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NEPAD Networks of Centre of Excellence in Water Sciences PHASE II

A C E W A T E R 2 p r o j e c t 2 0 1 6 - 2 0 1 9

Minutes of scientific workshop held at Swiss Spirit Hotel & Suites Alisa, Accra, Ghana, 31 Oct – 4 Nov 2016

Background

This project, requested by the African Ministers of Water to DG DEVCO, aims at supporting the establishment of Human Capacity Development Programme of the AMCOW in the Water Sector, strengthens institutional networking and improving research support to policy making by scaling up the approach of the pilot phase (phase I).

The main activities of the project consist in:

- Strengthening of two existing NEPAD water Centres of Excellence networks in Western and Southern Africa;
- Expanding the NEPAD water Centres of Excellence network to Central and Eastern Africa;
- **SCIENTIFIC ACTIVITIES COMPONENT (SC):** Strengthening institutional networking and improving research support to policy making in the water sector on the following topics:
 - a. Analysis of the Climate Variability in Africa;
 - b. Water Resources Security and SDGs – Online Atlas on Water Conflicts and Cooperation;
 - c. African Water-Energy-Food Security Nexus Assessment;
- **HUMAN CAPACITY COMPONENT (HC):** Supporting the implementation of the African Water Ministers' declaration urging AUC and NEPAD Centres of Excellence to develop a "Human Capacity Development Programme for junior professional and technician level capacity challenges in the water sector".

Concerning the geographical scope, in line with the available budget (whole budget of 6 million euros until 2019), the project will be implemented:

- At regional level in three regions: Southern Africa, Western Africa and Eastern/Central Africa;
- At country level in: 7 countries in Southern Africa, 4 countries in Western Africa, 5 countries in Eastern and Central Africa.

The project will be implemented under the coordination of the JRC and the support of UNESCO that will implement the Human Capacity activities. The Commission Decision was signed in August 2015 and the implementation of the project started in January 2016.

On May 2016, the Kick-Off meeting has been held in Cape Town (South Africa), where the project's outlines, including objectives, activities, expected results and tentative working plan have been shared among project partners and stakeholders (including RECs and Institutions).



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Scientific Workshop Objectives

1. Introduce and share scientific and technical objectives of the ACEWATER2 project among project partners and stakeholders
2. Share valuable experiences and competences of CoE (and stakeholders) to address the design and delivery of the Atlas on Water Crisis and Cooperation (ATLAS WCC) by means of plenary and group sessions;
3. Raise awareness about collaborations with other European Research Institutions (CREAF, CIRAD-IRSTEA, etc.) in the framework of supported initiatives (H2020, AU Calls, ...).
4. Discussing and outlining potential collaborations and planning implementation of foreseen activities (way forward)

Scientific Workshop Agenda

Workshop developed based on agenda in Annex I, with few minor modifications due to logistic issues (flights delays/connections). Following starting coordination meeting (JRC, Coordinator of Western network of CoEs), main steps have been:

- opening of the meeting and official remarks, brief participant's presentation;
- introductions by JRC of the SC (Scientific Component), Scientific TOPICS, road map to Atlas WCC (Water Crisis and Cooperation) and overview of thematic sessions;
- participants' presentations structured following four main sessions related to pillars: Climate Analysis, WEF (Water-Energy-Food nexus), Groundwater and Water Governance & Diplomacy; each session has been followed by a recap and an open discussion;
- Water Governance & Diplomacy session, chaired by Dr. Farolfi (CIRAD) and Dr. Sanchez/Mrs. Roig (CREAF), including a working groups session focused on participatory methods and governance issues;
- introduction to Atlas WCC and selection of flag case studies, followed by regional based working groups for Western CoEs, Southern CoEs and Central-Eastern candidate CoEs. Presentation of regional groups outcomes, plenary session and agreement of the way forward;
- session on research supported initiatives (including H2020) and joint proposals preparation by Mrs. Roig (CREAF) followed by a dynamic partnering session. The session included the example of H2020 project Afri-Alliance by Mr. Boubacar (WASCAL);
- synthesis and conclusions, regional meeting working sessions and final coordination meeting to define road map to follow;
- NOTE: the Agenda has been reshuffled due to late arrival of some participants because of flight delay. However, this has not affected the delivery of presentations and effective achievement of meeting expected results.



