

ACEWATER2 FINAL MEETING 2020
Day 1
3 November 2020 - Video Conference

Ezio Crestaz: Share screen. Ok, please, let me know if you see the presentation.

Cesar Carmona: Ok, thank you very much!

...all which will be showing their results. As for tomorrow, there will be the presentation of various activities, area by area throughout the component carried out within the context of this project. And lastly, there is a chapter dedicated fundamentally to the discussions on the future and the perspectives of the Center of Excellence. So, what the next activities will be, that will be discussed with our partners.

Next slide please. Thank you! So, once again, it's just a reminder very quickly, for those who do not know who I am. First of all, this is Center of Excellence of Nepad, which has been created in 2006 by the going declaration by the African Union coming from the Ministries for Science, Technology and Water resources. Back then, we launched these efforts throughout over the years, much sure of to become quite a network. This is a network you can see here on the screen, as I already explained the whole initiative has been placed under the umbrella of Nepad and the European Union. Our role as DEVCO or the European Union together and CCR is to provide the support to the afford for the implementation of the whole team, so that we together we may coordinate the activities carried out throughout the network.

Next slide please. Right. So, here you can see for yourself, what the different constitutions are that ascribe the network, institutions that are active within the watershed. And next slide.

Here once again, you may see various Centers of Excellence about liaising with us within the network. For example, in West Africa, when it comes to the implementation of certain activities. And very rapid enough to remind you of the activities of this center of excellence within the context of this project. And the second phase of this project, it is about enhancing reinforcing the activities carried out by South Africa and West Africa. We have established literally a network, a network of Centers of Excellence throughout the central and western part of Africa. Then, there is under way, a very critical activity – an activity that is based on the lack of declaration of 2013 towards the development of capacitation program for the consultations and IT technologies in this network. This activity is one that has been be carried out concretely by UNESCO. Next slide please.

Thank you. There, you may see now for yourself, as you very well know, there are various Centers of Excellence. The particularity and the originality of this center by Nepad is that we're now working in close cooperation with the guard political levels. As a matter of fact, throughout the regions and together with the domain of finance lunkers, watersheds and water basins are all very natural modules. Working in water, we work together towards establishing what the priorities and the targets should be. And these may then be perfectly implemented by the scientific centers, developing various activities - activities that are meant to be carried out in such a way as to be able to respond to each one's needs and priorities.

Hence, the importance of the ending this is something very, very specific to be such work what really makes us so original. So, on that I'd like to already give the floor to Ivan Kulis. He's Head of Unit for Management aspect and he is about... He's competent on the sustainable growth and then there'll be the opening remark.

Ezio Crestaz: Thank you, Cesar! Hi Ivan! Can you try to share your screen?

OPENING SESSION 11h00 -12h00

Ivan Kulis (JRC): Hi! Good morning, everybody! It's really nice to be here, and thank you Cesar for inviting me to this session. I don't have slides to share. I will very quickly talk about priorities and future work that JRC has in the area of Sustainable Resources Management. This is based on the work plan that we are also now discussing with different policy DGs in order to optimize our support in different policy areas. So, I would like to say that JRC has overall, a very strong heritage of activities on the global scale and on activities which are focused on Africa.

When it comes to sustainable resources, there are a few things which I would like to highlight. Obviously, Cesar already very well presented the Centers of Excellence. This is very important work, where we look at the water, energy, food and ecosystem nexus, and inter-sectoral dependencies in a cross-border context to allow overall for better management of the Nexus and environmental resources in Africa. Now, in addition to this, we have a few other activities. First, we have a Knowledge Center for Food and Nutrition Security. Now this center, which was launched about two years ago has a very important African component. And there are two mainstreams of work there. First is that it focuses on identifying agricultural production hotspots and anomalies. And there is a whole decision making, support system to guide the different stakeholders in understanding these anomalies and in acting very swiftly with anticipation.

The second thing that we do there is support to identification of the standards which define a famine. Obviously, when a country defines that it has a famine issue, it's based on international standards and JRC is part of the working group together with USAID, together with World Food Program and other UN organizations to understand and to define and to update these standards. Then, another thing that I would like to talk about is our support to work on a diversity area. We have just launched, a few weeks ago, Knowledge Center for Biodiversity. And obviously biodiversity is now a big priority within the European Green Deal. Good part of our work goes to supporting biodiversity issues in Europe, namely Biodiversity Strategy 2030, but we have a very important global, if you want, part of the biodiversity work, where we work very closely and DG DEVCO, specifically in a project which is called Biopharma, which tries to address priorities for improved management and governance of biodiversity and natural resources in Africa, Caribbean and Pacific countries.

Two more things I would like to mention. One is that we are very much preparing the launch of Knowledge Center on Earth observation. This is something that we have discussed with DG Davis, who is in charge of observation work within the commission and policies. And we as scientific body very much supporting this.

Now, what we have seen overall over the last years is that Earth observation has become a very important tool and mechanism, which can support different policies. We have very much worked mainly with only limited number of policy-DGs, so far, but then a couple of years ago we have done a study which looked into the uptake and the potential of Earth observation in different policy areas. And based on this very broad-brush study, we have decided to set up a Knowledge Center, which can deepen the uptake of earth observation in different policy areas. Now, we have a very strong stream of work in support to environmental monitoring in Africa, in particular we have so called E-stations, which have been organized

through the project which is for GMES and Africa, through which different regional observatories have the possibility to monitor and forecast their environmental situation and environmental hotspots. We are very much working to integrate coastal climate capabilities in these E-stations in order to have even better forecast possibility for the local stakeholders.

And then the last thing I wanted to mention is the African launch platform. This is a project that we have started to discuss couple of years ago, when we have produced a flagship report on science support to Africa. What we have done two years ago is that we went very broad within across the JRC and we understood that the expertise around Africa and JRC is very-very rich but it's also very fragmented. Now I am presenting only activities which are linked with sustainable resources that we have activities in the area of security, we have activities in the area of trade and taxation, for example. So, what we are trying to do now, this is again under discussion with different policy DG DEVCO, EAS and near, I just name few, is to set up an online entry Policy for All the richness of JRC data JRC information, knowledge on Africa. And I think that the way we see this is that this is not only, if you want a data repository, which is not so difficult to do obviously, technically there are several things that you need to address but I think that the real potential of this platform is actually at a certain moment to start providing integrated analysis of an interdisciplinary analysis, which brings together this richness and tries to intersect it in a different ways to support two different needs, being on the European, on the African side. And again, this requires quite some work, we are starting with, if you want data repository and information repository, and we will build it from there, in a regular interaction with European and African stakeholders.

