is important because the project is Africa-based and members come from Africa as well, where Internet connectivity or costs may compromise communications accessibility. Mr. Storti will confirm

information about features and arrangements with the Secretariat.

4.5.6 To the question on the advantage of having this community site on the WSIS portal rather than on the HOPE website, he first acknowledged that a similar functionality can be built onto any website, but identified two benefits: a) this portal re-uses a resource that is already available and b) it provides the opportunity for people of other communities to learn more about HOPE and generate interest and engagement.

4.5.7 A suggestion was made that the official HOPE website provides a link to this portal. There was clarification that the HOPE website is official and so more formal language use is to be expected, whereas being a social medium, the community website is likely to see more "relaxed and respectful" conversations.

4.6 Mr. Storti will send an email to all CEWG members within the next two days with an invitation link to the WSIS portal. CEWG members will need to register as members of the community.

## C.2.5. ELECTION OF CHAIR AND VICE-CHAIR

5.1 Ms. Salamé provided the CEWG with the opportunity to defer the election of the Chair and Vice-Chair but members were willing to proceed with the election.

5.2 Mr. Barlow was nominated as Chair and Ms. Bonzi as Vice-Chair.

5.3 Though interested, both will confirm their availability after discussions with Mr. Filali-Meknassi and/or their supervisors.

### C.2.6. CONCLUSION

6.1 Ms. Salamé thanked the CEWG members for their participation, wished everyone luck on the HOPE project, expressed confidence that the project will yield impressive results and wished everyone safe journeys home.

The meeting ended at 14h00.

Minutes Taken By Faviola Fernandez (Conference Rapporteur)

Paris, June 27, 2013

# PART D

# HOPE INITIATIVE KIT

United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

# HOPE - INITIATIVE

## KIT VERSION 1.0

**MODFLOW-2005 v. 1.11.00**

**STOAT v. 5.0**

## HOPE INITIATIVE KIT

**UNESCO 2013**

# CONTENTS

# D.1. PARTNERS

**African Ministers' Council on Water (AMCOW)**

http://www.amcow-online.org/

The African Ministers' Council on Water (AMCOW) was formed in 2002 in Abuja (Nigeria), primarily to promote cooperation, security social and economic development and poverty eradication among the 53 member states through the effective management of the continent's water resources and provision of water supply services in a bid to realize the 2025 Africa Water Vision.

AMCOW's mission is to provide political leadership, policy direction and advocacy in the provision, use and management of water resources for sustainable social and economic development and maintenance of African ecosystems.

In 2008, at the 11th ordinary session of the Africa Union (AU) Assembly in Sharm el-Sheikh, Heads of State and Government of the AU agreed on commitments to accelerate the achievement of water and sanitation goals in Africa and mandated AMCOW to develop and follow up an implementation strategy for these commitments. AMCOW has also being accorded the status of a

Specialized Committee for Water and Sanitation in the African Union.

**Creative Commons (CC)**

http://creativecommons.org/


Creative Commons (CC) is a non-profit organization headquartered in Mountain View, California, United States, devoted to expanding the range of creative works available for others to build upon legally and to share. Indeed, CC enables the sharing and use of creativity and knowledge through free legal tools.

CC free, easy-to-use copyright licenses provide a simple, standardized way to give the public permission to share and use creative work. CC licenses let easily change the copyright terms from the default of “all rights reserved” to “some rights reserved.”

**Dynamita**

http://www.dynamita.com/


Dynamita develops software solutions and provide numerical tools to support process engineers in:

- Designing wastewater treatment plants;
- Optimizing operational performance and resource demands;
- Modelling innovative technologies and process schemes.

for a cleaner environment. Dynamita is developing, advancing, applying and publishing mathematical models for the description of:

- Biokinetic degradation and conversion processes (advanced BNR);
- Equilibrium chemistry based methods (pH and precipitation estimation);
- Physico-chemical separation and conversion processes.

**International Groundwater Resources Assessment Centre (IGRAC)**

http://www.un-igrac.org/

IGRAC, the International Groundwater Resource Assessment Centre (as UNESCO Institute - Category II), facilitates and promotes international sharing of information and knowledge required for sustainable development, management, and governance of groundwater resources worldwide. Since 2003, IGRAC has been providing independent content and process support, focusing on Transboundary Aquifer Assessment and groundwater monitoring.

IGRAC contributes to the assessment of the groundwater resources of the world in order to encourage and enhance the conjunctive and sustainable utilization of both groundwater and surface water. Lack of data from systematic groundwater monitoring is one of the crucial obstacles for sustainable management of groundwater resources.

Based on the principles of participatory monitoring, IGRAC has developed the Global Groundwater Monitoring Network (GGMN). The GGMN is a programme in which groundwater data from a global network of groundwater professionals is gathered, processed and made accessible to a range of stakeholders. More information at www.ggmn.un-igrac.org

**International Hydroinformatics Centre (CIH)**

http://www.hidroinformatica.org/portalcih/index.php/es/

The International Hydroinformatics Centre (CIH - as UNESCO Institute - Category II) is a reference centre created to promote hydroinformatics applied to water management.

The International Hydroinformatics Centre is a result of the partnership between the Government of Brazil and Paraguay, Itaipu Binational and International Hydrological Programme (IHP) of UNESCO.