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Agenda of the scientific workshop 31 Oct - 4 Nov -2016- ACCRA GHANA						
Time	Sunday 30/10/2016	Monday 31/10/2016	Tuesday 01/11/2016	Wednesday 02/11/2016	Thursday 03/11/2016	Friday 04/11/2016
09:00 - 10:30		Coordination Meeting and Registration of participants	CLIMATE ANALYSIS (20') 8. Kabobo_ECCAS_Gabon 9. Ali_Aghymet_Niger 10. Saad_NWRC_Egypt DISCUSSION (30')	WATER GOVERNANCE AND DIPLOMACY (20') 1. Falcao_IWEGA_Mozambique 2. BAZOUNI(ECOWAS/WRCC, Burkina Faso 3. Faroff_CIRAD_France	ATLAS WCC (1h) Wrap Up Day 3 and conclusions JOINT PROPOSALS FOR SUPPORTED INITIATIVES 1. Olga ROIG-HERRERA_CREAF, Spain 2. BOUBACAR_WASCAL, Burkina Faso	Coordination Meeting Participant Departure
10:30 - 11:00	Participant Arrivals		Coffee break			
11:00 - 13:00		Opening of the meeting and official remarks: 1. EU (Carmona Moreno) 2. Words of Ministry of Water Resources, Ghana (Ampomah) 3. WANWATCE (Kane) 4. SANWATCE (Elema) 5. EU Delegation (Bazin), intro from participants (2')	WEF (20') 1. Beukman_GWP_South Africa 2. Chinyama_National University of Zimbabwe 3. Gamal_University of Khartoum_Sudan 4. Senzanje_University KwaZulu-Natal_South Africa 5. Vushe_NUST_Namibia 6. Kane_Niang Awa_UCAD_Senegal	WATER GOVERNANCE AND DIPLOMACY 4. Sanchez/Roig Herrera_BEWATER_Spain Focus group (45') and plenary (45') on participatory methods and governance issues	JOINT PROPOSALS FOR SUPPORTED INITIATIVES - Dynamic Partnering Forum ,Anabel SANCHEZ and Olga ROIG-HERRERA -CREAF, Spain; Paolo RONCO - JRC	Coordination Meeting Participant Departure
13:00 - 14:00		Lunch				
14:00 - 16:00	Participant Arrivals	introduction of the SC (20') (Crestaz - Ronco) introduction to scientific TOPICS (30') (Crestaz-Ronco) Climate Analysis, WEF nexus, Groundwater Water Governance&Diplomacy, Atlas WCC Road map to Atlas WCC: intro to the thematic sessions (15') (Crestaz-Ronco) CLIMATE ANALYSIS (20') 1. Diarra_2IE_Burkina Faso 2. ABDOURAHMAN_IGAD-ICPAC_Kenya	WEF (20') 7. Ehiorobo_University of Benin_Nigeria 8. Eduvie_National Water Resources Institute_Nigeria 9. Seetal_CSIR_South Africa 10.NDIAYE_OMVS-ANBO_Senegal DISCUSSION (30')	ATLAS WCC - Building the ATLAS WCC on flag case studies: introduction by Ezio CRESTAZ and Paolo RONCO (JRC) - Building the ATLAS WCC on flag case studies : regional based working groups (1h 30') for Western CoEs, Southern CoEs, Central-Eastern candidate CoEs	Synthesis and conclusions closure meeting Cesar CARMONA MORENO _ JRC_EU	Participant Departure
16:00 - 16:30		Coffee break				
16:30 - 17:30		CLIMATE ANALYSIS (20') 3. Parida et al_University of Botswana 4. Anom_Kwarne Nkrumah Univ_Ghana 5. NAMANGALE (University of Malawi) 6. de Clercq_University Stellenbosch_South Africa 7. Boateng_UNESCO-IHP_Ghana	GROUNDWATER (20') 1. NANGOUÉ_AMCOW Secretariat, Nigeria 2. Mengistu_University of the Western Cape_SouthAfrica 3. Nkhuwa_University of Zambia DISCUSSION (30')	ATLAS WCC 1. building on feedbacks: 15' per group 2. selection of flag case studies and way forward	Regional meetings working sessions - Regional meeting Western African Network – Alloune KANE (Cheikh Anta Diop University - Sénégal) - Regional meeting Southern African Network – Nico ELEMA (Stellenbosch University - South Africa)	
17:30 - 18:00						
20:00 - 21:30		social diner				

Figure 1: overall agenda of the Meeting



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WORKSHOP ROADMAP

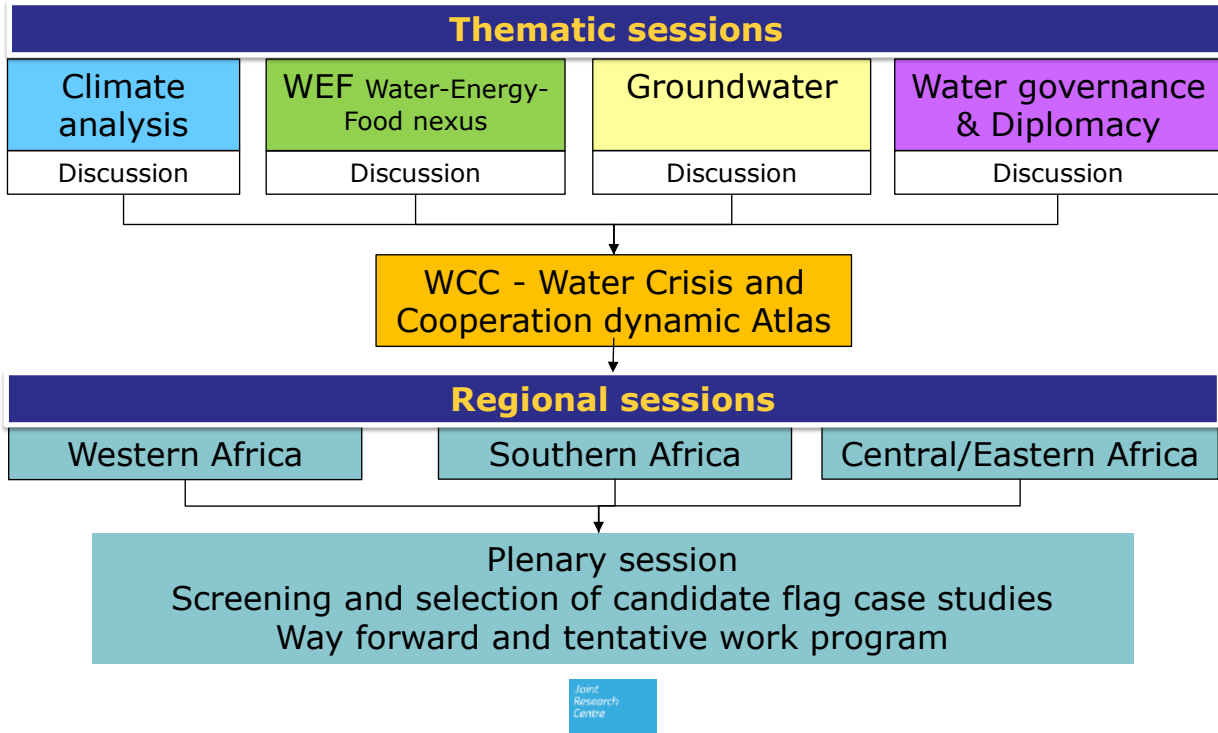


Figure 2: Workshop Roadmap



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31st OCTOBER 2016

1. Opening of the meeting and official remarks

The workshop initiated with welcome words from:

- Mr CARMONA-MORENO from the Joint Research Centre
- Mr AMPOMAH, Ghana, Words of Water Resources Commission of Ghana
- Mr KANE, WANWATCE

Mr BAZIN, from the EU Delegation in Ghana, could not attend the workshop.