Obviously, all of these activities support very much the European Green Deal, and European Green Deal is a big headline ambition, it's a major headline ambition of European Commission and it also has a very strong international component. It's obvious that European Green Deal will be successful, only if the activities outside are aligned with European objectives and priorities, and the few things that I mentioned so far, very much support European Green Deal International side.

So, as Cesar already alluded to, I will need to go for another meeting with my director in 15 minutes in actually, few minutes, so I'm very sorry that I was able to be only very-very short presentation of some of the key activities. But, obviously, should you have any additional questions, please don't hesitate to get in touch with me or with Cesar. Thank you very much.

Cesar Carmona: Thank you very much, Ivan! We will be giving the floor to Martin Bwalya. He is from AUDA-Nepad AUDA NEPAD Focal Point. Martin, you have the floor.

Martin Bwalya (AUDA NEPAD Focal Point): Thank you very much, and, good morning to everybody! I hope you can hear me. My network is not too good, so I'll try to speak now and will switch on the video later.

So again, thank you very much for giving us this space to participate in this meeting. And one thing we do recognize is the importance of this convening and also recognizing that it's not an isolated event, it is actually a continuous process of working together to deliver change and impact in terms of water and water-use systems.

I want to make very quickly just three points: the first one is information to say that in the last two years, two and a half years we have seen a major reform of the African Union Institutions with a decision in 2018, at the end of 2018 and actually constructed mostly 2019 and 2020 is the establishment of the African Union Development Agency. And this is a transformation from the previous Nepad agency, and why I say this is because in the African Union Development Agency there is a new structure. There are two things

that are critical to this discussion. One is the recognition and actually putting a very high premium on the knowledge and file. Knowledge, as a development resource and actually trying to work with Member States regional institutions to ensure that there is sufficient attention in terms of policy, in terms of investments, in terms of capacity to actually generate and use knowledge and science. The other feature of the new setup is actually the study establishment of five Centers of Excellence as part of the structure and priorities for the Nepad agency. And this connects very well with what we are having like the Water Center in Stellenbosch, but also other centers that we are working on. The five centers are going to our best actually, different countries. We have one or new rural resources and the food systems in Dhaka, human capital and institutions in Nairobi; a climate change and energy in Cairo. And we are just now working on one that will be best set somewhere in Central Africa on a supply chain and logistics diverted to industrialization and the continental free trade area. I mentioned these centers because in all of them actually okay... But the last one I didn't mention is the science, technology and innovation, that is being set up in Stellenbosch and is already quite advanced in terms of putting things on the ground.

Now I mentioned all these centers because in all of them as you may have noticed, actually issue of water runs through all of them. And this is important that it connects to this initiative, and hoping that going forward, we will continue to work together quite closely through our center on water in Stellenbosch. And actually, ensure that we're connected to practice, we're connected to policy. And that is my second point that as Nepad agency autonomy development agency, we have a very rich ecosystem of players, cutting across disciplines, sectors, regional, national, continental and global. And in that context we want to provide value especially that everything we are doing is reaching the front line of implementation and we are able to actually influence and contribute to change transformation in the grassroots and that's why when you talk about Nexus, what Nexus we identify is where we want to see very clear connection between the science, policy and practice. And I mention it because in our mandate, this is part of our responsibility to continue to foster actually the connection, interdependencies and collaboration between what is in science, what is practically being done on the front line of implementation, as well as the enabling policy environment that should make it happen. And the and this is an area where we work that will continue to deliver value and contribute to ensure that everything, we're doing in initiatives like this one is connecting to grassroots. And you can also see here our interest in actual leveraging, what is happening in the global shelf in the European Commission, European Union and actually to define those mutual areas where we can do things together. And lastly, is also not to forget that everything we're doing is actually framed within the context of agenda, which also connects very well with the SDGs and in that context we want to, in this initiative to put upfront, actually the nexus between human well-being, where water is a concern and actually, water is going to be water security fundamental in terms of establishing and satisfying human well-being needs and targets, you can come from sanitation to energy to various other health aspects. The other part is water and industry and just because in hygienical three SDG the issue of economic sustainable economic growth is cardinal. And lastly is the element of environment, and I raise them also because they're not an afterthought, we are saying a lot of the practitioners in buying in is because we are clear and concrete about water in advancing human well-being fully in advancing industrial development, and also ensuring that the environment, climate change, actually, framed and is clear how water actually features in there.

So, I would say again thank you very much for this meeting today and tomorrow, and we are participating through our team and colleagues in Stellenbosch. Nico is very much engaged with us, and hopefully together, we can continue to bring underleveraged African institutions, African players to actually deliver more and better. So, I thank you so much and looking forward to very productive discussions this day. Thank you.

Cesar Carmona: Ok, thank you very much, Martin! I will give the floor now to Abou Amani from UNESCO. So, Abou...

Abou Amani (UNESCO): So, let me share my screen. Can you see it?

Participants: Yes, thank you Abou. Yes.

Abou Amani: Ok, thank you. Thank you, Cesar and also good morning to all! We are very pleased and delighted, grateful for being a partner of ACEWATER-2 project. And first of all, I would like to thank JRC for giving the opportunity to UNESCO IHP to be a partner of this project, particularly the component on the Human Capacity Development for which my colleague Murray will make a detailed presentation on the result of that component. I would like also to thank all Nepad Water Centers of Excellence, who were involved in the implementation of this component. We're very grateful for the very good partnership we've had within the implementation of the project, and also to DEVCO, thank you for all the financial support, and also to AMCOW for all the fruitful collaboration on water issue.

So, I have few slides. I will go rapidly on those slides. I will go and present four components of this presentation. The first one is rapidly to give you an overview of the critical importance of capacity development within UNESCO IHP and also the UNESCO Water Family, and also other UN Water Global Framework. And then, I will rapidly go to our partnership with JRC, with AMCOW and also with Nepad Centers of Excellence. And then rapidly key result, just to give you heads on, because as I said Murray will provide a more detailed presentation on the results and then finally, I'll end on a way forward on how are we seeing the future collaboration.

So, here we have a slide which is presenting the IHP framework. First IHP-VIII, which we're implementing now and also IHP-IX which we are preparing. And I want to emphasize on the fact that almost for each IHP phase, water education was a key component and if you look at within this phase, among the six teams of IHP education as a key for water security is one of the key element and also if you look at also the next IHP phase we are preparing – IHP-IX, we can see among the three pillars of this new strategy we have water education in the fourth industrial revolution is really a key element which will be considered.