Located in Itaipu Technological Park, the centre contributes to capacity building of the necessary technological basis to give specialized support to the management methodologies and tools proposed. Thus, it comprehends an international technical cooperation network on technology applied to water management.

The main CIH's mission is to develop innovative solutions and

hydroinformatics tools for a sustainable water resources management. Seeking to promote applied research in water management themes, train people and develop systems and applications using Free and Open Source Software (FOSS), CIH treats water through a broad perspective, involving technology, energy and environment at the regional, national and international spheres.

The performance of CIH focuses on Land Management, through the study of the territory, the understanding and interpretation of this information, the presentation of viable solutions using and developing hydroinfromatics tools.

**IWA Sanitation and Water Management in Developing Countries Specialist Group**

http://www.iwahq.org/8d/networks/specialist-groups/list-of-groups/water-management-in-developing-countries.html

The general scope of the Group encompasses water supply and sanitation services and their interrelation with river basin management. The Group has a bottom-up approach and identifies regional focal points.

Since 2011 the Specialist Group has engaged intensively with the topic of decentralized *versus* centralized sanitation and wastewater

management systems with a focus on low and middle-income countries.

**Linux Professional Institute (LPI)**

http://www.lpi.org/

The Linux Professional Institute Inc. (LPI) was formally incorporated as a non-profit organization in New Brunswick, Canada on October 25, 1999. It has operational offices in Toronto, Canada and Sacramento, USA, with affiliates around the world. LPI brings together an active and committed community of companies, Information Technology (IT) professionals, training organizations and volunteers to achieve LPI's programs. LPI is recognized worldwide as the premier organization advocating and assisting in the professional use of Linux, Open Source, and Free Software.

LPI-East Africa promotes LPI programs and certifications in the nations of Kenya, Uganda, Tanzania, Rwanda, Burundi, Ethiopia and South Sudan.

**NEPAD Southern African Network of Water Centres of Excellence (NEPAD SANWATCE)**

http://nepadwatercoe.org/

The NEPAD Water Centres of Excellence is formed by centres of research, which meet the requirements as described in the NEPAD Water Initiative guide. The NEPAD Southern African Network of Water Centres of Excellence (NEPAD SANWATCE) contribute to the improved human and environmental well-being through research and development in water and sanitation. The specific goals are to:

- Improve conservation and the use of the continent's water resources;
- Improve the quality and the quantity of water available to rural and urban households;
- Strengthen national and regional capacities towards water resources management and to reduce impacts of water related disasters; and
- Enlarge the range of technologies for water supply and to improve access to affordable quality water.

The NEPAD Water Centres of Excellence's mandate is to:

- Facilitate and where applicable conduct selective research on water issues;

- Serve as a Higher Education (PhD; Post-Doc; Staff-Exchange) soundboard to the SADC region on regional water matters;
- Collaborate with other networks and institutions in specialized areas;
- Setting the SADC water research agenda;
- Establish a continental water research agenda, which is populated from the SADC regional water agenda.

**Nile Basin Initiative-Uganda**

http://nilebasin.org/

The Nile Basin Initiative (NBI), established in 1999, is a regional intergovernmental partnership that seeks to develop the River Nile in a cooperative manner, share substantial socio-economic benefits and promote regional peace and security. The partnership continues to be led by 10 Member States namely Burundi, DR Congo, Egypt, Ethiopia, Kenya, Rwanda, South Sudan, The Sudan, Tanzania, and Uganda. Eritrea participates as an observer. NBI was conceived as a transitional institution until the Cooperative Framework Agreement (CFA) negotiations were finalized and a permanent institution created.

To guide NBI, the Council of 10 Ministers (Nile-COM) in charge of Water Affairs in the NBI formulated a set of objectives for the

Strategic Action Program to enable all actions to be directed to the common cause in a common manner. The objectives are to:

- Develop the water resources of the basin in a sustainable and equitable way to ensure prosperity, security and peace for all its peoples;
- Ensure efficient water management and the optimal use of the resources;
- Ensure cooperation and joint action between the riparian countries seeking win-win gains;
- Target poverty eradication and promote economic integration;
- Ensure that the program results in a move from planning to action.

The Nile Basin Initiative Secretariat (Nile-Sec) is the executive arm of the Nile Basin Initiative and is located in Entebbe town, Uganda. The Nile-Sec supports the activities of the Nile-COM and Nile-TAC in the overall NBI process. Nile-SEC works to ensure the efficient and effective administration, financial management and logistical support to the Nile-COM and the Nile Technical Advisory Committee (Nile-TAC) as they carry out their responsibilities and work programs.

**Polytechnic of Namibia (PON)**

http://soe.polytechnic.edu.na/?q=civil/home

The Polytechnic of Namibia (PON), situated in Windhoek, Namibia, contributes to Namibia's development by providing tertiary technological career-oriented education at internationally recognized standards. The main objective of PON curricula is thus the practice, promotion and transfer of technology.

Since December 2012 PON was declared the Namibia University of Science and Technology (NUST or NU). Basically, NUST carries on the same mandate as before but at a higher level, like doctorates degrees, which hitherto was not legally possible.