Mr CARMONA welcomed all the participants to the workshop and recalled the general objective and principal results attended from the ACEWATER2 project. He reminded the participants that the project comes from an explicit request from AMCOW to the European Commission and that the objectives were decided during the ACEWATER-Phase 1 Final Meeting (October 2013) together with the CoE and partners and discussed in the framework of the KoM in Cape Town, South Africa (May 2016). Mr CARMONA explained that with that purpose the project supports the Water Sector priorities defined by AMCOW and in agreement with the Joint EU-Africa Strategy 2016 by considering two main components: Scientific-Technical (coordinated by JRC) and Human Capacity Development (coordinated by UNESCO-IHP). He also stressed the importance of the approach followed by the project that is expected to deliver relevant tools and instruments to support the decision making process: policy and decision makers (both from Africa and from Europe) are looking at the project outcomes with great attention and substantial interest for its potential to address the needs of African population in terms of access to safe and clean water.

Mr KANE introduced relevance of CoEs and their link with different Institutions and recalled major outcomes of climate variability analysis in the framework of ACEWATER-Phase 1. The international debate around water themes is rising, and the upcoming Marrakesh International Water Forum represents a unique occasion to focus on the challenge of water issues in Africa, with the horizon of 2030 objectives to archive it appears ambitious but achievable. He finally introduced the hypothesis of hosting in Dakar the next World Water Forum.

Mr AMPOMAH introduced relevance of research in water management and capacity building, stressing areas of concern as strengthening areas of competences (as GIS, regional databases, ...), developing new platforms to address water availability and quality issues, improving water management in a WEF perspective, addressing more intense use of groundwater face to challenges of climate variability and water Governance and Diplomacy issues. He particularly addressed the challenges of water resources management in Ghana by introducing the National Water Policy instrument, that is an essential component of the Ghana Development Agenda. The research on water is supposed to actively support the development of effective science based and sustainable resources management.

Participants briefly introduced themselves and their Institutions, by focussing on scientific background and experiences on water related issues.



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2. Introductions by JRC of the SC (Scientific Component), Scientific TOPICS, road map to Atlas WCC (Water Crisis and Cooperation) and overview of thematic sessions

Mr. RONCO and Mr. CRESTAZ from JRC introduced the Meeting Agenda, the Scientific Topics to be addressed and the Road Map towards the procedure to be established in order to design, build and deliver the Atlas WCC.

The Scientific Component foresees the joint development of methods and tools that will serve to address hydro/climatic Database, CC/CV (Climate Change/Variability) and WEF (Water-Energy-Food) nexus, further to the design and development of the Atlas of Water Crisis and Cooperation. The latter will serve both as a web based gateway to data geo-visualization/access and as a spatial reasoning and analysis platform. As usual, in this context, the classic issues of data availability, format and scale must be faced.

In fact, the development of joint scientific activities to address design and delivery of an Atlas on Regional Water Crisis and Cooperation is planned and that will allow the Institutions to work around a common objective. This tool is aimed at improving regional data accessibility in view of more effective water resources management and water related disasters and/or conflict impacts reduction through mitigation strategies, building resilience and reducing vulnerability.

The Scientific Activities will address Climate Change/Variability impacts assessment and WEF (Water-Energy-Food) nexus, as well as scenarios-based spatial reasoning and analysis capabilities. Expected data, to be integrated in the system, will include both bio-physical and socio-economic information.

Typical issues to be addressed include, among others, water dependency, impacts of climate change/variability, pressures induced by land use changes, and socio-demographic dynamics (i.e. population growth, urbanization, governance), impacts of human made infrastructures and policies on water availability and quality (i.e. reduced flow downstream of dams, fertilizers/pesticides cumulated load as resulting from agriculture practices, waste water discharge, industrial activities impact).

Given the above framework and in view of finalizing the meeting agenda, the organizers proposed the participants to design and deliver a short presentation (15' discussion + 5' discussion) providing context information about specific research interests, past and ongoing water-related activities in their own Institutions, as well as details on envisaged contributions in the framework of ACEWATER2.

A tentative list of issues to more effectively organize/structure information about available expertise and research interests through a brief review of past and ongoing projects, has been produced and shared among participants to support the shape of their contribution to the scientific component of the project.

Issues:

1. Main “water-crises-cooperation” thematic areas of interest where your Institution is working?
 - a. Climate Change / Variability
 - b. Water Quantity
 - c. Water Quality
 - d. WEF (Water-Energy-Food nexus)
 - e. Agriculture
 - f. Industry
 - g. Hydropower
 - h. Health (Sanitation, waterborne diseases)
 - i. Socio – demography
 - j. Politic - Governance



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- k. Culture
2. Which Geographical scope and Scale?
 - a. National/Regional Scale
 - b. River Basin Scale (National? Transboundary?)
3. Past and ongoing case studies, as well as planned projects
4. Which are the specific methods, tools and models (i.e. in hydrology, agriculture, socio-economy, etc.) used?
5. Are scenario-based analyses performed?
6. Data scale and sources:
 - a. Global available
 - b. National
 - c. Regional/Local, particularly (if available) ground based collected data (i.e. monitoring networks, spatial and temporal data collection frequency)

Contributions from CoE and project partners and stakeholders have been included in four thematic sessions devoted to scientific pillars of the project:

1. Climate Analysis
2. African WEF nexus
3. Groundwater
4. Water Governance & Diplomacy

Prior to the Scientific Meeting, a Book of Abstract, later updated as Proceedings (Annex II) with written contributions from participants (CoE, RECs, stakeholders, partners) have been produced and distributed.