And all those elements of building capacity also are part of what we call UNESCO Water Family if you know. For those who don't know UNESCO Water Family is comprising of course the national IHP committees in the countries, but we have also UNESCO Water Centers. We have 36 of them worldwide and also, we have the chairs within University who have 63 chairs within universities, and also have the world smart program. We have also what we call UNESCO Water Initiative, we have 18 of them, and through all those components, capacity development is really one of the elements. Of course, as you know the IHP program is first scientific program. We are doing the science also, promoting the science but one of the key elements is really how to use the science for policy decision making, how to have informed decision when it comes to water management. We cannot do that if you don't have well capacity professionals, this's why capacity development is really critical for us. Of course, we're all doing that, regarding Africa to align to also to the Africa 2063 to support actions that we're addressing the challenges, regarding water issues.

Another framework which is very important for which I think I want to emphasize for the future collaboration is this framework what you call now SDG-6 Global Accelerator Framework. As we all know, within the SDGs, SDG-6 is off-track, and the UN Water mobilize and put in place what you call a Global Accelerator Framework which has five components: finance, data and information, capacity development,

innovation and good governance. And you can see within the five priorities, capacity development also is very critical priority because we believe that without capacitated professionals, decision makers, we cannot expect to have a world informed decision when it comes to water.

Now in terms of partnership we, as I said, we have been working with JRC. Thanks, JRC for this great partnership and on how to bring science and policy together in Africa water sector. As I said within the component of ACEWATER-2, UNESCO is in charge of the Human Capacity Development. My colleague Murray will make a detailed presentation on that. Now, in terms of implementation, as I said, we have been working with Nepad Water Center of Excellence to identify what are the needs within the water sector in Africa, and how we can fill the gap when it comes to the capacity within those areas. So, we will see some concrete example of pilot training courses we are delivering on that.

Now we AMCOW. AMCOW is really natural and a traditional partner. We have been working for many years for AMCOW and our focus on AMCOW is aligned to, of course, the AMCOW strategy in order to deliver that strategy. And also, one of the elements is related, of course, to the issue on building capacity of youth. This is very-very important to build capacity of youth which are the change makers, and I believe that is one of the areas for which we can strengthen our partnership.

Now on a result rapidly, as I said, Murray will provide a more detailed presentation. Within the ACEWATER-2 we're supposed to deliver 13 sector-wide analysis, of course, working with 16 Nepad water Centers of Excellence. More detailed presentation will be made by Murray, then we were able to prepare national framework in 11 countries. Murray will have a list of those countries. And as you all know, unfortunately with this situation of COVID, we're obliged to reorient, to reorganize, and to adapt to the situation. In that sense, also we did a work on risk mapping and E-Readiness to see to what extent we can shift the face to face initial planning of pilot courses in E-Learning courses. And as you can see in details, we initially planned to have 44 PRE-COVID pilot training courses, including higher education and TVET. And so far, half of those pilot training courses will be or have been delivered.

Now lastly in future collaboration. Of course, for the future collaboration we're looking forward for strengthening our collaboration within the framework of the European Green Deal. Within that Green Deal, of course, we have many issues related to water and we believe that on the digitalization for knowledge access and mobility of skills and capacity across borders, we can continue building on what we have been doing within ACEWATER-2. And also, we believe that on water management and climate change in alignment to the green economy development is also an area for which we can build on what we have been doing already. This is only to identify some of those areas. But we have many areas I think we can work on it on the issue of building, promoting water cooperation, building peace through water. So, all those are main areas you can consider.

Now, this is my, this is the last slide with the centers of Nepad. I think within the centers of Nepad I think the point here is we need to discuss how to grow the network. We have, as we all know we have network now in West Africa, in Southern Africa in Central and Eastern Africa. We need to look at the Northern Africa, also how to bring on board other key partners from that region. We need also to rule out as piloting we did, because so far, we did pilot, I think now time to upscale the piloting so that we can reach a critical mass of water professionals to build their capacity. And now in terms of AMCOW, AMCOW I believe that for AMCOW the issue is still to continue a strengthening the issue of mobility, exchange of skill and also to strengthen knowledge and new ideas. And we believe that in emerging the issue of parity within the

European Green Deal, the needs within Africa, we can identify appropriate areas, where we can continue building on ACEWATER-2.

So, by ending, I would like again to thank all the partners, and specifically I want to thank the team of UNESCO starting with Murray, Anil and also Hong, who are really the key arm of that component within UNESCO. So, I'm looking forward for fruitful discussions. Maybe, I will not have time to link up continuously throughout two days, but Murray is representing UNESCO in all the discussions. Thank you.

Cesar Carmona: Thank you, dear Abou for very interesting presentation. Thank you for highlighting UNESCO within the context of ACEWATER project.

I will now ask to take the floor Arnaud de Vanssay. I'm not sure whether he is already connected. He had been saying he had had some problems connecting previously. Let me check whether or not he has been able to connect. Otherwise, we may defer his participation for later on. Arnaud, are you there? Arnaud, are you there? Right, Arnaud, apparently is not there. As people say, there are some problems with connection. Now while he is connecting, we will give the floor to the next speaker. I am not sure whether the next speaker is already there. Well, do we have someone in the waiting list?

Athina Ignatieva: Hi! There are no people in the waiting list at the moment.

Cesar Carmona: Ok, maybe they have some issues to connect. Maybe we will give the floor later. So, I will give the floor to Nico in order to start with the presentation of the Southern African network – the activities that have been implemented by Southern African network. Nico, floor is yours.

Dr. Nico Elema (SANWATCE - Southern African Network of Water Centres of Excellence): Thank you very much, Cesar! And I think this is all part of being flexible, I think one thing that we've all learned over the last six-seven-eight months during the COVID time is to be flexible and we've all become Zoom experts and Microsoft team experts. So, I think there's also some flexibility in the program, it will be wonderful to hear the comments from the colleagues from DG DEVCO and inputs always from AMCOW. But I think we if they become or if they login a little bit later, we can just give them the opportunity. So, thank you, I would just like to give a little bit of an overview. If I also refer to the agenda, the next hour, more or less, is dedicated towards the Southern African Network of Water Centers of Excellence. And after that, we will have, at around one o'clock, Central African time, we will have a lunch break. And then we will have some presentations from Western Africa and also from our Eastern African Network. So, that can just give you a little bit of a context of the program. And I think if everything goes well, we could be finished by around four o'clock this afternoon - Central Africa time. So, bear with us, I think, the presentations – there has been a lot of work in the background, but the presentations are prepared and let's see how we can navigate this.