The Department of Civil Engineering, an international centre of excellence in the field of Civil Engineering tertiary education, significantly contributes to sustainable national, regional and international development through the state of the art technology-oriented career education and training, adaptive and applied research and high quality services. The Department proposes a bachelor of technology in Water Engineering and introduced in 2011 a two-year Master's degree in Integrated Water Resources Management. This highly structured programme aimed at enriching local and regional professionals working in the area of water

resources management with the required academic and technical/laboratory skills that will on completion enable professionals to broadly design, manage, maintain and operate different water-related systems.

Moreover, the Department owns unique equipment in the water engineering laboratories and offers various services, such as water and wastewater quality analysis, soil fertility analysis and irrigation water analysis.

**Polytechnique Montreal**

http://www.polymtl.ca/en/

Polytechnique Montreal, founded in 1873, is an engineering school/faculty affiliated with the "Université de Montréal" in Montreal, Quebec, Canada and founded in 1873. The Department of Civil, Geological and Mining Engineering is one of the seven departments of Polytechnique Montreal. It has the role of forming avant-gardist engineers. This department has an international reputation and the graduates have to take an active part in the technological development of our society as well as the socio-economic development. Indeed, the accent is put on the progress of science and technology.

**Regional Centre for Integrated River Basin Management (RC-IRBM) / Africa Water Resources Capacity Building Programme (AwacaB)**

The Regional Centre for Integrated River Basin Management (RC-IRBM), hosted by the National Water Resources Institute Kaduna, Nigeria and as a category 2 center under the auspices of UNESCO, coordinates river basin management research and training for West Africa. RC-IRBM addresses issues relating to climate extremes, food security, water scarcity, water quality, environmental degradation and civil unrest arising from water conflicts, which hinders economic growth and sustainable development.

The objectives of RC-IBM are to:

- Constitute a facilitator and synergetic structure providing the articulation of the different scientific and institutional stakeholders at local, national, regional and international levels, for the implementation of the IRBM;
- Conduct and promote hydroinformatics, integrated water resources management and socio-economics research;
- Provide IRBM training and tertiary education facility for water professionals and practitioners in West Africa.

Thus, RC-IRBM's operations include to:

- Coordinate the implementation of co-operative research projects and studies with regional, federal and local

authorities as well as private sectors;

- Build and run networking for information and knowledge exchange capacity building in Member States of the West African Region;
- Organize training courses, seminars, workshops and meetings;
- Produce publications and dissemination of information.

**Texas A&M AgriLife Research**

http://agriliferesearch.tamu.edu/

A member of The Texas A&M University System, AgriLife Research, established since 1887, is the state's premier research agency in agriculture, natural resources, and the life sciences.

There are 13 AgriLife Research and Extension centers serving the specific research needs of each region and for agricultural and urban citizens across the state. The Center at Temple was established in 1909 and dedicates to improve soil and water natural resources by developing new technologies and methods to improve management of agricultural, urban and military land and water resources, enhancing educational resources via an interactive videoconferencing network, and using computer models to evaluate economic and environmental impacts of land management practices.

**United Nations Economic Commission for Africa (UNECA)**

http://www.uneca.org/

Established by the Economic and Social Council (ECOSOC) of the United Nations (UN) in 1958 as one of the UN's five regional commissions, UNECA's mandate is to promote the economic and social development of its 54 member States, foster intra-regional integration, and promote international cooperation for Africa's development.

UNECA's strength derives from its role as the only UN agency mandated to operate at the regional and subregional levels to harness resources and bring them to bear on Africa's priorities. To enhance its impact, UNECA places a special focus on collecting up to date and original regional statistics in order to ground its policy research and advocacy on clear objective evidence; promoting policy consensus; providing meaningful capacity development; and providing advisory services in key thematic fields.

UNECA also provides technical advisory services to African governments, intergovernmental organizations and institutions. In addition, it formulates and promotes development assistance programmes and acts as the executing agency for relevant operational projects.

One of its seven thematic areas is natural resources, for which UNECA focuses on the conduct of policy-oriented research aiming to support the policy, legal and regulatory frameworks for the proper management of natural resources in Africa. Moreover, UNECA seeks to enhance the knowledge base needed to strengthen human and institutional capacities and broaden stakeholder participation with regard to the protection of Africa's environment and to the management of its mineral resources. In the same vein, UNECA works to promote measures to address environmental concerns in the exploitation of Africa's natural resources.

**United Nations Educational, Scientific and Cultural Organization (UNESCO)**

http://unesco.org/new/en/natural-sciences/environment/water/ihp/


In 1945, UNESCO was created in order to respond to the firm belief of nations, forged by two world wars in less than a generation, that political and economic agreements are not enough to build a lasting peace.

UNESCO works to advance and promote science in the interests of peace, sustainable development and human security and well-being, in close collaboration with its Member States and a wide variety of partners. It is the only United Nations specialized agency with a specific mandate for science.

UNESCO implements its activities in water field essentially through its International Hydrological Programme (IHP). IHP is the only intergovernmental programme of the UN system devoted to:

- Water research and hydrological science for policy relevant advice
- Water resources assessment and management to achieve environmental sustainability;
- Education and capacity building responding to the growing needs of sustainable development

IHP's Member States in June 2012 have identified water security as a central topic in the next phase of the IHP starting in 2014 ("IHP-VII: Water Dependencies: Systems Under Stress and Societal Responses"). The themes of IHP-VII are:

- Adapting to the impacts of global changes on river basins and aquifer systems;
- Strengthening water governance for sustainability;
- Ecohydrology for sustainability;
- Water and life support systems;
- Water education for sustainable development.

