WATERNET news

Volume 12 Issue 1

Welcome Note

As we start 2017; it's a time to reflect on progress made towards goals and targets set for 2016 in general and Phase III in particular. WaterNet wishes to thank all partners, members and stakeholders who have contributed to the success of the network in 2016. 2017 marks the start of Phase IV. The WaterNet Management Board call on all members to work together in order to ensure the success of this phase which will run up to 2021.

In this issue:

The 17th WaterNet/WARFSA/GWP-SA symposium was successfully held at the Gaborone International Convention Centre (GICC), Gaborone, Botswana, from the 26th to the 28th of October 2016. The theme for the Symposium was "Integrated Water Resources Management: Water Security, Sustainability and Development in Eastern and Southern Africa". The annual Symposia remains a platform for water professionals to share advances in research and education related to Integrated Water Resources Management in the Eastern and Southern African regions and beyond. Water professionals concerned with the wise use of water regard this as a key annual event. To date, 17 Symposia have been organized attracting an average 400 water professionals.

Symposium 17's programme, just like in other years consisted of scientific presentation highlighting the latest research achievements as well as more general conceptual papers, special sessions and the AfriAlliance Innovative Bridge Event.

Symposium 17 was officially opened by the Honorable Prince Maele, The Botswana Minister of Land, Water and Sanitation Services >>>Page 3

Message from the WaterNet Trust Chairperson - Dr Lapologang Magole

It is my most singular honour to address all of you at the beginning of 2017 as well as the beginning of our WaterNet Phase IV (2017 – 2021). I would like to take this opportunity to wish you a happy and prosperous 2017. I would like to thank all the member institutions, international cooperating partners and the secretariat for working tirelessly in ensuring the success of our Phase III (2012 – 2016). I would like to inform the membership that, on behalf of the WaterNet Board and Membership, I signed the Phase IV financial support contract with DGIS to the tune of €1,700,000.00. Please join me in thanking the Netherlands Government for their continued support and partnership with the Region. That withstanding, may I remind us all that much work remains to ensure successful implementation of Phase IV but also to fund raise further to meet the total budget of €8,627,000.00.

I am glad to bring to your attention that since starting operations in 2000, WaterNet has a good track record in capacity building of water professionals across southern and eastern Africa. The network has produced **427 Master's graduates, 34% of whom were women,** a critical consideration in a field and region dominated by male professionals. A survey of alumni showed that **95% of respondents are currently working in southern or eastern Africa.**

Now that WaterNet is the official SADC subsidiary institution for building capacity in IWRM, it has been tasked with facilitation, development of material and hosting of short courses in the region. This has led to an increased flow of external funds to support this aspect, and represents a ripe opportunity for future phases. Since 2004, **59 short courses** related to IWRM have been delivered to **1,529 participants** in the region.

Since inception, WaterNet has managed projects worth nearly €17,300,000 and manages an annual budget of €1,400,000. WaterNet facilitates a range of collaborative research projects in the region that contribute to development outcomes while providing students with action research opportunities. Projects have been carried out in the Limpopo, Incomati, Zambezi, Pangani, Thukela, Niger, Eastern Nile and Oumer-Rbia River Basins. Twenty-four PhDs and 76 Masters Projects have been involved in the projects.

Lessons learnt

WaterNet has accumulated a wealth of experience and learnt a number of significant lessons over the last 15 years. The following are the critical lessons learnt which will inform the vision of Phase IV and the planned pathways:

1. The network needs to better express and capitalize on its value to the region—focusing on increasing its effectiveness at addressing emerging water-related challenges. Diversified funding, cost recovery, and more responsive programmes will help ensure network sustainability.
2. Capacity building programmes should be planned around development outcomes—planned changes in behaviour—in order to contribute to impact. Output based programmes rarely achieve lasting impact or approach the necessary level of integration due to their short term nature and output oriented goals.
3. Regional capacity building must integrate theoretical perspectives with locally relevant approaches to problem solving to be effective in the long term.
4. Peer reviewed scientific publications are necessary outputs of research. However, articles are insufficient tools for reaching broad audiences. It is necessary to invest in creating meaning from science in order to share findings and the significance of research more widely.

MOVING FORWARD INTO PHASE IV

WaterNet will continue its capacity building programmes in Phase IV, with greater emphasis on dedicating that capacity to achieving outcomes and impact. WaterNet will focus on developing mechanisms for making its academic and training programmes, research and outreach activities more cohesive and aligned to regional priorities as reflected by SADC and other strategic partners.

There are four pathways identified for achieving Phase IV goals. These are arranged around work areas as summarised below. Each pathway is a thematic thrust, objective outcome and work area of WaterNet Phase IV. The four pathways are interrelated and shall be pursued simultaneously.

Work Area 1: Institutional and organisational governance: Network management and governance
Outcome Objective 1: Increased effectiveness and sustainability of the network
Work Area 2: Capacity development through education and professional training
Outcome Objective 2: Problem-solving and action oriented post graduate educational programmes and short professional training courses delivered and sustained
Work Area 3: Generation and application of new collaborative research for development
Outcome Objective 3: Enhanced and sustained regional cooperation and research capabilities in delivering water solutions in the SADC region.
Work Area 4: Knowledge Management and Outreach
Outcome Objective 4: Increased relevance and involvement of WaterNet in solving water problems through enhanced and promotion of understanding of IWRM

May I call upon the WaterNet family to work together between 2017 - 2021 in order to achieve the major goal of Phase IV.

17th Symposium Opening Ceremony

The opening ceremony of the 17th Symposium was attended by over 350 delegates who included participants to the symposium as well as invited guests from various government Ministries and organisations from Botswana.

The University of Botswana (UB) Deputy Vice Chancellor Academic and Student Affairs, Professor Martin Mokgwathi, welcomed delegates to Botswana in general and the Symposium in particular. He highlighted that the symposium came at an opportune time when the region is struggling with water-related risks posed by climate extremes. He referred to the storm which ravaged Gaborone a week earlier which caused extensive damage to property and infrastructure. He noted that, across Botswana, the land is scorched and temperatures were around 40°C leading to water scarcity as a result of high evaporation rates. Professor Mokgwathi said that the destruction caused by the storm in Gaborone in general and at UB in particular demonstrates the real challenges climate change posed, hence the need for decision and policy makers to be well informed through research. As a result he expressed the hope that the presentations at the symposium based on research would go a long way in informing planning and decision making "under such uncertainty". Professor Mokgwathi expressed his desire to have the proceedings of the symposium as well as challenges faced by the water resource managers, published in peer review journals for wider dissemination to managers and academics across the world. Prof Mokgwathi said that since there is widespread water scarcity in most pasts of Africa, including Botswana, it is important for water managers to share knowledge on how best water resources can be conserved and managed sustainably.