3a. Participants presentations on Climate Analysis pillar (continued on 1st November)

Presentations delivered:

- Hydrologie et ressources en eau à l'échelle des petits et moyens bassins du Burkina Faso : Abdoulaye DIARRA (2iE, Burkina Faso)
- IGAD-HYCOS project achievement and challenges: Houmed Gaba Maki ABDOURAHMAN (IGAD-ICPAC, Kenya)
- Climate variability and its impact on Water Resources in Semi-Arid areas - The Case of Botswana: Bhagabat Prasad PARIDA (University of Botswana)
- Promoting a Water Secured Africa through Adaptive Research and Capacity Building: Geoffrey ANORNU (Kwame Nkrumah University of S&T, Ghana)
- Current activities, data and potential contribution: Jimmy NAMANGALE (University of Malawi)
- Redesigning water access and water information services for a better future: Willem DE CLERCQ (University of Stellenbosch, South Africa)



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3a. Participants presentations on Climate Analysis pillar (continuing from previous day)

- The Water Information System for better knowledge and sustainable management of water resources in Central Africa Region: Charles TANANIA KABOBO (ECCAS, Gabon)
- Regional water resource monitoring in West-Africa: achievements and challenges: Abdou ALI (Agrhyment, Niger)
- NWRC Contribution in the Framework of ACEWATER-2 Project: Samy Abdel-Fattah SAAD (National Water Research Center, Egypt)

A short round table (30') was held at the end of the session, based on the inputs provided by the speakers. The debate raised the following issues:

- Data availability, quality, ownership and sharing
- Climate analysis at which scale? Urban vs Rural
- Crossing geoclimatic zones
- The (often neglected) issue of lakes
- The meaning of "Crises", where the delivery of the Atlas should be built upon

3b. Participants presentations on African WEF nexus pillar

Presentations delivered:

- Scientific Activities - NUST: Annatoria CHINYAMA (National University of Science and Technology, Zimbabwe)
- Research Activities of the Water Research Centre relevant to ACEWATER2: Abdo GAMALELDIN MORTADA (University of Khartoum, Sudan)
- Water-related Research Activities at the UKZN and Potential Contribution in the ACEWATER2: Aidan SENZANJE (University of Kwa-Zulu Natal, South Africa)
- NUST Research Projects (2015 & 2016): Andrea VUSHE (Namibia University of Science and Technology)
- Climatic Vulnerability and water resources variability in West Africa: Focus on Senegal through the Senegal River basin example: Alioune KANE and Fall NIANG AWA (University Cheikh Anta Diop, Senegal)
- Unlocking the potentials for multiple utilization of dams and reservoirs in Nigeria: Jacob EHIOBOBO (University of Benin, Nigeria)
- Impact Assessment and viability of Irrigations Schemes programmes in the Sokoto Rima Basin Development Authority, Project for Intensified Agriculture and Poverty Alleviation in Nigeria: Martin O. EDUVIE (National Water Resources Institute Kaduna, Nigeria)
- Baseline IWRM Information – An Inter-Disciplinary Project Approach, Aswhim SEETAL (Council for Scientific and Industrial Research, South Africa)
- Présentation de l'OMVS, Aram Ngom NDIAYE (OMVS, Senegal)

A short round table (30') was held at the end of the session, based on the inputs provided by the speakers. The debate raised the following issues:

- Water Quality & Food Quality



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- Dams: downstream impact on hydrology and sediment balance
- Flooding risks and particular flash floods in urban environments, demanding for specific approaches
- Biofuels vs. renewable, water consumption
- Water wastes and urban settlements
- Irrigation challenges with Geology / Soils (e.g. Sahel, Kalahari)
- Coastal Greenhouses (Energy & Water for food production?)
- Impact of Precipitation Variability on Agriculture, Livestock & Fisheries
- River Bodies, Estuary Studies and Wetlands, playing an ecological role and protecting coastal areas
- Transboundary Governance, with water-sharing based on equitable sharing
- Dams multiple use: different Authorities-different Purposes (Energy-River Basin-Transport Authorities)
- Multiple Sector Challenges Require Interdisciplinary Approaches
- Geothermal resources

3c. Participants presentations on Groundwater pillar

Presentations delivered:

- Activities of AMCOW on groundwater: Charles NGANGOUE (AMCOW Secretariat, Nigeria)
- UNESCO CHAIR in Hydrogeology as a centre of excellence of Southern Africa at the forefront of capacity building, research and development of groundwater professionals: Haile Arega MENGISTU (University of Western Cape, South Africa)
- Specific Interests for Water Resources Development and Management for Zambia: Daniel NKHUWA (University of Zambia)
- Shallow Groundwater Irrigation for Food Security in Northern Ghana: Barry BOUBACAR (WASCAL, Burkina Faso): this presentation has been delivered on 3rd November due to late arrival of the speaker.

A short round table (30') has been held at the end of the session, based on the inputs provided by the speakers. The debate raised the following issues:

- Impact of aquifers salinization along coastal areas
- Artificial recharge to groundwater bodies
- Migration of groundwater expertise towards private sector
- Requirement for improving groundwater catchment level management
- Uncontrolled groundwater abstraction
- Groundwater sanitation problems in shallow aquifers
- Impact of urban settlements, face to poor sanitation and population growth on groundwater bodies
- Transboundary aquifers management
- Need for coupled surface water and groundwater analysis approaches



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4. Water governance and diplomacy

Presentations delivered:

- IWEGA past and ongoing water-related activities in Southern Africa region and potential contribution in the framework of ACEWATER2 project: Mario Paulo FALCAO (IWEGA, Mozambique)
- Activites du Centre de Coordination des Ressources en Eau de la CEDEAO en Matiere de Renforcement des Capacites dans le Domaine de la Gire en Afrique de l'Ouest: Janvier BAZOUN (ECOWAS/WRCC, Burkina Faso)
- Participatory methods and tools for water governance at the Joint Research Unit G-Eau: Stefano FAROLFI (CIRAD, G-EAU, France)
- The BeWater Project: making society an active participant in water adaptation to global change. Anabel SANCHEZ (CREAF, Spain)

Focus group (45') and plenary (45') on participatory methods and governance issues have been chaired by Stefano FAROLFI (CIRAD, G-EAU, France) and Anabel SANCHEZ (CREAF, Spain).