**University of Ouagadougou-Burkina Faso**

http://recherche.univ-ouaga.bf/

Established in 1974, the University of Ouagadougou is the oldest university in Burkina Faso and the largest nationally in terms of numbers of students, teachers and training courses. Its missions include training, scientific research and service to society. Currently, the University of Ouagadougou offers five Training and Research Departments: the Department of Humanities, Arts and Communication (UFR/LAC), the Department of Human Sciences (UFR/SH), the Department of Exact and Applied Sciences (UFR/SEA), the Department of Life and Earth Sciences (UFR/SVT) and the Department of Health Sciences (UFR/SDS) and three institutes: the Burkinabe Institute of Arts and Trades (IBAM), the Higher Institute in Population Sciences (ISSP) and the Pan African Institute of Studies and Research on Media, Information and Communication (IPERMIC).

Created since 2011, Doctoral Schools include nearly sixty research centres and laboratories, all working around training and research. The University of Ouagadougou has three Doctoral Schools:

- Sciences and Techniques;
- Health Sciences;
- Humanities, Communication and Human Sciences.

Doctoral Schools offer:

- Quality scientific training covered by reckoned laboratories and research centres;
- Training, teachings, seminars or training courses included in the Doctoral School programme and useful for their research work and the elaboration of their professional projects; and
- An international opening.

The University of Ouagadougou 2012-2016 Strategic and Operational Research Plan has just been adopted and allows making some guidance for the future. Research at the University of Ouagadougou aims at promoting the knowledge of our natural and social environment and allowing access to scientific and technological progress in order to contribute effectively to Burkina Faso economic, social, technical and cultural development. As the country faces water problems, many water courses have been developed in technology and environmental studies. Research themes in line with national priorities are identified and executed. Research centres and laboratories offer adequate multidisciplinary research teams in water issues.

**United States Environmental Protection Agency (USEPA)**

http://www.epa.gov/


The United States Environmental Protection Agency (USEPA) is an agency of the U.S. federal government, which was created for the purpose of protecting human health and the environment by writing and enforcing regulations based on laws passed by Congress. The USEPA was proposed by President Richard Nixon and began operation on December 2, 1970, after Nixon signed an executive order.

The USEPA has its headquarters in Washington, D.C., regional offices for each of the agency's ten regions, and 27 laboratories. The agency conducts environmental assessment, research, and education. It has the responsibility of maintaining and enforcing national standards under a variety of environmental laws, in consultation with state, tribal, and local governments. It delegates some permitting, monitoring, and enforcement responsibility to U.S. states and the federal recognized tribes. The agency also works with industries and all levels of government in a wide variety of voluntary pollution prevention programs and energy conservation efforts.

The Office of Water (OW) ensures drinking water is safe, and restores and maintains oceans, watersheds, and their aquatic ecosystems to protect human health, support economic and

recreational activities, and provide healthy habitat for fish, plants, and wildlife.

OW is responsible for implementing the Clean Water Act and Safe Drinking Water Act, and portions of the Coastal Zone Act Reauthorization Amendments of 1990, Resource Conservation and Recovery Act, Ocean Dumping Ban Act, Marine Protection, Research and Sanctuaries Act, Shore Protection Act, Marine Plastics Pollution Research and Control Act, London Dumping Convention, the International Convention for the Prevention of Pollution from Ships and several other statutes.

The USEPA developed quite a number of software in various areas for use by the USEPA team in fulfilling its mission.

**United States Geological Survey (USGS)**

http://www.usgs.gov/

The United States Geological Survey (USGS), established in 1879, is a science organization that provides impartial information on the health of our ecosystems and environment, the natural hazards that threaten us, the natural resources we rely on, the impacts of climate and land-use change, and the core science systems that help us provide timely, relevant, and useable information.

Water is one of six science mission areas of the USGS. Water's assignment is to collect and disseminate reliable, impartial, and timely information that is needed to understand the Nation's water resources.

The USGS Water Mission Area actively promotes the use of this information by decision makers to:

- Minimize loss of life and property as a result of water-related natural hazards, such as floods, droughts, and land movement.
- Effectively manage groundwater and surface-water resources for domestic, agricultural, commercial, industrial, recreational, and ecological uses.
- Protect and enhance water resources for human health, aquatic health, and environmental quality.
- Contribute to the wise physical and economic development of our Nation's resources for the benefit of present and future generations.

The USGS has developed more than 110 software in various hydrological areas for use by the USGS's team in fulfilling its mission. These software can be used, copied, modified, and distributed without any fee or cost. Use of appropriate credit is requested. USGS Water Resources Software are available at http://water.usgs.gov/software/.

**Water Research Centre (WRc)**

http://www.wrcplc.co.uk/

Water Research Centre (WRc) is an independent and employee-controlled organization with an expertise built from over 80 years of national and international work. WRc is dedicated to providing innovative and practical solutions and operates in the water, waste and environmental sectors.

WRc is a people-based business with valued skills in engineering, science, IT, environmental, social and financial fields.