Officially opening the 17th WaterNet/ WARFSA/ GWPSA symposium, the Honourable Minister of Land Management, Water and Sanitation Services, Hon. Prince Maele said the presentations based on research to be presented over the three day period would become handy in the formulation of strategies to address water problems in eastern and southern Africa. The Minister expressed his confidence that the presentations will provide a good platform for identifying solutions to regional water issues, gaps and priorities. He said the symposium would deliver some meaningful and practical recommendations for consideration by relevant water sector institutions in eastern and southern Africa in order to ensure water security.

The Honourable Minister also applauded the theme of the symposium given the challenges facing the land and water sector worldwide as a result of climate change. He said there was need for integrated water management strategies to ensure water security, sustainability and development within the southern African region. Mr Maele applauded the annual symposia which have gone a long way in forging a strong regional family of water professionals and stakeholders concerned with the efficient use of water. The Hon. Minister said that event has become the key annual event in water research in east and southern Africa. Hon. Maele said the 17th Symposium like other previous similar events is a platform for water professionals to share advances in research and education related to Integrated Water Resources Management. The minister also spoke about the development of strategies for Integrated Water Resources Management that is called for business people, civil society, government and academia to work together. He said it was through such collaboration that they could address local and trans-boundary water issues, surface and groundwater on an integrated approach. He emphasised that the gathered scientists and policy makers have a collective responsibility to work together in ensuring sustainable access to good quality water for all, within our respective countries, the region and ultimately the continent.

17th Symposium Official Opening in Pictures

Dr Lapologang Magole, the WaterNet Board of Management Chairperson giving her remarks during the official opening of Symposium 17.

Two of WaterNet alumni, Mr Tiego Mpho and Ms Tshepo Setlhogile

Prof. Joseph Mbaiwa, the Symposium 17 LOC Chairperson giving some introductory remarks during the Opening ceremony

Delegates following proceedings

Participants following proceedings during the official opening

High table dignitaries leaving the auditorium

17th Symposium: Summary of Sessions

The symposium had a total of 25 planned sessions, of which 6 were plenaries, 14 thematic sessions and 7 special sessions.

•Plenaries included the opening, scientific and closing Special sessions, the following sessions were convened by various institutions:

- Water Security - Taking Communities beyond Short-Term Relief" (Water Relief),
- Challenges and opportunities of applying the Ecosystem Approach in IWRM in Orange-Senqu River Basin
- Bridging the gap between innovators, industry, funding partners & policy makers, AfriAlliance Innovation Bridge Event:
- Development of water accounting and its policy uses in Africa 2016 WaterNet Symposium;
- Meet the Expert: The role of hydrology in transboundary governance
- Hydrological sciences and practice in a rapidly changing world; "Panta Rhei

The Symposium was attended by a total of 309 participants. A total of 141 papers were presented as summarised below.

Theme	Planned	Actual
Hydrology and Global Change	33	30
Water and Environment	42	40
Water, Land and Agriculture	25	23
Water and Society	11	9
Sustainable Water Distribution and Sanitation	26	26
Water Res. and Infrastructure Management	8	9
Scientific Plenary Session	4	4

Summary of Emerging Issues by oral theme

Hydrology and Global Change
The following is the summary of presentations done under the above mentioned oral theme

- The debate for this conference on the hydrology theme was the need to continue improving the understanding of the subject matter first (water science i.e. SW & GW basic knowledge) before applying such techniques
- Applying appropriate modern techniques was encouraged alongside reality checks of what is being estimated with real data on the ground, although data scarcity is the norm rather exception

Water and Environment

- The focus was on showcasing lab and field-based emerging remediation technologies to deal with emerging pollutants and removing undesirable elements in water, wastewater & environment
- With increasing effects of climate variability and other challenges that threaten water availability & quality, actions are required to facilitate usability of these technologies.

Water Land and Agriculture

- The idea of Cobb–Douglas production function (CDPF) was tried by various presenters: CDPF function is widely used to represent the technological relationship between amounts of inputs such as land, water, weather, markets, capital and labour (explanatory variables), and amount of output (response variable) that can be produced by those inputs. The Cobb-Douglas form was developed and tested against statistical evidence by Charles Cobb and Paul Douglas during 1927–1947.
- Calls for the need to promote sustainable agriculture_to achieve food security thereby ending hunger. Presentations focused on showcasing interventions that have potential to meet the SDG2. Such interventions ranged from social (institutions), engineering and simulation solutions
- Studies focused on the need to improve explanatory variables in CDPF to improve production or productivity (ET & rainfall simulation, soil moisture improvement, improving farming practices and knowledge mostly indigenous ones which are perceived inefficiency for various reasons.

Sustainable Water Distribution and Sanitation

- Presentations focused on showcasing technologies and interventions that provide feasible scaling up to improve access to potable water sources & hygienic practices
- The need to continue with health education interventions through various platforms and communication media was emphasised. The consensus was that communities need feasible and affordable technologies that are appropriate to their settings.
- Researchers need to understand people's settings and contexts before imposing seemingly working and scientifically proven technologies if sustainable uptake of such technologies will be realised to achieve SDG 6

Water and Society

- Understanding communities way of life provides a basis of formulating sustained engagement and collaborative mechanisms for joint problem analysis, intervention-seeking and implementation of such initiatives
- Land reform is vital but not sufficient condition for transformation due to deep-seated inequities, hence the need for accelerated reforms for land-water for communities through participatory methodologies
- Reforms in water-related policy, legislative and gender frameworks fail to translate into tangible benefits to smallholders or emerging farmers.

17th Symposium: Summary of Sessions

Water Resources and Infrastructure Management

- Presentations focused on developing and testing reliability and performance of the systems for WRM: farmers' participation in collective maintenance of water infrastructure. A good platform for identifying solutions that work at local scale that have potential to address national and regional water issues were presented and discussed.
- The business model in WRM remains theoretical. Civil society, government and universities researchers/workers continue to think along the lines of right-based approach toward water resources than business which is opposite the oil model

Special Sessions

Six special sessions were held during Symposium 17. The following are the summaries from some of the special sessions.

AfriAlliance Innovation Bridge Event

- Discussed how to bridge the gap between innovators, industry, funding partners and policy makers;
- These players discussed how they can jointly work together;
- WRC (RSA) explained how they fund research activities and source funds to sustain research activities;
- CSIR (RSA) explained how IWRM can be used to 1) design a scientific research projects which address social needs and 2) to bring natural and social scientist to work together a project;
- Participants identified and matched social innovations and needs in focus group discussion set up;
- Working together provides a basis for more innovative ways of managing water resources sustainably aligning IWRM principles.