Details on the interactive session, including sensible questions and issues and outcomes from group sessions are described in Annex III.

5. Introduction to Atlas WCC and selection of flag case studies, followed by regional based working groups for Western CoEs, Southern CoEs and Central-Eastern candidate CoEs. Presentation of regional groups' outcomes and agreement of the way forward

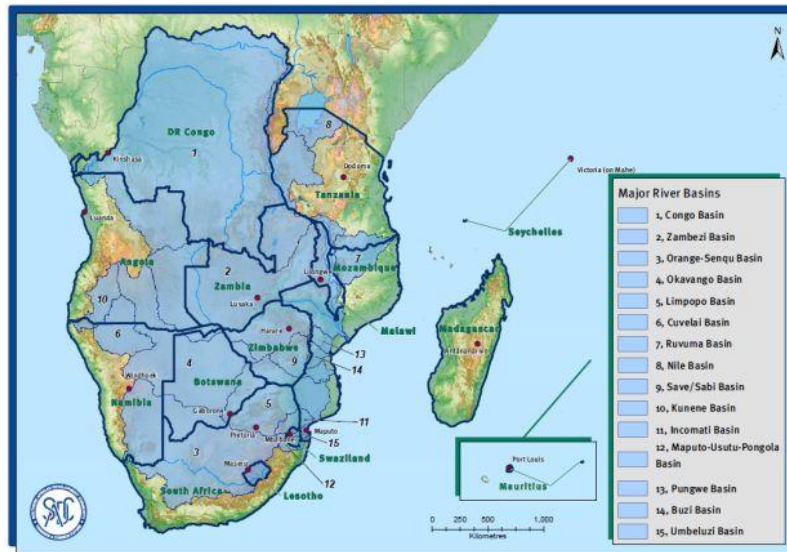
Regional meeting working sessions were structured in three groups – CoE Southern Africa, CoE Western Africa and candidate countries in Central/Eastern Africa – whose initial objective was to select candidate study basins, but which later extended to include discussions on thematic areas of interest.

The issue of the Atlas on Water Conflicts and Cooperation had been deeply debated, in particular as far as the overall objective of the tool, its end-users, the meaning of “Conflicts and Cooperation”, and the applicability to African case studies are concerned. The discussion led to the decision to include the design and establishment of a “Glossary” and shaping the “Mission” of such ATLAS WCC within the (upcoming) initial phases of development of such instrument.

The session continued at Regional level. Briefly, the discussions proven to be very fruitful and effective and led to the selection of case studies (both at regional level and at transboundary river scale) where the upcoming activities of the project will be implemented (development and piloting of ATLAS WCC).

Here below, the outcomes of the regional sessions (paragraphs are from respective CoE networks).

Southern African Network of CoEs



Discussion took place amongst delegates of the Southern African Network of Water CoEs, first identifying various River Basins in the SADC region. Major River Basins include the Congo Basin, Zambezi basin, Orange-Sengu Basin, Okavango Basin, Cuvelai Basin amongst others (refer to figure above).

Following discussions amongst participants, it was decided that the Zambezi River Basin would be the most appropriate as case study area, with the following motivations:

1. The Zambezi River Basin is trans-boundary, and includes eight countries (Angola, Namibia, Botswana, Zimbabwe, Zambia, Tanzania, Malawi and Mozambique). The percentage of each country in the Zambezi Basin is presented in the following table.

Country	% of basin
Angola	17,4
Namibia*	1,3
Botswana*	0,9
Zimbabwe*	15,8
Zambia*	42,5
Tanzania	2,1
Malawi*	8,0
Mozambique*	12,0

* - countries with NEPAD SANWATCE CoEs

Source: FAO



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2. Six member institutions from the NEPAD SANWATCE are located in the Zambezi River basin. These institutions include the Namibian University of Science and Technology, University of Botswana, National University of Science and Technology (Zimbabwe), University of Zambia, University of Malawi and Eduardo Mondlane (Mozambique). Other members not in the Zambezi River Basin include South African member institutions: University of Stellenbosch, CSIR, University of KwaZulu-Natal and the University of Western Cape.

Where institutions are not physically in the Zambezi River Basin, opportunities do exist for them to collaborate and contribute expertise and skills towards the project, in collaboration with partner institutions.

3. The Zambezi River Basin is further a highly diverse basin in terms of climate variability, hydrological diversity, population distribution, various industries such as mining and sugar cane farming, diversity in agriculture, aquaculture, tourism, various large dams and hydro-electricity plants, and ideal to address challenges related to the Water-Energy-Food security nexus.

From a governance perspective, the role of the SADC water Division should be taken into consideration and also ZAMCOM, the Zambezi Watercourse Commission.

Further, the SADC Water Science Research Agenda should be used as reference in identifying research topics in the Zambezi River Basin, in order to provide legitimacy and support from the SADC Water Division.

Western African Network of CoEs

It was agreed that the second phase of work of Western Network of African Centers of Excellence (WANWATCE) is to ensure that the CoE answer and work together on specific thematic areas.