WRc has 30 years' experience of development and application of models for wastewater treatment processes. WRc is recognized internationally for its software development, including costing and the clean water sector.

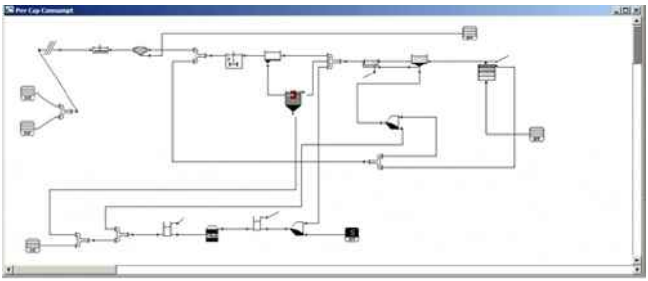
## D.2. APPROVED SOFTWARE

### D.2.1. WASTEWATER COMPONENT

**STOAT - Water Research Centre (WRc) [DOWNLOAD]**

STOAT, developed by Water Research Centre (WRc), is a PC based computer modelling tool designed to dynamically (unsteady-state) simulate the performance of wastewater treatment

works. The first release of the software was in November 1994 and the latest (as of January 2014) in March 2013. The license permits free use but not for military purposes and the software is not open source. STOAT was designed for engineers working in wastewater treatment field. WRc provides training on STOAT but it is not free of charge.

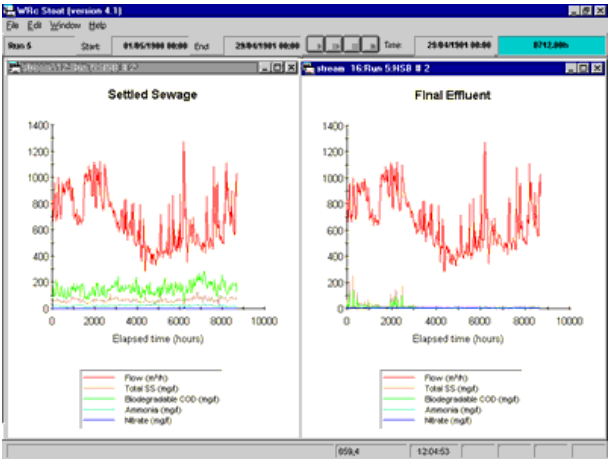


STOAT, written in Visual Basic and Fortran programming language, can be used to simulate individual treatment processes or the whole treatment works, including sludge treatment processes, septic tank imports and recycles. The model enables the user to:

- Improve effluent quality, reducing risk of consent failures;
- Reduce capital and operational costs;
- Design treatment plants more efficiently;
- Optimize treatment plant operation;
- Optimize the response of the works to changes in the influent loads, works capacity or process operating conditions;
- Troubleshoot operational problems;
- Carry out integrated catchment simulation;
- Train staff in best practices.

The Windows interface allows users to quickly build a plant model and enter the data using simple dialogue boxes. Results can be shown while a simulation is taking place and are stored as data files for subsequent analysis.

STOAT has various interfaces that other software packages may use, so that STOAT can be used in combination with other wastewater sector programs. WRc uses one of the interfaces to provide a (non-free) Supervisory Control and Data Acquisition (SCADA) training simulator to allow operators to experience routine and emergency control room procedures for their sewage works.




STOAT contains a range of features, which makes it the most comprehensive modelling package available, including:

- Models all common treatment processes;
- Offers both BOD and COD models;
- New models continually being added;

- Integrates with leading sewerage and river quality models;
- Easy to use, with user friendly interface;
- Includes quick build wizard;
- Support for batch simulations;
- Allows simplified sewer modelling (SIMPOL);
- Data transfer to other packages (Infoworks and DHI file transfer protocols; DHI .COM and OpenMI 1.0 COM and .NET interfaces).

STOAT includes models for:

- Storm tanks;
- Primary tanks;
- Wet wells;
- Equalization tanks;
- Activated sludge - including oxidation ditch and - and P-removal systems;
- Sequencing batch reactors;
- Compartmented SBRs;
- Tower activated sludge systems, e.g. Deep shaft;
- Activated sludge settling tanks;
- Trickling filters;
- Trickling filter settling tanks;
- BAFs;
- Biological fluidized beds;
- RBC's;

- Submerged biological contactors;
- Disinfection;
- Chemically assisted sedimentation;
- Dissolved air flotation;
- Chemical phosphorus removal;
- Mesophilic anaerobic sludge digestion;
- Thermophilic aerobic sludge digestion;
- Sludge incineration;
- Direct and indirect sludge drying;
- Heat exchangers;
- Gas boilers and CHP engines;
- Sludge dewatering;
- PID controllers;
- Ladder logic controllers;
- Fuzzy logic controllers;
- Instrumentation;
- Detention tanks;
- Combined sewer overflow;
- “Black box” correlation based models;
- Sensitivity analysis;
- Calibration routines;
- Optimization routines;
- Support for user-written models.