Water Security - Taking Communities beyond Short-Term Relief" (Water Relief)

This special session was convened by **SADC-UNESCO**. The aim of the session was to raise awareness, generate dialogue and build partnerships for joint action on the SADC Regional Water Programme for early warning and building resilience to floods and droughts and improving livelihoods via water security. The session focused on group activities on three themes:

- Policies and strategies for water resources management
- Capacity development
- Transboundary water resources management

The Ecosystem Approach in IWRM

This session was convened by the International Union for the Conservation of Nature. The purpose of the session was to demonstrate how to mainstream the ecosystem approach in IWRM using Orange-Senqu River Basin making IWRM operational. The following are the major highlights from the session:

Challenges and opportunities of applying ecosystem approach were outlined. The discussion was followed by a video clip to highlighting key results on mainstreaming ecosystem approach in IWRM

Main Outcome of the Discussion

- Participants commended the innovative efforts of researchers in trying to make IWRM operational at river basin level. **Highly supportive approach**
- Nevertheless, the dangers for community fatigue were stated due to **terminology overload** or frequent changes in terminologies to communities which may lead to slow up of approaches being introduced to communities
- This suggests that before communities understand the meaning of IWRM in practice, another approach comes in which may lead to slow adoption
- Discussion provided insight on how to improve on the intervention

Development of Water accounting and its policy uses in Africa

This special session was convened by the Centre for Applied Research. This was a 2nd session after Mauritius on WA. It aimed at sharing experiences on water accounts and WA policy applications in SADC; sharing new developments and initiatives in WA and discuss ways to promoting the use of WA in SADC as tool for IWRM

- Main outcome for developing WA as IWRM implementation tool
- Experiences on WA were shared from Madagascar, Rwanda, Namibia and Botswana through presented and discussions.
- Application of WA policy was discussed
- New initiatives in WA were stated (1.New WA Project; 2.Case studies of 4 countries; 3. Regional Strategic Action Plan)
- Ways of promoting the use of WA in SADC states were discussed
- Community of practitioners were discussed and Champion earmarked for WA Projects to facilitate WA issues in SADC region

Poster Session

The poster session held on 26th October 2016 was one of the most exciting events of Symposium 17. The following Table 1 summarizes posters displayed during this session.

Theme	Displayed	Young Scientists
Hydrology and Global Change	9	9
Water and Environment	6	6
Water, Land and Agriculture	4	4
Water and Society	2	2
Sustainable Water Distribution and Sanitation	5	2
Water Res. and Infrastructure Management	3	2

Closing Gala Dinner for the 17th Symposium

On the last day of the Symposium on 28th October 2016, a closing gala dinner was held in the evening at the GICC. The gala dinner was attended by all the symposium participants.

Part of the delegates during the closing gala

The major highlight of the closing gala was the awards for young scientists, below the age of 35, who made outstanding presentations for oral and poster sessions as well as the Best Young Water Scientist award, renamed The Lewis Jonker Award for the Best Oral Presentation by a Young Water Scientist in 2015. The award was named in honour of the late Lewis Jonker who unreservedly spent his energy and creativity in contributing to the evolution and growth of WaterNet, and building a new generation of water managers, not only in South Africa but also in Southern and Eastern Africa.

Dr Lapologang Magole, gave a few words in memory of Lewis before the award was presented. She highlighted that Lewis dedicated his time and energy to the growth and management of the water sector in the region in general and WaterNet in particular. As a result of the role that he played, her board so it befitting to name the award in his honour.

Dr Lapologang Magole speaking on the late Lewis Jonker and the award named in his honour

The 2016 winner of the Lewis Jonker Award for Best Oral Presentation by a Young Scientist was Ms Makoba Malema from the Council for Scientific and Industrial Research (CSIR), South Africa. She presented a paper during Symposium 17 entitled: The quality of harvested rainwater in the Eastern Cape, South Africa: Implications on treatment and use

Ms. Makoba Malema receiving her certificate and award from Prof. Hubert Savenije

Makoba Malema is a PhD student based at the Council for Scientific and Industrial Research in South Africa. Her research interests include exploring alternative water resources mainly because almost all countries are either faced with shortage of water or existing water resources are heavily polluted. She aspires to play a critical role in creating solutions for augmenting existing water supplies through technologies such as rainwater harvesting.

In terms of future prospects, Makoba sees herself implementing long term water solutions working together with various stakeholders and fellow researchers especially in South Africa for the country's deteriorating water resources.

Commenting on the Lewis Jonker prize, Malema said "The prizes make me extremely proud as it shows the impact of my research in the water industry. Being a young water scientist winner also gives me more motivation to work hard in my current position"

Malema applauded the organisers of the 17th WaterNet/WARFSA/GWPSA for conceiving the idea of young scientists awards. She said, she like other young scientists continue to participate more in upcoming international conferences as it is the best place to share and receive knowledge with other researchers. She highlighted that international conferences like the annual WaterNet/WARFSA/GWPSA/It are great platforms to network and also gives one room for growth in the research field.

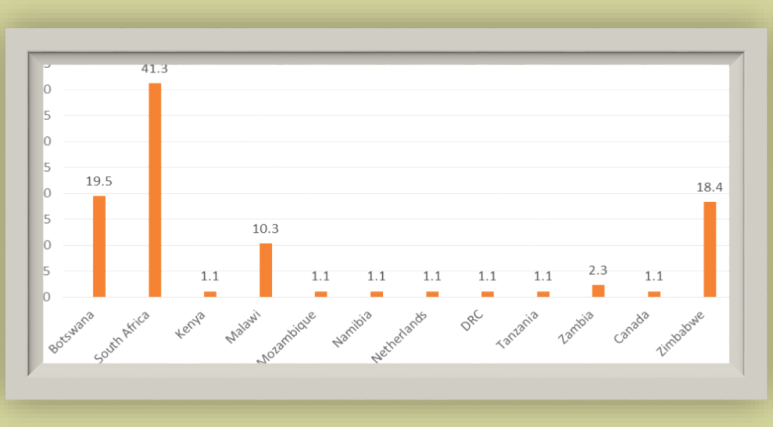
Young Scientists Winners of Various Categories

Theme	Winner	Picture	Title of Paper
Water and Land	Tendai Nharo		Modelling floods in the Middle Zambezi Basin using remote sensing and hydrological modelling techniques
Hydrology	Webster Gumindoga,	Award received on his behalf	Hydrologic evaluation of bias corrected CMORPH rainfall estimates at the headwater catchment of the Zambezi River
Water Resources Management	Stanley Sharaunga		Determinants of farmers' participation in collective maintenance of irrigation infrastructure in KwaZulu-Natal
Water and Society	Mercy Mbula		Assessment of Socio-economic Impacts of Water Hyacinth on Kafubu River: Case Study of Ndola District, Zambia
Water and Environment	Eutilerio Felizardo Crisino Chauque	Award received on his behalf	Degradation of cyanobacteria biotoxins in aquatic environments using dendrimer supported bimetallic nanocomposites immobilized in polyethersulfone membranes
Water Supply and Sanitation	Makoba Malema		The quality of harvested rainwater in the Eastern Cape, South Africa: Implications on treatment and use
Best Poster	Nicholas Christopher Mbangiwa		Modelling and measuring of total evaporation in a dryland soybean crop