I think also from the outset, I must emphasize, you know the comments that Abou made, the comments that JRC has made and Cesar and Ivan. This is not an effort that we as Centers of Excellence do on our own. My role is to manage the Southern African Network, as the program manager but it's in a full partnership. We've got centers in Southern Africa Network; they are 11 institutions. But we also work very close with our colleagues in West Africa, the five institutions there and the four institutions within East Africa. And indeed, as the comments were made, we should look further to Northern Africa as well, as we expand the network into the future. So, without too much further ado in our session, we will – my colleague Joanna Fatch – she's also within the Secretariat of the Southern African Network. She can give an overview and a highlight of the scientific component and also the HCD - the Human Capacity

Development component within the ACEWATER program. But we will also, if the colleagues are connected, give opportunity to SADC Waters Division to make some comments and reflections also on our role and activities we engage in, because we are very close to SADC as well. But we also have an opportunity for Mandry Intani from the Department of Science and Innovation from South Africa to give a 10-minute presentation. And then, after that we have a “question and answer” session. So, without further ado, can I give the floor to Joanna? And I think Joanna, you will have some presentations also that you can share with us.

Joanna Fatch (SANWATCE): All right. Good morning, everyone! My name is Joanna Fatch and I’m the project manager for SANWATCE, Southern African Network of Water Centers of Excellence. So, I hope you can see my screen. I'm just going to...

Dr. Nico Elema: Okay, thanks Joanna, perfect! You could maybe just put... Yes, put it in slideshow. Thanks.

Joanna Fatch: So, I will make two brief presentations. The first one is going to be on the implementation of the water corporation in Southern Africa, water corporation on Zambezi River Basin project and this was implemented by Centers of Excellence – 10 of the 11 Centers of Excellence took part in this project and, of course, with input from the University of Mauritius, as well in cooperation with Joint Research Center. And together with Zambezi Watercourse commission, we have been studying Groundwater Management Institute among other stakeholders.

So, the main objective was to assess Water Energy Food Ecosystems (WEFE) nexus interdependences and to evaluate sustainable bridging gap solutions based on state-of-the-art reviews and scientific analysis. The identification of priorities needing specific objectives and activities was therefore informed by ZAMCOM strategies, priorities and challenges. So, specifically, the project thought to evaluate the impacts of changing water availability, due to climate variability, land use demography and other pressures by using an integrated approach, including socio economic dimension to develop a state-of-the-art reviews and scientific analysis of WEFE Nexus, to support decision makers with science-, knowledge- and knowledge based tools and methods for the assessment of patterns of cooperation in water issues to enhance scientific and technical cooperation including effective data management among relevant stakeholders at the national and base level, and to provide scientific and technical assistance for monitoring assessment of ongoing undertakings.

So, there were clusters that were put together and this included climate variability and extreme events, surface hydrology, groundwater hydrology and quality hydropower and geothermics, agriculture and water and water governance and information systems. So, in terms of a high-level, kind of presentation on what happened in these different clusters for the climate variability and extreme events, so, this developed or conducted analysis of climate variability and risk assessment of extreme events in Zambezi Watercourse. The surface hydrology cluster modeled current and future hydrological scenarios to assess what availability in the phase of competing water uses and these include hydro power, hydro power irrigation, water supply and ecosystem protection, the groundwater hydrology and quality conducted hydrogeological mapping, and characterization of groundwater at the basin and country scale. This was in Zimbabwe and Zambia, for example, including flow modeling and aquifer vulnerability to contamination.

The hydro power and geothermics cluster models current and future hydro power production scenarios and multiple purpose dam optimization in the phase of competing water uses. They conducted a hydro power economic assessment and a study on the status and future perspectives of the geothermal energy

industry, which seems very high or at least has a high potential, especially in the eastern Rift Valley. So, the cluster also took into account challenges related to climate change, population growth and increased food needs.

The agriculture and water cluster conducted an assessment of baseline conditions, such as crops water demand, productivity and irrigation requirements and modeled future potential irrigation development scenarios-based management practices for food security in the phase of climate variability and change in the basin. They also conducted an assessment of livestock and fish farming, as well as an overview of traditional agriculture practices in the basin.

The Water Governance Cooperation and Information Systems cluster developed a manual on best practices in water governance at the river basin levels focusing on water permits and accountability as well as the development of knowledge management system to support existing water information systems such as Zambezi Watercourse commission, water information system, water ZAMWIS and the groundwater database developed by the SADC-GM.

So, in terms of the key outcomes, in terms of climate change in phase of climate change and using the various scenarios and looking at consumptive water use scenarios, it is estimated that there will be a decrease in the future water resources availability in the entire basin. Particular decline over the Lake Malawi/Niassa/Nyasa sub basin of Zambezi, it's expected or at least from the scenario analysis, there'll be a mild decrease in mean annual water levels for all reservoirs and this has implications also on the decrease in the groundwater levels and return flows and the impacts, especially in humid areas. In terms of hydro power, the mean annual generation, given the scenarios will decline and this could result in the losses of about 2400 Gwh/yr. So, some of the recommendations from this project include the need for a comprehensive assessment of the observed streamflow data accuracy and a better understanding of the interactions between groundwater and surface water interactions, given the critical roles and both resources and the better understanding of future water uses in the basin.

In terms of agriculture, fisheries and livestock, there's a high potential for largescale and smallholder irrigation in the basin and with the potential to increase irrigated area up to 300% by 2025. Similarly, there is a high potential for fisheries and livestock production and this implications for rural livelihood and improving that, especially as well as rural economy.

As for Water Governance, ZAMCOM Agreement and the Strategic Plan for Zambezi Watercourse 2018-2040 addresses water governance and provides room for improved governance at the basin level, the WEFE Nexus approach, as a governance implementation framework presents opportunities for integrated management at the basin level. So, some recommendations include the sustainability or looking at sustainability of irrigation development and looking at it from a WEFE context, both in terms of investment, as well as in looking at the tradeoffs. The importance of smallholder irrigated sector in uplifting rural livelihoods and enhancing food security in the basin and more broadly in the region, and the need to improve fisheries and livestock sectors and the need to enforce good data management practices for science and for decision making and policy.

Thank you very much for your attention!

Dr. Nico Elema: Thank you, Joanna! Are you going to switch over to the presentation for the Human Capacity Development now?