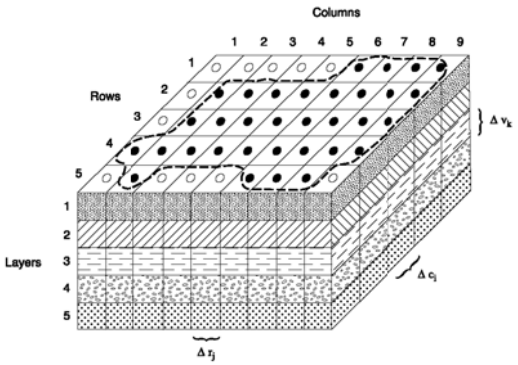
## D.2.2. GROUNDWATER COMPONENT

**MODFLOW-2005 – United States Geological Survey (USGS)**

**[DOWNLOAD for Windows – Unix and Related Programs]**

MODFLOW–2005, commonly called MODFLOW, is a three-dimensional (3D) finite-difference groundwater model that was first published by the United States Geological Survey (USGS) in 1984. The current version of MODFLOW-2005 is v.1.11.00, released August 8, 2013. The software is free and open source and was designed for scientists, students and resource managers working in the field of groundwater, especially saturated and unsaturated groundwater flow and groundwater recharge. USGS provides training on MODFLOW-2005 but it is not free of charge.

The goals for MODFLOW-2005 are that the program can be readily understood and modified, is simple to use and maintain, easily executed on a variety of computers with minimal changes, and is efficient with respect to computer memory and execution time.



MODFLOW-2005, written in the Fortran 90 programming language, has a modular structure that allows new capabilities to be developed and added for a particular application. It simulates steady and nonsteady (transient) flow in an irregularly shaped flow system in which aquifer layers can be confined, unconfined, or a combination of confined and unconfined. Flow from external stresses, such as flow to wells, areal recharge, evapotranspiration, flow to drains, and flow through river beds, can be simulated. Hydraulic conductivities or transmissivities for any layer may differ spatially and be anisotropic (restricted to having the principal directions aligned with the grid axes), and the storage coefficient may be heterogeneous. Specified head and specified flux boundaries can be simulated as can a head-dependent flux across the model's outer boundary that allows water to be supplied to a boundary block in the modelled area at a rate proportional to the current head difference between a "source" of water outside the modelled area and the boundary block.

The model may be used for either two- or three-dimensional applications. Input procedures have been designed so that each type of model input data may be stored and read from separate external files. The specific computational and hydrologic options are constructed in such a manner that each option is independent of other options. Because of this structure, new options can be added without the necessity of changing existing options.

# PART E

# ANNEXES

United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

# HOPE - INITIATIVE

World Water Day 2013 International Year of Water Cooperation

## ANNEXES

**UNESCO**

# CONTENTS

# ANNEX 1. TERMS OF REFERENCE (ToRs): STEERING COMMITTEE (SC) UNESCO'S HYDRO FREE AND FOSS PLATFORM OF EXPERTS (HOPE) INITIATIVE

## Steering Committee (SC) Role

The present document establishes the roles and functions of the Project Steering Committee (SC), both collectively and individually. It is owned, maintained and utilized by the SC to ensure that the project is steered responsibly and efficiently.

The Project SC of the UNESCO's Hydro Free and FOSS Platform of Experts (HOPE) Initiative is defined as the key body within the project governance structure that is responsible for the overall supervision of the initiative.

## SC Mandate

The SC will oversee the development and implementation of an action plan related to the use of Free and FOSS that can assist water authorities, teachers, university lecturers and researchers, young Information Technology (IT) entrepreneurs, among other stakeholders in Africa, to elaborate water management models.

The core mandate (not exclusive) of the SC is:

- Promoting quality education and capacity development through innovative use of Information and Communications Technologies (ICTs) in the field of water management.
- Stimulating IT entrepreneurship for research and development of water management tools based on Free and FOSS solutions;
- Encouraging good governance structures at all levels for the sound and sustainable management of water resources, through an enhanced use of ICTs tools and resources tailored to Member States' needs;
- Ensuring that Africa and gender equality issues are mainstreamed throughout the implementation of the project;
- Raising awareness on the benefits and opportunities offered by Free and FOSS solutions.

Specific activities may include:

- Identifying priorities for resources allocation within the HOPE Initiative;
- Pursuing opportunities to secure adequate funding for the implementation of the HOPE Initiative;
- Providing guidance to achieve the sustainability of the HOPE Initiative;
- Contributing to the final evaluation of the HOPE Initiative;

- Responding to changing conditions by seeking options for adaptive and creative management throughout the implementation of the HOPE Initiative.

## SC Composition and Functioning

### *Organogram*

The SC consists of a representative body of members reflecting the breadth of experience and expertise required to effectively address the HOPE Initiative's objectives. Members will include representatives from international and regional Organizations as well as specialized Committees whose mandates are devoted to water research, water resources management, and/or water education and capacity building. Membership of this SC is held by the Organization and not by the individual; hence the Organization can be represented by different appointed representatives (only one representative per Organization at a time).

The Chair of the HOPE Consultative Expert Working Group (CEWG) is an ex officio member of the SC. His/her role in the SC is to ensure the liaison between the SC and the CEWG by reporting the recommendations and decisions agreed in the SC to the CEWG.

Specific tasks and responsibilities of this function are described in detail in the Terms of Reference of the CEWG.

The Project SC is comprised of up to 10 members in total, including the Chair of the CEWG and a UNESCO representative.