Evaluation of Symposium 17

To evaluate the success of the 17th WaterNet/WARFSA/GPW-SA Symposium participants were asked to complete an online survey. Out of 287 participants, 98 filled in the online form. Thus, a random sample equivalent to 31.6% of the participants (i.e., 98/287) was used to evaluate the symposium. The majority of the participants of Symposium 17 were below 35 years of age (48.3%) while 39.1% were in the 35 - 50 age group. A smaller proportion of the respondents were above 50 years of age (12.6%). More so, the majority of the participants for the symposium were males (63.2%).

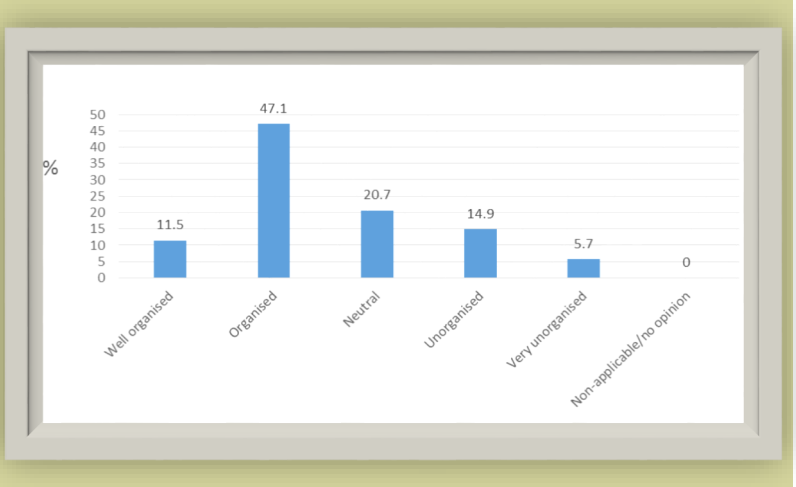
As shown in the Figure below, the majority of participants, 41.3% were from institutions in from South Africa. A considerable number of participants came from Botswana (19.5%), Zimbabwe (18.5) and Malawi (10.3%). The rest of the countries contributed less than 2.3% of the participants.



Participants and countries they came from

The majority of participants 74% are based at universities either as lecturers, students or researchers. Science councils, policy makers/ government and international organisation, together, contributed about 24% of the symposium participants. Other types of organisations contributed 2%.

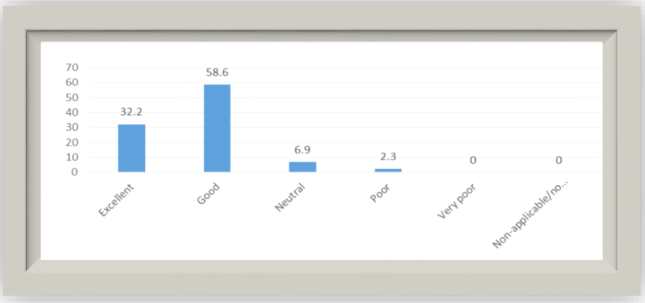
Sixty-nine percent (69%) of the respondents highlighted that the symposium met their expectations in terms of the official opening and closing sessions, presentations in the various sessions, special sessions and excursion.



Participants' expectations

In terms of organisation, 57% of the participants said that the event was organised while the remainder felt that organisation could have been better.

As shown in the Figure below, the majority of participants were happy with the quality of presentations during the oral sessions, , (i.e., good and excellent which are 58.6% and 32.2% respectively). Thus, in total, 91% of the participants were impressed by the quality of oral presentations during the symposium.



Opinions on quality of presentations

As shown in the Figure below, the majority of participants (56.3%) highlighted that the quality of poster presentation were good.

Opinions on quality of poster presentations

Recommendations

The following are some of the recommendations from the participants;

- Better time management for sessions
- Increase the number of prizes for young scientists
- Involve the private sector which deals with water issues

The AfriAlliance Innovative Bridge Event (IBE) at Symposium 17

During the 17th WaterNet/WARFSA/GWPSA Symposium, WaterNet jointly with consortium partners convened the first innovation bridge event (IBE) of European Commission funded AfriAlliance project under the Framework of Horizon 2020. This is a five year project whose overall objective is to establish mechanisms for African and European stakeholders to work together in the areas of water innovation, research, policy and capacity development in order to enhance the preparedness of Africa for future Climate Change challenges.

The IBE was staged in two sessions comprised of an exhibition done on 26 October 2016 focussing on innovations in water and climate change. The second session was held on 27 October 2016 as a dialogue entitled 'Bridging the gap between innovators, industry, funding partners & policy makers'. This included policy discourses and group discussions. The discussions focussed on knowledge transfers between innovators, industry, funding partners & policy makers, the challenges being faced and the possible solutions to these problems.

Official Launch of the IBE

The Botswana Minister of Land Management, Water and Sanitation Services, Hon. Prince Maele, officially launched the AfriAlliance Innovation Bridge Event.

Honorable Minister of Land Management, Water and Sanitation Services, Mr Prince Maele, officially launching the AfriAlliance IBE

After the launch the Hon. Minister had time to visit all the exhibition stands together with his officials at the Gaborone International Convention Centre Garden. Exhibitors had a few minutes to explain to the Minister their innovations.

The Minister at the AfriAlliance exhibition stand

Exhibitions

There were 15 different exhibitions from Botswana (SADC Secretariat and University of Botswana), Malawi (Mzuzu University and University of Malawi), Namibia (National University of Science and Technology), Uganda (University of Dar es Salaam), South Africa (University of Witwatersrand), Zimbabwe (University of Zimbabwe) and Europe.

Selected Exhibitions

Alternative water sources: ***Dr Ronald Tshelametse (University of Botswana.***

The technology exhibited was motivated by the drying up of Botswana present water sources that is accounted for by global warming. The climate of Botswana seems to be translating from semi-arid to arid with prolonged droughts, shifting but brief rainy seasons and rising average temperatures. The lack of rainfall and the high temperature exposes the water sources of the country under strain. The observed dry wave propagating from the south to the north and possibly eventually crossing the border and affecting the sources of northern perennial rivers (the Zambezi and the Chobe). The primary water sources for the country include underground water, surface water and to a small extent recycled water. With the high eventuality of the surface water drying up and the highly polluted ground water also dwindling, the proposal is to harvest air water via condensation as an alternative water source for Botswana. Mathematical models on condensation were studied and applied to the Gaborone meteorological data. The results reveal air water as an alternative water source for Botswana is a viable option.