Joanna Fatch: Yes, yes. Okay. So, excuse me! So, this presentation is going to be our experience implementing the human capacity development component of the ACEWATER project in the region. So, the human capacity development component and I will refer to it as to the HCD competent. It supports the implementation of Decision-12 of the 11 AMCOW Executive Committee meeting of 2013 and Decision-14 of the General Assembly 2016, and therefore supports the preparation of national frameworks on human capacity development addressing junior professional and technician level capacity challenges in five pilot countries in the region, namely Botswana Malawi, Mozambique, South Africa and Zambia, including the implementation of HCD frameworks, together with monitoring and evaluation frameworks.

In terms of process, a regional consultative workshop was conducted as a reception of the project to understand the regional water sector, human capacity development context by drawing on experiences and exploring possible linkages with relevant human capacity development initiatives in the region as well as to identify opportunities for linkages and synergies in order to ensure that the human capacity development component supports, adds value and avoids duplication of existing human development initiatives.

A feedback session was conducted during the 1814 it was set up symposium, held in Namibia in 2017 to share progress and implementation of the project, and subsequent project appraisal – project progress presentations have been made to the Water Resources Technical Committee and taken on further to ministers. At the national level national consultations included a situation analysis of sector, excuse me, sector human capacity development initiatives, so as to have a responsive Human Capacity Development Frameworks. National dialogues were conducted with stakeholders to prioritize human capacity development needs. And finally, validation workshops were also conducted with stakeholders to validate outputs of the process and of course, possibly to inform the implementation.

So, in terms of some of the outcomes that came out of that process, I will quickly go through some of things that were quite outthere and were interesting for us to observe at the national level, understanding clearly that sorting of the objective of the process was the same, however informed by the national processes, outcomes or the outputs of these processes may differ.

So, in Botswana, the process contributed to existing opportunities to develop an appropriate national human capacity development strategy that assists the country to achieve its Vision 2036 through an empowered effective and efficient water sector. The process identified some key priority training areas that are outlined on the presentation that included isotope hydrology and integrated groundwater-surface water hydrology, for the junior professional level, and for the technician level borehole drilling and well maintenance and groundwater monitoring and analysis. In Malawi, the process started the conversation for the development of Human Capacity Development Strategic Framework for the Ministry of Agriculture, Irrigation and Water Development with the Ministry of Education also demonstrating ownership of the process. Identified priority trainings included courses within the Master of Science in Water Resources Modeling and Governance (Chancellor College), Master of Science in Infrastructure Development and Management at the Polytechnic University in Malawi.

In terms of the technical level trainings, technician level rather, this included the Certificate program for Water Technicians and the Apprentice Diploma Program for Water Technicians.

In Mozambique, the process informed the development of a Capacity Building Strategy for Junior Professionals and Technician Personnel in the water sector with the process led by the Ministry of Science and Technology, Higher Education and Training. The strategies are currently going through cabinet

processes for approval. And priority trainings identified including Water Quality Management, Water Economics and Governance, Integrated Water Resources Management. For Technician level, this includes Monitoring and Evaluation of Water Quality and the Design and Assembly of Different Water Supply Systems.

In South Africa, understanding that there is a variety of Human Capacity Development initiatives, the process, brought to the need for the development of HCD Monitoring, Evaluation and Reporting framework for the Department of Water and Sanitation with strong support from the Energy and Water Sector Education and Training authority. This Monitoring, Evaluation and Reporting Framework will therefore inform the implementation of the National Water Sector Master Plan.

In Zambia, the HCD component makes a contribution towards the formulation of a national plan and recognition of prior learning, as well as occupational qualifications and technical skills training for the water sector.

Prior to trainings identified in Zambia include Water Resources Monitoring, Integrated Water Resources Management, Environmental Quality Modeling and Groundwater modeling for Junior Professional level. At the Technician level, trainings include Drilling methods and well completion, Field hydrogeology, pumping test and analysis of tools.

Dr. Nico Elema: Joanna?

Joanna Fatch: Yes?

Dr. Nico Elema: There's been a request. Your sound comes and goes quite a bit. And I'm not sure if the interpreters can hear you well. But maybe just speak, close to the microphone, please. Thank you.

Joanna Fatch: All right, maybe now? Yeah. Is it better now? I am sitting in the same position but I think the network is a little messy.

Dr. Nico Elema: Okay, thank you.

Joanna Fatch: All right. Okay. In terms of the rollout of priority courses, this was as already alluded to by Dr. Amani, the rollout of priority courses was affected by the Covid-19 pandemic. It was ambitious at the beginning that we'll have 16 courses for and in every country, specifically in Botswana, Malawi, Mozambique and Zambia, but due to constraints brought about by the Covid-19 pandemic, we've been able to implement eight courses. We either developed a new or reviewed for implementation in this phase, and these are shown in the table presented.

So, in terms of some common gaps, one finds that national policy and legislative frameworks in the five countries acknowledge the importance of human capacity development in the water sector, some instances include funding mechanisms. Yet, this is currently not in effect as relevant institutions to implement are said, provision have either not been formed as yet or are not fully functional. Overall, the challenges lie in the implementation of policy or strategies as well as the lack of clarity in defining the focus for junior professionals and technician level, human capacity development programs in the water sector. It was found that previous HCD analysis undertaken were not necessarily demand-responsive as such results and outcomes have generally not been institutionalized, and therefore not been not been sustained. There's inadequate connectedness and collaboration between key institutions and

furthermore, current academic programs do not adequately address the skills required by the sector, resulting in the industry perceiving graduates as not possessing requisite technical skills to accompany academic qualifications, hence not job ready. This is made worse by the nonexistent or inadequate internship and mentorship initiatives for students to ensure job ready personnel at graduation. Furthermore, existing TVET – Technical Vocational Education Training institution programs do not adequately cater for the skills needed by the sector.

In terms of common needs and priorities, given that these requisite policies strategies and legislative framework, there is need to address implementation issues in HCD in the water sector in the region.

It's important to recognize experienced skilled personnel despite not having formal qualifications. Therefore, it brings to an attention to issues such as recognition of prior learning.