***Nomination and Term of Office of SC Members***

Nominations of new SC members shall be put forward by current SC members and must be postmarked to UNESCO-HOPE Secretariat no later than a month before each SC meeting. UNESCO-HOPE Secretariat shall make nominations available orally to members of the SC and the CEWG during their respective statutory meetings.

Selection criteria for SC members to be defined.

SC Members are appointed to serve an initial term of 2 years, with the possibility of renewing their mandate. Continuity should be ensured by a rotation system (of at least 50%), which retains institutional memory. Such renewal is subject to a collegial decision taken by quorum.

***Voting system***

Quorum-based (50% plus 1 of the attendees) voting taken by a show hands.

***Statutory meetings***

The SC will meet a maximum of twice a year (either face to face or by conference call).

If a SC Member is unable to attend the meeting, he/she may appoint an alternate to attend and act on his/her behalf.

**Review and Evaluation of ToRs and mandate**

The SC shall review the terms of reference and mandate of the SC when and if needed on an annual basis.

**Logistic information**

Day-to-day business is handled by the UNESCO-HOPE Secretariat.

SC Members will receive the Daily Subsistence Allowance (DSA) for travel and accommodation expenses related to attendance of statutory meetings in accordance with UNESCO travel policies (Ref. UNESCO Administrative Manual).

# ANNEX 2. TERMS OF REFERENCE (ToRs): CONSULTATIVE EXPERT WORKING GROUP (CEWG) UNESCO'S HYDRO FREE AND FOSS PLATFORM OF EXPERTS (HOPE) INITIATIVE

**Consultative Expert Working Group (CEWG) Role**

The present document establishes the roles and functions of the Consultative Expert Working Group (CEWG) of UNESCO's Hydro Free and FOSS Platform of Experts (HOPE), both collectively and individually. It is utilized by the CEWG to ensure that the project is implemented efficiently from the technical and scientific point of view.

The CEWG serves as a technical advisory board that informs and counsels as and when requested by the Steering Committee (SC) on the technical aspects of the HOPE Initiative.

The CEWG is an interdisciplinary collaboration of experts working on a variety of activities in the field of Information and Communications Technology (ICT) for integrated water resources management. (e.g. water resources, rivers and groundwater; urban water modelling and Geographic Information System [GIS], collection systems, water distribution, flooding, wastewater treatment, among others), including knowledge synthesis, guideline development and dissemination.

**CEWG Mandate**

The CEWG will provide technical and scientific assistance and guidance necessary to the development and implementation of an action plan (developed by UNESCO HOPE Secretariat) related to the use of Free and FOSS for Integrated Water Resources Management (IWRM).

The core mandate of the CEWG is two fold: Advise the SC through the UNESCO-HOPE Secretariat in:

- Discussing and providing technical and scientific guidance related to the implementation of the HOPE Initiative;
- Preparing policy recommendations for their consideration;
- Reviewing, selecting and testing software, where and when appropriate, for inclusion in the HOPE labelled portfolio.

Work with and support the UNESCO-HOPE Secretariat in delivering the following outputs:

OUT-1: Appropriate platform (HOPE) infrastructures and/or facilities for hosting Free and FOSS for water management are in place, operational, well maintained, and their correct use actively promoted [Hardware];

OUT-2: Policies: procedures, rules and regulations for the development, contribution/selection and acceptance, maintenance and use of Free and FOSS for water management;

Plus: A collection of suitable Free and FOSS for water management is in place and actively promoted [Software];

OUT-3: People in the water sector in Africa have increased awareness, knowledge and skills in the use of Free and FOSS for water management [Human ware];

The CEWG will also advise on the identification and the implementation of appropriate Free and FOSS and its management that would provide alternatives to the commercial engineering software in the field of IWRM.

**CEWG Composition and Functioning**

***Organogram***

The CEWG consists of 16 members, including a Chair, a Vice-Chair. The CEWG shall reflect the breadth of experience and expertise required to effectively address the HOPE Initiative's objectives in the 8 areas/challenges identified in the Africa Water Vision for 2025.

Membership of this CEWG could be held by Organizations as well as by individuals in their personal capacity.

***CEWG Chair and Vice-Chair Mandates***

The CEWG Chair sits on the SC as an ex officio, non-voting member and he/she ensures the effective liaison between the two bodies, the SC and the CEWG.

The Chair with the assistance of the UNESCO-HOPE Secretariat sets the agenda, convenes statutory meetings, ensures that they are properly conducted and reports recommendations to the SC.

The Deputy Chair takes the role of the Chair when the Chair is not present.

The Chair may convene meetings at other times when he/she finds support of at least 50% plus 1 of the members of the CEWG when necessary to do so.

Whenever necessary, in order to address specific issues, the Chair may establish task teams and/or sub-working groups whose membership shall not be limited to the CEWG members.

***Nomination and Term of Office of CEWG Chair and Vice-Chair***

The Chair and Vice-Chair will be elected every two years by voting members of the CEWG as soon as the statutory meeting takes place (face to face or conference call). Their terms shall commence immediately.

All voting members (with the exception of the Institution hosting the HOPE Secretariat) are eligible to hold the Chair and Vice-Chair positions.