Dr Ronald Tshelametse exhibiting his innovation

The AfriAlliance Innovative Bridge Event (IBE) at Symposium 17

The design of permanent support for KSPS draft tube access tunnel:
Ms. Fiona Mazvita (Former student, University of Zimbabwe)

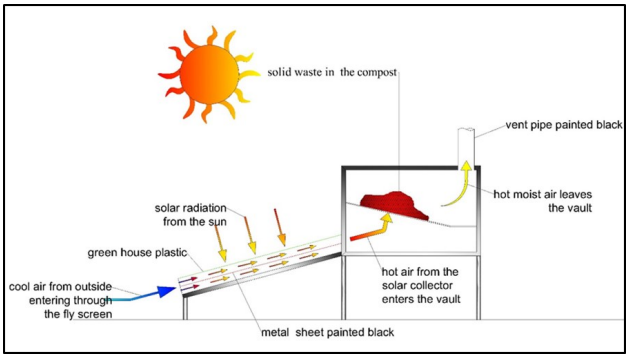
The project focuses on the design of an economic, safe and structurally sound rock re-support system for the Kariba South Power Station (KSPS) draft tube access tunnel with the use of both empirical and analytical design approaches. It is aimed at the recovery of utility services as outlined in the Zimbabwe Agenda for Sustainable Socio-Economic Development (ZimAsset) policy document. The use of Terzaghi's classification system and the Rock Quality Index System were adopted in determining the loads acting on the tunnel face as well as the most suitable form of support considering the geological data provided by the KSPS. For analytical analysis, Solid Works a finite analysis software was used in modeling the stress, strain and deformation patterns that would result after the application of the calculated loads as well as verifying the suitability of the designed support. The results yielded no excessive deformations on the tunnel interface confirming a satisfactory design. A cost benefit analysis was then carried out to evaluate the economic benefits of re-supporting the tunnel versus re-constructing the tunnel in the event of collapse. It is therefore beneficial to re-support the tunnel because tunnel collapse will lead to disruptions in electricity generation which will affect Zimbabwe and other countries in the Southern Africa Pool. The research concludes that the designed re-supported will sufficiently hold the tunnel and recommends the use of tunneling technology in the country's transportation system.

Ms. Fiona Mazvita explaining her innovation to Minister, Mr Prince Maele

Optimization of moisture loss in an Ecosan Waterless Toilet: Mr Tinashe Zacharia (University of Zimbabwe)

Waterless toilets that are designed for reuse of excreta (Ecosan Toilets from ecological sanitation) have gained popularity in recent years especially in developing countries. The selling points for this toilet have been (i) no water requirements (ii) protection of groundwater sources and (iii) resource recovery and reuse. However, these toilets have failed in many areas of which some of the main drivers for the failure have been odour and handling of excreta during the "harvesting" period. Handling and disposal of the excreta has been complicated by the high moisture content of the excreta which among other problems makes the excreta offensive. This project applied innovative techniques to deal primarily with moisture content of the excreta during composting in the toilet at the same time dealing with the odor problems. >>>

A Modified Ecosan Toilet (MET) model incorporating an inclined solar air heater, made out of simple material including a greenhouse plastic, and a 3m high vent pipe was constructed. The solar air heater, which was open at the bottom end, and linked to the excreta composting volt at its top end, resulted in increase in air temperature in the solar heater leading to an upward movement of the warm air into the volt of the MET and consequently suction of cooler air through the bottom end of the solar air heater. The warm air in the volt then further moved up the air vent due to reduction in density due to heat. Movement of air in the vent pipe was accelerated by the Bernoulli Effect created by the difference in air speed at the top end of the vent pipe and at the lower end of the vent pipe located in the volt. There was a higher speed at the top of the vent pipe due to reduced obstruction and drag to flow of air. A Conventional Ecosan Toilet (CET) model also constructed as a control. Pig excreta from a nearby farm was used in the batch experiments. Results showed that the air temperature in the METvolt was 2 times higher than the ambient temperature while the temperature in the excreta compost in the volt was nearly 1.5 times the ambient temperature. There were no significant differences in the ambient, volt and excreta compost temperatures for the CET. Moisture content in the MET was significantly lower than in the CET over the entire composting period. The MET offers opportunities for improvement of the conventional ecosan toilet leading to a higher potential for uptake of the toilet.



A Modified Ecosan Toilet (MET) model as proposed by Mr Tinashe Zakaria

Honourable Minister, Mr Prince Maele, at the SADC Secretariate exhibition stand

The AfriAlliance Innovative Bridge Event (IBE) at Symposium 17

Catchment based Water resources Management (CBWRM) in Uganda. A case of Rwizi catchment: Mr. Bogere Robert (University of Dar es Salaam)

The innovation involves management of the Water Resources with involvement of the stakeholders, which is one principle of Integrated Water Resource Management. The stake holders are decision makers in the development which takes place within the catchment. It is the participatory approach of managing the Water Resources.

Mr Bogere Robert, Presenting his innovation to the Honorable Minister

Applying psychoenergetics to enhance seedling development and crop yields: Prof John Ndiritu (University of Witwatersrand)

The innovation centres around the application of yogic farming, a psychoenergetic technique in improving crop yield and nutritional content. There is evidence that water responds significantly to the energy of human consciousness. This innovation aimed to find out if applying this subtle energy on the water used to germinate seeds and to irrigate crops enhances seedling development and crop yield. The seedling development experiments indicate that psychoenergetic energy applied as concentrated positive thought to water enhances seedling development with average increases of 27% and 15% in seedling length realized with carrot and lettuce for the experiments where an experienced meditator provided the energy directly and remotely from close distance (10 km). Application of the enhancing energy to water by learner meditators (who learnt the method in 3 days) realized a 4% increase in average seedling length.

Prof. John Ndiritu showcasing his innovation to the Honorable Minister, Mr Prince Maele

Adjudication of exhibitions

All the exhibitions were adjudicated by a panel of three judges. One exhibition was found to be outstanding. This was the exhibition by Mr Tinashe Zakaria. For being judged the best exhibition, Mr Zakaria was presented with a shield and a trophy which were received on his behalf by his supervisor, Eng. Zvikomborero Hoko.

Eng. Z. Hoko receiving the certificate and trophy on behalf of Mr T. Zakaria from Rd. Natacha Armosi

All the other exhibitors received certificates of exhibition.