Furthermore, it's imperative to attend to the gaps and the weaknesses in water related programs that capacity building institutions, especially at the technical vocational education training institutions. Similarly, this needs to foster greater collaboration between and amongst capacity building institutions, and the government – with government water utilities and the private sector to ensure that human capacity development initiatives respond to the needs of the sectors. Such collaborative arrangements include placement of students and recent graduates for internships and apprenticeships of relevant institutions. The ministry responsible for water as the sector lead needs to own, drive and be the champion of human capacity development efforts in the water sector in collaboration with other government ministries such as labor and education. This will ensure that human capacity development initiatives are integrated within government policy and strategic frameworks, as well as being responsive to the real pressing needs at the national level. Challenges and gaps in existing curricula at capacity building institutions, both tertiary institutions and activity institutions or technical vocational education training institutions, require a targeted institutional strengthening or revival of the courses that they offer.

So, as a last slide. In terms of the key lessons and some of the recommendations from the process, we felt that as a region, it was important to appreciate the context being cognizant and appreciating the regional frameworks, for example, Regional Strategy Action Plan IV that is now coming to an end and therefore situation with the human capacity development program within the actual world. The human capacity development programs must therefore reflect national realities and be informed by appropriate institutional frameworks, sector and national development aspirations. Human capacity development programs have to add value. So, as a process, as part of the process, it was important to repeatedly ask ourselves what is the value proposition of this human capacity development program to the National Water sector.

Similarly, it was important to understand the water value chain, and we have to understand the water value chain, and to sustain the skills required to deliver sustainable water resources management and water services delivery.

And lastly, it is important that process defined and informed subsequent stages of the program. And as we go forward, how these processes are able to inform subsequent stages of the program. This builds on a ship insurance uptake and informs replication. Similarly, national human capacity development frameworks can be used to leverage additional resources both internally through the national budget and the private sector as well as through external funding as it is happening currently in Zambia.

And this will help in terms of implementation as prioritized actions reflect sector needs and are therefore also most likely to be taken forward and to continue with international processes. Thank you very much!

Dr. Nico Elema: Sorry, I was on a long mute. Thank you very much Joanna for the presentation!

I think in a nutshell, looking at the presentations, I think it is important that we acknowledge all the Centers of Excellence. I've put in a comment there in the chat. Remember this work is not done by us as the Secretariat, it's done by all the member institutions. So maybe I could just highlight the institutions as well for the rapporteurs being the University of Botswana, The University of Malawi, the University of Eduardo Mondlane in Mozambique. In South Africa we work very closely with the University of KwaZulu-Natal, The University of the Western Cape, The Council for Scientific and Industrial Research - the CSIR, and also, colleagues within Stellenbosch University and then also, you know, those were the universities in the pilot countries. But along the way, we still have three other institutions, being this University of Science and Technology within Zimbabwe, and also the Namibian University of Science and Technology, and also the University of Mauritius, who worked with us the spot as we implemented this project in order to achieve joint learning. So, I just want to acknowledge all our partners, and all the effort they've done in this. Along the way we've also partnered with ZAMCOM – the Zambezi basin commission, and especially when it came to our research activities, it was important for us that we don't just embark on this activity as academics as researchers, but that we really make sure that we align our research activities towards the needs and the strategic plans of the Zambezi basin permission. The same applies and you would have seen it in Joanna's comments with regards to our human capacity development initiatives. They we've partnered with water net and other partners as well and working very closely with the member states within SADC in order to define these priorities. And I think also, if I just look briefly back on the journey that when COVID started we had all these wonderful plans of implementing pilot courses, but with the support of UNESCO and the JRC, we were able to realign those activities, and as many institutions were embarking on emergency online teaching, we could undertake e-readiness assessment and also start converting and changing the program in such a way that we could implement these courses, actually online. So, it's been a learning experience, and also looking forward with uncovered a lot of the priorities and the needs.

I also see comments that DEVCO and also, AMCOW is online now. And I think we acknowledge the flexibility in the program. So, I don't know, program director Cesar, you know or if we are missing or we can continue, and then we can continue further with the Southern African network. Thank you.

Cesar Carmona: Okay. So, DEVCO is already there, also AMCOW. So, what I will propose is to give the floor to, as it was foreseen at the beginning, to give the floor to DEVCO to introduce some few words about the activity that DEVCO is implementing in the developing countries, concretely in Africa. After him I will give the floor to AMCOW – to Canisius. Thank you very much. So, Arnaud, the floor is yours.

Arnaud de Vanssay (DEVCO): Yes, Cesar. Can you hear me well?

Cesar Carmona: Yep. Perfect. Thank you.

Arnaud de Vanssay: Okay, so that's great. Thank you very much.

Just first of all, I'd like to thank you very much for organizing this event and for all the work that has been done all these years together with UNESCO. Also, thank you for AMCOW for the support that AMCOW has provided to this program during all these years.

And also, of course, all the regional organizations that have been so important in trying to advance the scientific agenda and water in the region during these years. So, let me first, maybe I can introduce myself. So, my name is Arnaud de Vanssay, I am the new team leader for water in DEVCO. My head of unit – Chantal Marginson and deputy were not available today because they are on holidays, so that's a good excuse, I guess, for not joining. So, they asked me to represent DEVCO today and I'm very happy to do it.

As you all know, water is really important in our lives. When, once you have lived in an arid country, you cannot forget how water is important. In all these countries water is as precious as gold and it's always the first thing that you are offered when entering a house. So, nevertheless the SDG 6.1 and 6.2 are lagging far behind and sanitation and SDGs is probably one of the least advanced even in Europe.

So, a report by the African Development Bank pointed out that in Africa during the period 1518, the financing gap for the water sector was bigger than the combined financing gap for energy, transport and ICT infrastructures all together. So, this financing gap is as high as 43 to 53 billion US dollars.

So, financing an inclusive proper development isn't EU priority for DEVCO and for the European development financing institutions. And this includes of course the water sector, but solutions are existing. Innovative financing resources could be made available, a progress could quickly start but for this you need to have good projects: well-prepared, attractive, bankable with innovative solutions. You need to have effective water governance with well-managed institutions deploying state-of-the-art solutions, integrated with ICT technologies and for this you need talent and knowledge and Africa has got talent, we say that the next Einstein will be African. But knowledge is not always there. This is what these projects end up doing by developing the network of Centers of Excellence, bringing talent and knowledge together. Hundreds of students have been trained and now can work in water utilities to bring innovative solutions to improve water governance, to improve sustainability of projects and to convince investors to step in. This great afford of capacity buildings needs to be continued if we want to reach the SDGs 6.1 and 6.2. But it cannot be done in isolation. This effort is complemented by DEVCO support to the Global Water operator partnership. So, our GOPA with UN abetted. So, the GOPA project will promote capacity building thanks to business to business cooperation and collaboration between water operators from European Union and southern countries, of course proposal is in preparation and should be launched before the end of the year. It is crucial that the private sector, also brings in its knowledge, as well, in terms of technologies, as in terms of management, and this is what we hope to achieve. At the same time, the Nexus project in West Africa, Northern Africa and Southern Africa is resource financed by DEVCO together with different partners, including UNESCO and also the Italians, the Germans allowed to develop important working areas and these projects, identified more than 40 potential other projects, linking water, energy, and food. It is now time to develop these projects till often at the concept level into a well-elaborated and attractive pipeline. And for this we need to gain these talents. But financing is also needed for these pipelines, this is the aim of our new investment in the climate investor to program. This fund is opening a 500 million US dollar window for financing water projects. The fund will pay particular attention to Nexus projects, including those that we have developed in Africa.