***Nomination and Term of Office of CEWG Members***

Nominations of new CEWG members shall be compiled by the HOPE Secretariat and put forward to the SC for review and approval.

Selection criteria for CEWG members should reflect experts that can address one or more of the challenges of the Africa Water Vision for 2025.

CEWG members are appointed to serve an initial term of two years, with the possibility of renewing their mandate for a maximum of two terms. Such renewal is subject to a collegial decision taken by the SC.

***Voting system***

Quorum-based (50% of the attendees plus 1 member) voting.

***Statutory meetings***

The CEWG will meet a maximum of twice a year (either face to face or by tele-conference). A CEWG statutory meeting will be valid with a quorum of two/thirds of its members.

**Review and Evaluation of ToRs and mandate**

The CEWG can propose amendments to the terms of reference to the SC.

**Logistic information**

CEWG Members will receive the Daily Subsistence Allowance (DSA) for travel and accommodation expenses related to attendance of statutory meetings in accordance with UNESCO travel policies (Ref. UNESCO Administrative Manual).

# ANNEX 3. SCORESHEET

**The selection**

After receiving a proposal (nomination form), the HOPE Secretariat convenes an evaluation committee for the Software evaluation. The evaluation committee is composed by the CEWG members as well as by external experts. The evaluation is based on a ScoreSheet, approved by the subcommittees. The ScoreSheet is divided into two parts: Section I -General criteria, which is common to all the areas agreed on and provides information on History and Experience, Costs, Hardware & Installation requirements, Customization, Data usage and analysis, Support, training and service, User Interface and Security and Section II - Technical Criteria is concerned with the inner workings and is specific to each water area. Section II provides information on available processes, model structure, model solution approach, etc.

For each question, the evaluators select the appropriate answerer on column F and the number of points awarded appears in column G while the total score for each sub-section is calculated on column I.

The evaluators might add comments/issues that should be brought to the attention of the other evaluators and the HOPE secretariat on line 80 and their final decision on line 82.

**Timeframe**

In order to maintain the plan schedule, we ask the evaluators to return their completed evaluations via e-mail [admin@hope-initiative.net] within a specific time frame (15-20 days).

# ANNEX 4. SOFTWARE NOMINATION FORM

## Join us

Submit your contribution: [Software Nomination Form]


If you feel that your software /modules /applications /plugins in the areas of water resources, rivers and groundwater, urban water modelling, GIS, Collection systems, water distribution, flooding, wastewater treatment etc. is /are:

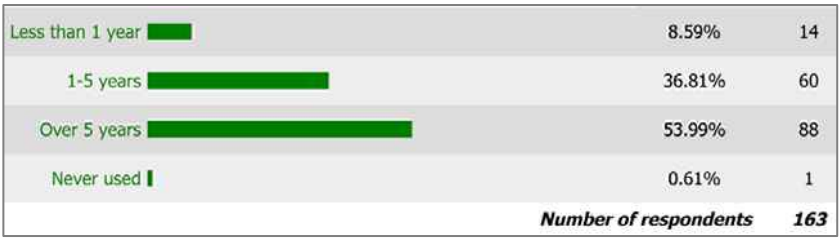
1. consistent with this Free and/or FOSS above philosophy and;
2. your product meets the criteria of the HOPE Initiative to receive the HOPE certification label and to be part of HOPE kit;

Then, please submit the completed software nomination form to Dr. Filali Meknassi at admin@hope-initiative.net.

Please note that “The primary difference between free software and open source is one of philosophy. According to the Free Software Foundation (FSF), nearly all open source software is free software. The two terms describe almost the same category of software, but they stand for views based on fundamentally different values.

Thus, the Open Source Initiative considers many free software licenses to also be open source. These include the latest versions of the FSF's three main licenses, the General Public License (GPL), the Lesser General Public License (LGPL), and the GNU Affero General Public License (AGPL)." (*Source: Wikipedia*).

# ANNEX 5. SURVEY



| | | |
|---|---|---|
| Less than 1 year | 8.59% | 14 |
| 1-5 years | 36.81% | 60 |
| Over 5 years | 53.99% | 88 |
| Never used | 0.61% | 1 |
| | ***Number of respondents*** | ***163*** |

UNESCO HOPE Secretariat invites you to participate in an assessment survey (Click here to access) designed to gauge your opinions on how to provide Member States excellence in the area of Open-source software in hydrology. This survey concerns your recent interactions with specialized software in hydrology. Your responses will be kept confidential.

# UNESCO's Intergovernmental Scientific Cooperative Programme in Hydrology and Water Resources

The International Hydrological Programme (IHP) is the only intergovernmental programme of the UN system devoted to water research, water resources management, and education and capacity building.

Since its inception in 1975, IHP has evolved from an internationally coordinated hydrological research programme into an encompassing, holistic programme to facilate education and capacity building, and enhance water resources management and governance. IHP facilitates an interdisciplinary and integrated approach to watershed and aquifer management, which incorporates the social dimension of water resources, and promotes and develops international research in hydrological and freshwater sciences.

United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

UNESCO
DIVISION OF WATER SCIENCES (SC/HYD)
7 Place de Fontenoy, 75007 Paris, France
Contact: Youssef FILALI-MEKNASSI
Email: y.filali-meknassi@unesco.org
Web: www.HOPE-Initiative.net