Prof J. Ndiritu receiving his certificate

Ms Fiona Mazvita receiving her certificate from Dr Natacha Armosi

The AfriAlliance Innovative Bridge Event (IBE) at Symposium 17

AfriAlliance Plenary and Workshop Sessions

The second session of the IBE which was held on the 27th October 2016 comprised of a plenary discussion and an AfriAlliance workshop. This was subtitled "**Bridging the gap between innovators, industry, funding partners and policy makers**". The AfriAlliance plenary discussion was attended by 21 participants. Dr Jean-Marie Kileshye Onema, the WaterNet Manager welcomed participants to the event and he also gave opening remarks. Dr Kileshye Onema outlined the objectives of the workshop as follows:

- Presentation of AfriAlliance objectives and partnerships
- Reach out and have an interaction on water and climate change with stakeholders
- Exchange and collect information on social innovation for new technological and non-technological solutions to address climate change impacts and water related issues

Dr Natacha Armosi gave a brief background to the concept of social innovations. She highlighted the definition of social innovation given by the European Commission as follows:

- the development and implementation of new ideas (products, services and models) to meet social needs and create new social relationships or collaborations.

She went on to state that *social innovations* are mainly aimed at improving human well-being and these are:

- Innovations that are social in both their ends and means.

She pointed out that the Stanford dictionary states that: A *social innovation* is a novel solution to a *social* problem that is more effective, efficient, sustainable.

Presentations

Prof. P Oberholster presented Green engineering technologies as an adaptation measure for climate change vulnerability in developing countries: the South African case study. The presentation focused on:

- Water availability in Africa and climate change
- Self-sustainable technology requiring no chemicals or electricity
- Algae bio-reactors

The presentation showed that by 2025 southern African countries>>> including Botswana, Malawi, Namibia and South Africa will be classified as chronic water scarcity while Lesotho, Swaziland, Tanzania and Zimbabwe will be in the water stress category. South Africa is semi-arid with an average rainfall of 470 mm/a, well below the world's average of 840 mm/a Water requirements already exceeded the demand in 10 out of the 19 WMA in the year 2000 Quality and quantity plays a major role in water reuse with the current climate change scenarios

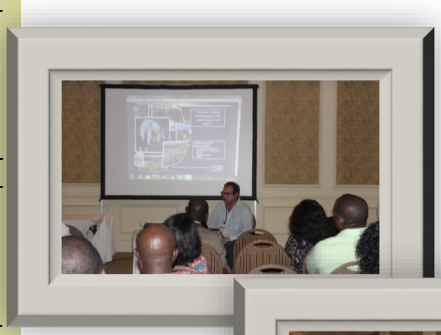
Biggest challenges of WWTW in rural Africa:

1. Inadequate sanitation is one of the leading causes of water pollution and consequently illness in many underdeveloped countries.
2. Effluent not within guideline standards for water reuse
3. Aging infrastructure
4. Skill shortage
5. Phosphorus sensitive catchments (Changing habitat conditions and reduction of ecosystem services)

The Algae-based treatment for rural municipal domestic wastewater pond systems can be a useful innovation in such a context. The technology facilitates the effective and efficient removal of nutrients (specific phosphorus) and pathogens in rural Wastewater Treatment Works (WWTWs) effluent through algae based treatment (phycoremediation)

Water Research Commission: Knowledge Services

Ms. Sibongile Mavimbela from the Water Research Commission, South Africa, presented on "Knowledge Services", mainly focusing on the role her organisation in this aspect. She highlighted the challenges being faced by the WRC in their efforts to bring about water and climate change innovations/technology. She stated that there are so many innovative ideas, but the challenge is funding on their development. The more people get access to funding the better way of strategizing on innovations. She indicated that knowledge sharing is important, it can be done via different media platforms. A barrier to this knowledge sharing aspect is that not all people can afford to purchase a newspaper, but rather the use of radios and campaigns can be more useful. >>>



Left: Prof P. Oberholster

Right: Ms Mavimbela

The AfriAlliance Innovative Bridge Event (IBE) at Symposium 17

Group Discussions

Group discussions were conducted to identify the various social innovations in the water and climate change sector as well as the barriers to these social innovations. Finally, a combined focus group discussion to map the way forward was conducted.

Barriers that hinder social innovations were identified as following:

Funding
Perceptions and culture
Political aspects : within a country
Knowledge sharing (illegibility, the poor may not be able to purchase the newspaper and that not everyone has access to the internet).

Solutions to the barriers

Knowledge sharing *via different media platforms (radio, newspapers, internet ads and newsletters) campaigns and educational programmes.*
A proposed budget to allow funding of social innovations.
People with innovations are supposed to publicize their innovations to allow implementation of their ideas.

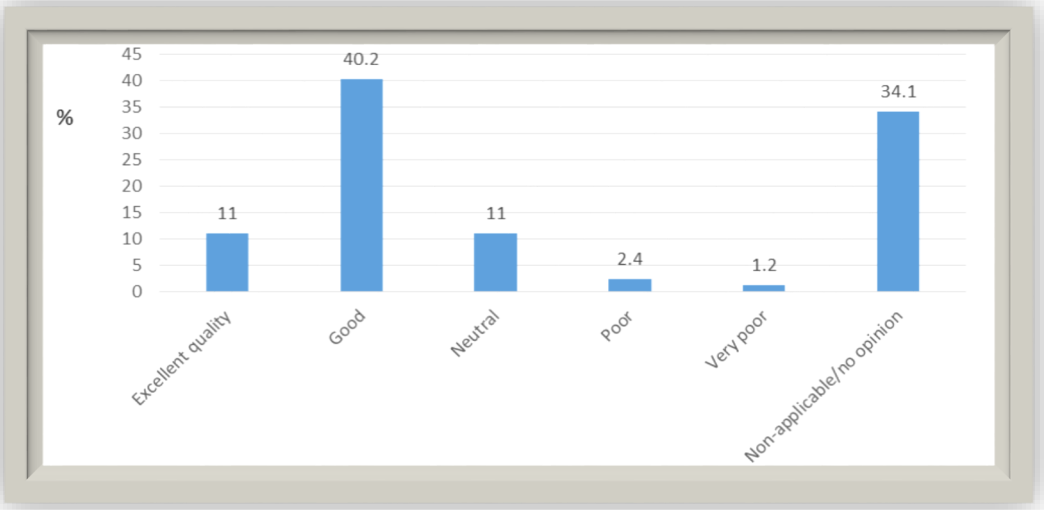
Participants during group discussions

IBE Evaluation

In terms of organisation, 44.7% of the participants who attended the IBE, said that the event was well organised. However, about 5.9% of the symposium participants felt it was poorly organised.

Regarding the quality of exhibitions showcased at the IBE 44.6% of participants indicated that these were at least good while 41.2% had no opinion. In terms of the quality of the presentations done during the second, session of the event, 51% of the participants said these where at least good while 34.1% had no opinion as shown in the Figure below.