The WANWATCE coordinated by Prof. Alioune KANE (Senegal) is constituted by:

- Cheikh Anta Diop University, Dakar - Senegal
- ZiE Ouagadougou - Burkina Faso
- Kwame Nkrumah University of Sciences and Technology, Kumasi - Ghana
- University of Benin City, Benin City – Nigeria
- National Water Resources Institute, Kaduna - Nigeria



The Western Network of CoE of NEPAD on Water Sciences

Partners of WANWATCE are OMVS (Senegal River Basin Organization), ECOWAS (Economic Community Of West African States), AGRHYMET and WASCAL (West African Science Service Center on Climate Change and



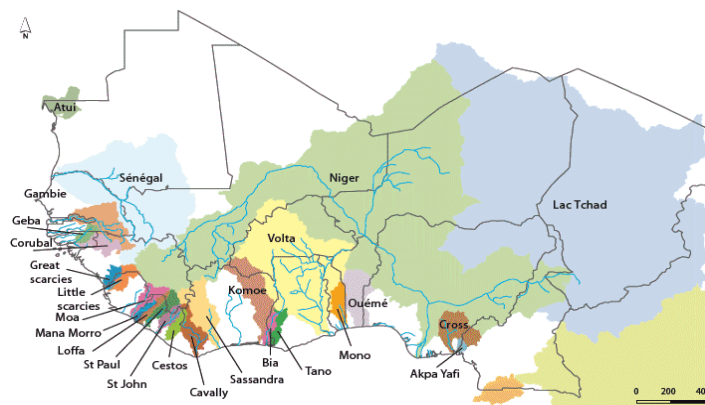
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Adapted Land Use) Program. At national level, Centers of Excellence work closely with ministries in charge of water and sanitation and research institutions.

The end products should be scientific products that will aid decision makers. The Atlas of Water Crisis and Cooperation should be dynamic and help identification of hot spot on water at regional level. Kind of end users of this Atlas (scientists, policy makers and local communities) will be clarified in order to be more efficient.

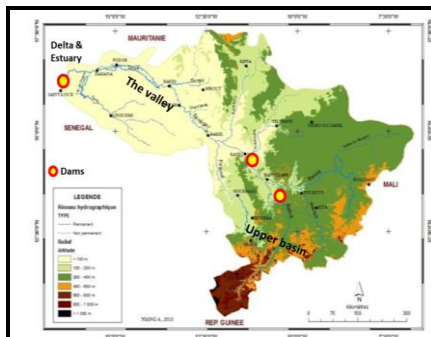
Three transboundary River Basins were considered: Senegal River Basin, Volta River Basin and Niger River Basin.



Source : ESRI, Global GIS, WHY MAP Réalisation : M. Niassé, C. Mbow (2006)

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Transboundary River Basins in West Africa



- Senegal River Basin (SRB)**
- 300.000 km²
 - 4 riparian states : Guinea, Mali, Mauritania and Senegal
 - OMVS as River Basin Authority



- Volta River Basin (VRB)**
- 407.093 km²
 - 6 riparian states of VRB (Ghana, Burkina Faso, Togo, Benin, Ivory Coast and Mali)
 - VBA as River Basin Authority



- Niger River Basin (NRB)**
- 2.262.000 km²
 - 10 riparian states of NRB (Benin, Burkina Faso, Cameroon, Chad, Ivory Coast, Guinea, Mali, Niger, Nigeria and Algeria)
 - NBA as River Basin Authority

Arising from the deliberation and in order to accommodate all participants three areas were identified:



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- a. Training (hydraulics engineers, masters and PhD) and capacity building on different topics
- b. Research at local and regional level
- d. Operational products for decision makers

In order to adequately carry out the training component which should cover the sub regions the ECOWAS Secretariat should be approached to assist in funding the regional training for manpower Development.

In terms of research, the following thematic areas have been identified:

- Climate variability and extreme weather events and their impacts on the WEF Nexus
- Water Security and Atlas
- Deltas and Estuaries issues in the selected Basins
- Transboundary water governance and management

Central/Eastern Africa

In view of next extension of Network of Centers of Excellence in Water Sciences to Central and Eastern Africa, the debate in the framework of the Regional Group has been initially focused on possible alternative options in the selection of candidate study area(s).

An initial proposition focused on Nile sub-basins (i.e. eastern or western Nile) has been discussed, stressing complexity and challenges. However, the issue that Central Africa would not be represented was highlighted, and relevance of Congo River Basin stressed as well. Based on that, a general agreement converged on an analysis, which would cover both Nile and Congo River Basins, although this should be better defined at a later stage, once Centers of Excellence extension process will be finalized.

Most of the following debate has been directed to other issues of general relevance, as the need to make clear analysis scale, expected end-users, data requirements and functionalities of the Dynamic Water Atlas, coherently with discussions already held in previous plenary sessions of the workshop. Particularly the concept of atlas dynamism has been addressed, making clear that it is expected that end-users will have the ability to interact with Atlas knowledge base to investigate scenarios.

On the other hand, it has also been clarified that the Atlas is not intended as being continuously updated with new data, which would rather be a requirement of a quasi-real time monitoring and simulation system. This is out of the scopes of the project.

Participants of the Regional Group focused on Central and Eastern Africa included, further to Ezio Crestaz and Murray Wayne Biedler as discussion facilitator:

- Gaba Maki Abdourahman Houmed / IGAD-ICPAC
- Ngangoue Charles / African Ministers' Council on Water (AMCOW)
- Samy Abdel-Fattah Saad / National Water Research Centre (Egypt)
- Tanania Kabobo Charles / ECCAS - Economic Community of Central African States
- Gamaleldin Mortada Abdo / University of Khartoum (Sudan)



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6. Joint Proposals for Supported Initiatives

During this session, especially devoted to the presentation of the different opportunities of support for research projects, some key information about the ongoing H2020 programme, including the upcoming calls for proposal on water sector and land management have been presented. The session has been scheduled as follow:

- The Horizon 2020 programme and how to prepare a competitive proposal: *Olga ROIG-HERRERA (CREAF, Spain)*
- Introduction to dynamic brokerage and presentation of the topics: *Olga ROIG-HERRERA (CREAF, Spain)*
- Best practices: the AFRIALLIANCE project: *Barry BOUBACAR (WASCAL, Burkina Faso)*
- Dynamic Partnering Forum (facilitators: *Anabel SANCHEZ and Olga ROIG-HERRERA -CREAF, Spain; Paolo RONCO - JRC*)

Among the participants, a specific request of interest in specific calls for proposal and, in particular, in the upcoming Call for Proposal on land management RUR-03-2017 have been shared. Deep discussion among participants has been followed regarding: i) the issue of eligibility of African Institutions as leader and/or as partner; ii) the possibility of applying from CoE as single entity and/or as part of the network of CoEs; iii) the role of EC and other African Institution in supporting CoEs in designing, preparing, submitting and (possibly) implementing (funded) proposals.