Today, we are closing ACEWATER program. However, it is not the end of our ambitions. Innovation, the digital economy, green and sustainable investments are at the heart of the EU agenda for international partnerships. This will be translated in the coming months in concrete programs at national, regional and international level. Knowledge, skills and education should be reinforced across the board. At the same

time, water is one pillar of the Green Deal. We will probably see a growing water portfolio in the coming years. Regional programs will also probably include more water to support priorities identified at the country level. So, opportunities related and further work on this very important topic we need to be done with all patterns for that Centers of Excellence and trained competent people will be more needed than ever - Talent and Knowledge. At the same time, we need to see more integration, what can be the role of the private sector in the centers to share their needs and to support research. Our governance can be further involved in the research agenda and get useful feedbacks for decision making. All students can be traded according to the needs of our employers, so that they can be useful on the market and prepare all these projects that we were talking about.

So, the ACEWATER-2 project addressed research data sharing technology transfer and human capacity for junior and senior professionals and technicians at Africa's water sectors. It was more than welcomed. But this will be further needed in the years to come. We included proposals in our programming, but it will be not enough. All stakeholders should clearly voice these needs at all levels: at the level of civil society but also at the level of private sector, at the level of universities, at the level of the water basins, at the level of regions or at the level of the African Union.

So, let me finish by thanking you again JRC and UNESCO for the excellent work along the years.

And, to thank you for organizing this event. So, this event is reporting and teaching to identify lessons and begin to build your next steps. We will keep a close eye on the results of the next exercise to build our next programs. And we wish you a very fruitful discussions and sorry again for being late this morning. But I hope it's just a tool to be able to further participate and listen to all the great work that you have been doing during these years. Thank you again and enjoy the day.

Cesar Carmona: Okay. Thank you, Arnaud for the presentation, for giving us a flow of activities that the European commission are doing and implementing in Africa, and for giving us an idea what are the next activities the Center of Excellence can continue to implement in the coming years. So, this is one of the main points that we will discuss tomorrow morning where we will speak about the future, the next activities that the Center of Excellence will implement in the coming years. Thank you very much!

So, I will the floor to Canisius. Thank you very much Canisius for being here with us! And the floor is yours.

Canisius Kanangire (AMCOW): Thank you very much Cesar, Mr. Arnaud de Vanssay, colleagues from different Centers of Excellence. I wish, first of all to thank very much the organizers for giving us this opportunity to also participate in this very important meeting, which is mainly to close the project and take on the main results that we have been able to achieve during the last three years. Before I go to that part of it concerning the gains of this project, let me come to some of the key realities and some of the challenges that a project like this, and I hope some successors to this project will have to help us address. In a recent report by the SDG Center for Africa, it was revealed that minimum progress has been made and that, in some countries there is stagnation when we consider the targets we have for the SDGs in general. And the Center forecasting that, except for the North Africa, in all the other regions in Africa, it is unlikely that we will meet the SDGs. This is something... okay it was said in the report, which was conducted through a very serious evaluation of the progress made, but when we go around in African countries and discuss with the decision makers, when we conduct our monitoring systems, when we talk with people on the ground, we noticed that, indeed - the progress is very slow when we have some progress in the countries. And we know very well that in some areas there is very much of a stagnation and in some indicators, we have seen even that countries have gone backwards. That situation has many

reasons and, in many fora, we have been discussing the bottlenecks that we have identified for many countries with regards to what make them not progress. It was a commitment that they have accepted then themselves. And all, look at it through different efforts, we noticed that we have a problem with policies, which are not aligned with the current situation, the current aspirations, the current goals that we have – the SDGs and other high level commitments and because of that, of course, it is very difficult to translate them into sound strategies and plans, which can attract then budget allocations and implementation. We also notice and it is linked to the policy issues, we also notice that we have weak institutional arrangement, which most of the time characterized by too much fragmentation and therefore, you don't have a clearly institution responsible for overseeing, for spearheading activities, for monitoring and coming back and learning from what is happening on the ground.

We also notice that there is very inadequate financing of activities. We believe that for us to attend and sustain a sustainable development, a sustainable growth to start with, and then the status we have reached, we need absolutely to have adequate and sustained financing effort from our own countries. Our donors and development partners will come to complement those efforts, will come to catalyze those efforts, but we need to generate a form of financing within, from within, from the government, from a private sector, from philanthropists and others sources, innovating financing methods, but we need absolutely to generate, most of those finance from within, so that we can be able to grow in a sustained way and be able to maintain the gain.

When we look at the bottleneck, most of the time, we look more at the finance. But we, I mean we as AMCOW and you as the Centers of Excellence. We very much know that huge limitation to the ambition of the African continent may also lie in the inadequate capacity, human resource capacity that we have. We still have very few educated and skilled people in the area of water and sanitation. And because of this, we have many, many...We have to utilize resources, coming from overseas, which are more expensive and which should be needed for more complex works. But maintenance, operations, sustainability of the gain should be done by people in the country at different levels in the governance structures. And that is very much lacking. And I think that is one of the reasons why, even the resources which are generated from different supporters of Africa, don't necessarily result into the progress that we needed to have and into the transformation of the water and sanitation sector that is aimed at by our high level decision making, through different commitments, like Sharm Sheikh, like the Africa Water Vision, like the SDGs, like the government on commitment sanitation, etc. etc.

And yet, we have an enormous force in our youth. As you know, Africa has 60% of its population still aged below 25 years. It means that if we use that strength, educate it properly, put it in research and develop skills, we can change the current situation, instead of keeping the current status quo, where that youth is used by opportunistic politicians for their own interests. I think we need to prioritize. When I say "we" I'm thinking of African government. We need to prioritize capacity building and aim at bridging the huge capacity gap that we have. As long as we will not have a critical mass of skilled people with very solid hands on capabilities, we will not be able to transform the water and sanitation sector and reach the targets that we have said through different commitment.