In terms of value, 32.5% of the respondents regarded presentations done during the second session of the IBE as very important, while 25.0% viewed the opportunity to interact provided by the plenary sessions, focus group discussions and during exhibitions as the most valuable aspect of the IBE.



Regional Masters Programme in IWRM: Graduation for the 2016/17 Intake

Sixteen MSc in IWRM students (10 males and 6 females) from the University of Zimbabwe, Civil Engineering Department's 2016/17 intake graduated on 29 September 2016. The Chancellor of the University of Zimbabwe, President Robert Gabriel Mugabe capped the graduates. The students are Kagiso Mosimanegape (Botswana) Tshikeba M Kabantu (DRC), Fred T Nyirenda (Malawi), Esperanca Muchanga (Mozambique), Chaze Sibeya, Kornelia N Lipinge (all from Namibia), Zine Matshakeni (South Africa), Sithembiso Mkhonta (Swaziland), Thembeka S Nkambule (Swaziland), Stephano D Mbaruku (Tanzania), Goodson Masheka (Zambia), Alfred Misi, Paidamoyo Vushoma, Felistas Mupedziswa, Oliver Masimba, Bester Maramba (all from Zimbabwe)

After the main graduation ceremony, , a Faculty of Engineering ceremony was done where the students were handed their certificates.

Some of the graduates with the Dr Jean-Marie Kileshye Onema (WaterNet Manager), Dr Hodson Makurira (Dean of the Faculty of Engineering) and Dr M Tumbare

University of Zimbabwe, MSc in IWRM graduates expressing their happiness after graduating

Fifteen MSc in IWRM students (11 females and 4 males) from the University if Dar es Salaam, College of Engineering's 2016/17 intake graduated on 12 November 2016. The students are Mosate Tshegofatso (Botswana), Jules Beya-Tshimpampa (DRC), Alice Karimi (Kenya), Matsumunyane Nkeletseng and Cecilia M Moqekela (Lesotho), Judith Tembo (Malawi), Eduardo M Cuamba (Mozambique), Magdalena Shao, Clarance Paul and Chillo M. Selemani (Tanzania), Kangume, Charity (Uganda), Kalonge and Beatrice (Zambia)

MSc in IWRM students at UDSM were part of this congregation being addressed by the Chancellor, Hon. Jakaya Kiketwe

Magdalena Shao (Tanzania)

Clara Paul (Tanzania)

Regional Masters Programme in IWRM, 2017/18 Intake

The Regional Masters Degree Programme in IWRM remains central in WaterNet activities. Results for the 2017/18 intake are out and successful applicants have already been notified. Twenty (20) applicants were recommended for the admission into the MSc program within the Departments of Civil Engineering at the University of Zimbabwe (UZ) and University of Dar-es-Salaam (UDSM) for the 2016/17 intake. The 20 candidates were considered from the 40 shortlisted candidates; with 10 candidates following core courses of the programme at the UZ and specialisation modules at the indicated institutions (Table 3). The other 10 will be considered for admission into the programme at UDSM, which is the other core host institution under the WaterNet Fellowship Programme. Successful applicants will be sponsored through the WaterNet Fellowship Fund.

Table 2: Successful applicants for 2017/18 MSc in IWRM intake

Surname	Name	Sex	Specialisation	Nationality	Host Institution
Chanda	Dau	Male	GISEO	Zambia	UDSM
Rombe	Blessed	Female	WSS	Zimbabwe	UDSM
Sumbu	Prisca	Female	GISEO	DRC	UDSM
Chebungei	Mirriam	Female	W&S	Kenya	UDSM
Malonga	Bardely	Male	W&L	DRC	UDSM
Mwanza	Gabriel	Male	WSS	Zambia	UDSM
Sifundza	Zanele	Female	W&S	South Africa	UDSM
Matsebula	Bongekile	Female	WRM	Swaziland	UDSM
Miriam	Esanju	Female	WSS	Tanzania	UDSM
Innocent	Lyamuya	Male	WRM	Tanzania	UDSM
Segosebe	Tswelelo	Female	WSS	Botswana	UZ
Ranko	Ogone	Female	WRM	Botswana	UZ
Penelao	Nangolo	Female	W&E	Namibia	UZ
Munthali	Gracium	Male	WRM	Malawi	UZ
Ncube	Lynette	Female	WSS	Zimbabwe	UZ
Makalamele	Neo	Male	GISEO	Lesotho	UZ
Rampepe	Suping	Male	W&L	Lesotho	UZ
Mtimuni	Yamikani	Male	WRM	Malawi	UZ
Dlamini	Takhona	Female	WRM	Swaziland	UZ
Teta	Charles	Male	W&E	Zimbabwe	UZ

Key for acronyms

GISEO : Geographical Information Systems and Earth Observations (University of Kwazulu Natal)
HYD: Hydrology (University of Dar-es-Salam)
W&L Water and Land (University of Botswana)
W&S: Water and Society (University of Western Cape)
WSS: Water Supply and Sanitation (Polytechnic of Namibia)
WRM: Water Resource Management (University of Zimbabwe)

Introduction to open source QGIS for Geospatial and Earth Observation

A WaterNet Alumni tracer survey undertaken in 2015/16 signalled the need for developing skills in the use of GIS and Earth Observation among Waternet alumni. As a response to this, a 5-days training on the use of Open Source QGIS software for Geospatial analyses and Earth Observation was organised in collaboration with the University of Botswana as the lead institution with contributions from the Water resources department of ITC, University of Twente.

The main objective of the workshop was to introduce the open source QGIS (including the WOIS) tool and to develop skills the QGIS software operations. With the gained knowledge the trainees should be able to operate QGIS, perform simple gis-operations, perform an image classification and use the WOIS workflows.

The course which was attended by 19 participants focussed on the following areas:

- Introduction on QGIS-based geospatial operations
- Use of Water Observation and Information system as plug-in in QGIS
- Use of QGIS for land cover classification purposes
- Provide information on ESA's Sentinel Programme
- Applications of GIS/EO for IWRM

Africa Drought Monitoring

Mitigating the impacts of drought and famine is one of the primary aims of many governments and humanitarian organizations in the African region. Mitigation, however, cannot be effective if the causes and characteristics of drought events and processes are not well understood through a holistic approach addressing also the monitoring and early warning and the vulnerability aspects. In collaboration with IHP, the Department of Civil and Environmental Engineering, at Princeton University has developed an experimental drought monitoring and seasonal forecasting system for Sub-Saharan Africa. The system merges climate predictions, hydrological models and remote sensing data to provide timely and useful information on drought in developing regions where institutional capacity is generally lacking and the access to information and technology prevents the development of systems locally. A key element of the development of the system is the transition and testing of the technology for operational usage by African partners/stakeholders.