7. Synthesis and conclusions, regional meeting working sessions.

Cesar Carmona Moreno chaired the final session, where the most important and relevant outcomes of the meeting, together with the way forward and proposed work plan for the following year implementation have been proposed.

Here below, is the (non-exhaustive) list of relevant thematic issues that were shared during the (thematic) sessions:

Climate Analysis

- Data collection, including quality, sharing and processing
- Climatic data statistical analysis
- Scenario based simulation assessment on climate impacts: drought (water availability) and flooding (specific issues with flash flooding)

African WEF Nexus

- increasing water demand (population growth, agriculture),
- Water quantity, allocation to competing uses and equity principle, water divergences (i.e. inter-basins transfer or even countries transfer), irrigation management practices, sea water desalination, dams



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- Impact of human settlements (i.e. sewage – and radioactive - disposal, poor water treatment facilities -> sanitation issues), agriculture (fertilizers, nutrients), industries (mining) on water quality
- Energy, hydro-power production (and multi-purpose)
- Land and soils degradation (loss of fertility, erosion), sediment transport, reservoir sedimentation
- Scenario based analysis on different water allocation, use and consume

Groundwater

- Challenges of aquifers systems characterization (geometry, hydrogeological properties)
- Recharge/storage/discharge assessment (even more critical in fractured bedrock)
- Impact on groundwater quality
- Guidelines for monitoring assessment
- Artificial recharge (see also to positive impact of flooding on recharge before dry season)
- Specific issues, as knowledge of drilling techniques, monitoring strategies

Water Governance & Diplomacy

- Different tools and models on participatory approaches on water governance
- Institutional networking on water governance, including management of data repositories
- Interactive session, by means of focus groups and plenary, around three main topics/questions:
 - Identify barriers and opportunities offered by different water governance practices in Africa
 - Gather information on participatory experiences in the African context
 - Evaluating how the methodologies and tools presented can be used in the African context

General but relevant Outcomes of the Scientific Meeting were:

- Deep share of scientific competences, interest and perspectives of CoEs network: each CoE shared its specific competence, background, skills and scientific interests within the ACEWATER2 project, so to actively participate and contribute to the designing and implementation of (scientific) actions;
- Institutional networking towards the establishment of an effective sharing platform inside the project framework. The issue of Data Sharing has been deeply debated, but not a bounded decision has been made out of it. The upcoming activities, in particular the ones devoted to the Climate Variability Analysis, WEF and ATLAS WCC will be implemented following the approach used for the first phase of the ACEWATER project, namely the sharing of metadata and by-products instead of (rough) data, when available.
- Building the Atlas WCC (or other?) at river basin scale. This is probably the most important achievement of the meeting. The Regional networks of CoEs (candidate CoEs for the case of Eastern – Central Africa), after deep sharing and discussion, have reached a consensus over the selection of flag case studies where the piloting of the foreseen scientific activities (included but not limited to the ATLAS WCC) will be performed. The Western network of CoEs agreed over the Senegal, Volta and Niger River Basin by considering the delivery of regional products. The Southern network of CoEs selected the Zambezi River Basin as single (but very much relevant) case study where the entire SANWATCE will work upon, while the candidate



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CoEs in Eastern-Central Africa pointed out the Congo and the Nile, to be preliminary considered at regional basis.

- Participation to the Scientific Meeting has been considered as:
 - Being active in the process/analysis
 - Providing knowledge/Information/Data
 - Interest in using the results for further analysis
 - Interest in participating into the interpretation of the results
 - Interest in Capacity Building
- Sharing on H2020 around topics and applicability issues have been proven to be very appreciated initiatives by the participants. Further steps will be promoted soon after the meeting, in order to ensure the full eligibility of African partners and support the design and submission of project proposal from CoEs.

Way forward

1. Characterization of case studies:
 - regional/local scale data, including ground based;
 - available tools, models and documentation;
 - key issues, priorities, potential sources of conflict and/or cooperation
2. Based on selected flag case studies, agreement on participant's role/contributions, depending upon specific 'local' knowledge, scientific interests and applicability of (general) lessons-learned to other basins of interest.
3. Preparation and circulation through partners of draft short state-of-the-art reports, to be used as key reference documents to build upon.

Tentative work programme

Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
Extended case studies documentation											
	Agreement on selection of flag case studies										
	Available data and by-products sharing										
		Conceptual framework analysis and development									
				Climate Variability/Extremes analysis							
				African WEF (Water-Energy-Food) nexus (including groundwater)							
				Atlas WCC - Methodological analysis design and development (including Water Governance&Diplomacy)							
				Operational design		First tests on geovisualization capabilities		System check and appraisal		Beta version release	

WANWATCE meeting (Western networks of CoEs) followed.



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Prof. Alioune KANE who led the WANWATCE introduced the meeting. He addressed the topics agreed by all members of Western Network. Several issues were raised during the meeting (funding, administration and others).

The issue of funding of scientific activities conducted in the framework of the second is very important. Thus, the funding issue is to be resolved before starting the activities of Phase II. Precisely because of the experience learned from Phase I, CoE remain very cautious on the funding of activities by their respective Institutions.

Three Transboundary River Basins have been selected at sub regional level. In the umbrella of WEF Nexus, it is possible to go to competitive funds, based on lessons learned from different experiences in the basins identified at the sub regional level.

The Secretariat of WANWATCE will establish a list of all activities to be implemented out during the Phase II and will ask each CoE to indicate their areas of interest and contributions. This will facilitate the generation of the budget to propose to JRC.

Work on three catchments seems to be very complex but it is possible to keep these three basins and select one on which job will be piloted. Good practices and lessons identified on each basin can be replicated in other basins.

The JRC roadmap will allow everyone to position themselves on issues that interest its institutions.

All members of WANWATCE must be trained on best practices and methods of writing research proposal. Communications need to be increased between the different CoEs for better understanding of activities to be done and for skills development.



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ANNEX I – DETAILED AGENDA OF THE MEETING



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ANNEX II – PROCEEDINGS



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ANNEX III - INTERACTIVE SESSION ON WATER GOVERNANCE AND DIPLOMACY

Objectives

With this session we'd like to enhance a debate able to deliver **key messages** on the opportunities to **transfer** the tools and methodologies of the projects presented into your context.

Timing and working schedule

1. Introduction of the exercise (5')

Organizers will explain the dynamics of the session

2. Group work (45')

Participants will be invited to take part of 3 focus groups, each tackling a specific topic.

The moderator of each group will invite a participant to be the "reporter", who will present the group's conclusions to the plenary.

3. Plenary (45')

All groups will present their findings in plenary and questions will be addressed.

Guidance for group discussion.

Each group will discuss one of the following topics related to the session.

1) Identify barriers and opportunities offered by different water governance practices in Africa

Governance practices establish and frame the relationship between citizens and the government, as well as they frame governmental structure and dynamics in decision making. This debate should highlight those **barriers** and **opportunities** you think should be taken into account when designing innovative governance practices.

2) Gather information on participatory experiences in the African context

This debate wants to help sharing knowledge on relevant participatory experiences in the African context particularly focusing on: **who participates**, what kind of participation, **to do what**, until what extent the results are included in decision making, etc.

3) Evaluating how the methodologies and tools presented can be used in the African context

This session has allowed to get an overview of tools and methodologies. To which extent do you consider these could be **applied in your context**? Are there **elements that can be adapted** to allow its use?

GROUP 1. Barriers and Opportunities offered by different water governance practices in Africa

Barriers:

- Lack of support for research
- Lack of interactions/connections/coordination between institutions
- Fragile flow of data/information from research to decision makers
- Lack of willingness to 'let go' at the institutional and public decision making level
- Lack of leadership



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- Lack of inclusiveness
- Lack of consolidation of existing achievements
- Lack of long term vision
- Existence of cultural barriers
- Lack of financial capacity
- Lack of political will
- Lack of sincerity from political representatives
- Lack of awareness
- Lack of clarity on the role/responsibility of stakeholders
- Heterogeneity of actors/points of view
- Lack of harmonization of laws and legislations
- Lack of subsidiarity between different institutional scales

Opportunities (presence of pre-conditions)

- Facilitation of the diffusion of scientific information
- Mobilization of informed people/local knowledge
- Foster cooperation
- Responsiveness of actors to change
- Incentive to inclusiveness
- Foster 'ownership'/responsibility
- Political will/institutional reform
- Existence of functional regional coordination policies
- Existing and functioning institutions at different levels
- North-south co-operation
- South-south co-operation
- Openness and transparency
- Management capacity

GROUP 2. Gather information on participatory experiences in the African context

who participates (WHO?)

- National or regional governments (ministries, departments)
- Municipalities
- Local communities
- Technical staff
- Sectoral representatives (mining industry, farmers,...)
- Private consultants
- International organisations
- Researchers
- Village heads, chiefs, traditional leaders
- Water companies
- NGO's

what kind of participation (HOW?)

- Meetings
- Workshops
- Focus groups
- Field visits
- Modelling exercises



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- Bilateral meetings
- Short courses
- One case of facilitated process including all stakeholders
- In most cases processes led by governments

to do what (WHAT FOR?)

- Assess environmental management programs of private activities (mining)
- Knowledge sharing
- Sharing needs in training and capacity building
- Better prospect of small farmers and generate market access
- Irrigation development and advice for farmers regarding crops
- Water management plans at national level
- Take measures for groundwater protection
- Water use regulation

FINAL IDEAS

- Governmental institution lead and not local stakeholders in many cases.
- Voices from farmers not clearly heard thus not sustainability of the programs.
- Youth/intergenerational representation lacking
- Media lacking
- Educational institutions lacking
- Need for impartial facilitation
- Need for gender balance specifically when making decisions
- Need to take into account power balance and cultural perspectives.

GROUP 3. Evaluating how the methodologies and tools presented can be used in the African context

To which extent do you consider these could be applied in your context? Are there elements that can be adapted to allow its use?

Participant	Rating (Scale 1 to 5; 1=not relevant - 5=relevant)					Scale	Adaptation / Challenges	
	WEF	Groundwater	Governance	Climate Change				
1	4	3	5	4	T/B		1. Complicated / too detailed. Must tailor to audience, stakeholders and actors. Recognise diversity.	
2	4	3	5	-	-		2. If it does not fit, don't use it; or adapt it for use.	
3	3	3	4	3	T/B		3. Appropriate tool design and stakeholder orientation	
4	5	5	4	4	T/B		4. Beware that participation does not become consultation	
5	5	3	4	5	T/B		5. Representivity - youth (inter-generational) and gender	
6	-	4	-	-	T/B; R/B			
7	4	4	4	4	Country			
8	4	4	4	4	T/B; Country			
9	4.5	4.5	4.5	4.5	T/B			
10	-	4	-	4	-			
11	4	4	-	-	-			
Average Rating	4.17	3.77	4.31	4.06	T/B=7 C=2 R/B=1			



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ANNEX IV: PICTURES





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