In order to enhance drought monitoring in Southern Africa, UNESCO-IHP partnered with WaterNet in organising a three day workshop to train participants from SADC Member States on how the Princeton University drought monitoring and seasonal forecasting system can be applied in Southern Africa. The participants were specifically drawn from hydrological sections of the water sector and meteorological departments from all the 15 Southern African countries. The training workshop took place at the Department of Geography and Environmental Sciences (DGES), University of Zimbabwe, 9 – 11 November 2016.

The training workshop had two primary goals: (1) knowledge dissemination about drought research and training for workshop participants on the use of Princeton University drought monitoring system, and (2) drought and monitoring/forecast capacity building at the local institution of WateNet in the University of Zimbabwe.

Enhancing resilience in the Limpopo basin through water governance and disaster risk preparedness

WaterNet in collaboration with GWPSA and the Resilience in the Limpopo Programme (RESILIM), held a five day training course on Enhancing resilience in the Limpopo river basin through water governance and disaster risk preparedness. The training course was held in Bulawayo, Zimbabwe from 21 to 25 November 2016 and was attended by 40 participants. Participants were drawn from Botswana, Mozambique, South Africa and Zimbabwe , representing important sectors such as agriculture, education, hydrology, meteorology, hydrology and civil protection. Additionally there were representatives of civil society who are involved in implementing disaster risk reduction projects in the Zimbabwe part of the Limpopo basin. The combination of government representatives, civil society and researchers created a good ambience for sharing experiences . The course focused on enhancing knowledge and skills for addressing the challenges and opportunities in WASH in the low income and peri-urban areas in the region and Africa as a whole.

The overall objective of the regional training course was to build institutional capacity of LIMCOM and targeted institutions to use disaster preparedness action planning to increase resilience in the Limpopo River Basin. The training took into account key concepts such as Water Governance, Water diplomacy, Nexus Approaches and Disaster Management principles and Tools and how these could be applied in practice.

The training process employed facilitation techniques, group work, case studies and fieldtrip. The envisaged outcomes of the training included:

- Enhanced capacity in disaster risk reduction of relevant stakeholders in the four riparian countries of the Limpopo Basin
- A common understanding among the participants of the Limpopo River basin Disaster Risk Preparedness Action Plan;
- Enhanced capacity to facilitate implementation of DRR at different and relevant levels in the basin.

New Appointment

The Board of Directors of GWPSA is pleased to announce that a **WaterNet Alumni** (from the first stream, of MSc in IWRM at the University of Zimbabwe, 2003 - 2004) and Harvard Graduate, Alex Simalabwi has been named the new Executive Secretary, Head of Africa Coordination Unit and GWP's Global Lead on Climate Resilience. His appointment was effective on January 1, 2017. Alex Simalabwi succeeds Ruth Beukman who served GWPSA since 2003.

Alex Simalabwi is an international development professional that brings a wealth of experience to his new role. He has extensive expertise in water resources management, climate change adaptation, economic development, finance, investment strategy design and public policy. He holds postgraduate qualifications in Business (MBA), Civil Engineering, MSc in Integrated Water Resources Management from the University of Zimbabwe and a Master's Degree in Public Policy from Harvard University Kennedy School of Government.

Simalabwi Co-Chaired the World Bank Expert Group for climate resilience, advised the Bank where to invest their climate funds among 34 countries. He initiated and led the design of the Global Water, Climate and Development Program (WACDEP) at Global Water Partnership Head Quarters in Sweden and led its expansion across 60 countries spanning four continents: Europe, Asia, Africa, Latin America and Caribbean. As part of his new role, he will Head the GWP Africa Coordination Unit and continue as GWP global Lead on climate change, providing strategic leadership and direction on climate resilience across the GWP network around the world.

Mr Simalabwi has helped more than 20 countries and governments develop investment plans on integration of water into economic national development. He is the lead author of the report "Water Security for Development in Africa' and led the development of the African Union strategic framework for water security and climate resilient development.

He has worked at all levels starting in his home country, Zambia supporting the water reforms that led to the creation of 10 water companies across the country, and worked in private sector consulting engineering. He was first active with GWP at country level in 2004 when he was appointed by GWP Southern Africa in a project manager role for the IWRM/Water Efficiency plans, before moving to the global secretariat in Stockholm, Sweden. While based at the Global Water Partnership HQ in Stockholm, in addition to his many roles in the water and climate programme, He was also Network Officer for GWP Caribbean, Eastern Africa, Southern Africa and was the Pan Africa Coordinator. He is thus a familiar face in the GWP network, the global intergovernmental processes on climate change, international development and the water sector.

The WaterNet Board of Management, member institutions and the WaterNet Secretariat is very pleased by the appointment of Mr Alex Simalabwi to his new position. The network feels honoured by seeing one of its alumni being appointed to such an important and strategic post in the region.

Upcoming events...

The first AfriAlliance Conference will be held from 22-24 March 2017 at the Birchwood Hotel and OR Tambo Conference Centre, Ekurhuleni, South-Africa, and serves as the inaugural meeting of the AfriAlliance innovation alliance. AfriAlliance is a 5-year project funded by the European Commission aiming to facilitate the collaboration of African and European stakeholders in the areas of water and climate innovation, research, policy and capacity development.

The first AfriAlliance Conference will be hosted by the Local Climate Solutions for Africa (LoCS4Africa) 2017 Congress on Water and Climate, organized by ICLEI Local Governments for Sustainability, Africa Secretariat, in partnership with Ekurhuleni Metropolitan Municipality. The conference will include demand-driven workshop involving interactive and dynamic workshops that provide the opportunity for in-depth exchange of experiences and ideas, Showcasing African initiatives, i.e. innovative African research, technology, capacity development, policy or governance initiative and pitched poster session, presenting highlights from innovative African research, capacity development, policy or governance initiative. For more information follow this link.

The International Association of the Hydrological Sciences (IAHS) 2017 Scientific Assembly will take place in Port Elizabeth , South Africa, 10—14 July 2017. WaterNet session at the upcoming IAHS 2017 scientific assembly in Port Elizabeth , South Africa. WaterNet session #3 Understanding spatio-temporal variability of water resources and the implications for IWRM in the semi-arid east and southern Africa, invites your abstracts for communication, the deadline for online submission is 14 February 2017. Partial funding will be provided to outstanding submissions with preference given to young professionals. Submission of abstracts for the session is now open via the Copernicus online system, here.

GWP is organising a training on International Water Law (IWL) in Africa together with partner organisations. The training will take place in Kampala, Uganda, 5-11 June 2017. Up to 50 people can participate, with funding available for 30 African-based participants. Application deadline is 20 February. For more information follow this link here.