It is high time for Africa to invest in education, to bring the higher learning institutions, the research institutions and Centers of Excellence like this one to work together and train for specific tasks, so that our graduates can respond to the challenges of the development agenda that we have as a continent, as individual countries. And those governments should again work to make sure that those skilled people

are maintained into the system, motivated to really contribute to the change that we need. It is a time for action in that area.

Research investment has been also very minimal. As long as you don't invest in research, you don't manage to generate new knowledge and innovation will not come. There is even a very weak knowledge management and sharing. And because of that, there is very low uptake of the knowledge, updated knowledge into policymaking decision-making processes, being guided when we are deciding on where to put our investment. And that needs to be changed.

We are currently working on some of the areas like in the development of the African sanitation policy guidelines, bringing in the expertise of many from across the world, so that we can be able, at least to have a guideline, which will help countries to look again to their policies and create the enabling environment that we need to transform that sector. We will do the same for the water subsector and mainly for groundwater where we have already established the program to spearhead those transformations for groundwater and that is the UPAGRO - an African program for African...I mean, for ground water.

I wish to take the opportunity to thank the Centers of Excellence for the role they have played in generating knowledge and putting the knowledge and training people in these areas, so that at least we can contribute to reducing the gap that we have currently in the water and sanitation sector. I wish to comment also the role that played the JRC and the UNESCO, IHP that in the coordination of ACEWATER-2 project. Because, indeed, I attended some of the workshops. Indeed, it was aimed at addressing those issues for the African continent and bring us some solution to the very acute problem of knowledge and innovation in the area.

Today, we are gathered to conclude the project. It is not a happy event. We would wish, I have wished to have rather a celebration to start ACEWATER-3. But I will say that it is also a happy event, because we will be sharing the outcome of successful projects and lessons learnt. And we will certainly derive a number of recommendations, which will guide us who are on the field in different sectors, in different areas to learn from what was done during the three years, and from that create a new path for capacity building and research in the area of water and sanitation. AMCOW will be pleased to take on the outcome, to take on the lessons learnt to disseminate them through our various networks to use them in our different projects and programs and new initiatives to link the centers and those results with the knowledge that AMCOW has just been creating and which would be launched officially on the 18th of this month, I mean, yes, this month of November. And then link it also to those new projects that we are creating in groundwater in transponder in waters and also, in the sanitation area. AMCOW remains available and very much really to partner with Centers of Excellence, with other projects which are working in the area of knowledge creation, knowledge dissemination and empowering the youth, as well as other professionals in Africa, so that we can be able to reach the critical masses that we need to address the many challenges we still have in the area of water and sanitation. I thank you very much and congratulate Cesar and your colleagues for the work very well during the three past years. Thank you very much.

Cesar Carmona: Thank you very much, Canisius for these kind words. So, it took note of the importance of knowledge and education, the role that these concepts are playing in the water sector in Africa, so this is something very important that the Center of Excellence has been developing during these last years. So, it's clear that this is really very important in order to develop technology research and innovation in Africa and we are really happy to contribute there. So, I have to say that during this last year, the Center

of Excellence has produced something like eighty technical and scientific report that we will share with you in these coming weeks, in this coming month.

So, thank you very much. So, I will give the floor again to Nico who was presenting the Southern Africa activities during these last years. Nico, the floor is yours. Thank you very much and sorry for this interruption.

Southern Africa (11h00-13h00)

Dr. Nico Elema: Thank you, Cesar and thank you very much also for the comments from AMCOW - Prof Canisius. You know, over the years we've built up quite a good relationship and we've really seen over the last three- or four-years acceleration of our partnership and also the comments from colleague Arnaud de Vanssay, we haven't met before but I'm looking forward to engaging with you, also from DG DEVCO and see how we can partner together. So yes, I think it was not bad to take this little detour along the way to also hear the comments from AMCOW and also from DG DEVCO. But then just to recap, we have seen the presentation from this SANWATCE – the Southern African Network on outputs in terms of the scientific component which was led by the JRC, and then also the HCD component which was led by UNESCO, and with all the Centers of Excellence in Southern Africa, contributing towards the project.

Part of our session now is also there's a lot of talking, but we still have... I think we are now exactly on time, given the way that we're navigating the agenda. But we also have some inputs from SADC, which I've mentioned earlier, we partner very close with SADC, and to make sure that our activities, support the SADC water research agenda, which we are responsible for and we also, it was approved by the SADC Ministers for Water in 2013. But then we also ensure that we contribute to the Regional Strategic Action Plan-IV (RSAP-IV) and there is a new round and a new revision going on the RSAP-V will probably be launched next year. I'm just not sure if Dr. Caprice Cabey is online. I tried to look from SADC, but also it might have nominated Mr. Dumisani, I'm not sure if they are online. Can somebody just give me an indication?

No, I don't think they... I think they might have had technical issues as well. But, you know, last week we had the Water Net Symposium and there, Prof. Cabey He also made comments. But as I say it's very important for us within the SANWATCE that we build a very-very strong partnership with SADC – with SADC water base, which is located within Gaborone. And there we see guidance, we see the guidance from the member states, specifically in terms of water and then how we contribute to RSAP-IV and the SADC research agenda. But that maybe gives me a very good connection also to the next speaker – Miss. Mandry ... What is your surname again? You know, we know people at their first names, Mandy N. She's from the South African Department of Science and Innovation. So, it's important for us, you know we engage with the SADC Ministers for Water, but we also engage with the SADC Ministers for Science and Innovation. And through the last 10 odd years, the South African Department of Science and Innovation have supported the South African Secretariat here at Stellenbosch University to enable us to do our activities and to engage and continue. So, it's wonderful to have Mandry also online, and also to give us a presentation on how they are supporting this initiative, not just in terms of South Africa, but also within the larger region.

So, Mandry I end over to you. Mandry, sorry Mandry but can I just do a decent introduction?

You are the Deputy Director for Africa Multilateral Cooperation within the South African Department of Innovation and thank you very much. Good to see you!

Mandry NTSANI (South Africa Department of Science and Innovation): Thank you very much Nico and Good morning and good afternoon to the colleagues depending on where you're connecting from! So, from like Nico indicated the purpose of my presentation was mainly to give a snapshot, in terms of how as the Department of Science and Innovation have supported the Nepad Science, Technology and Innovation Flagships over the years. So, in terms of my brief outline is that South Africa currently is the Chair of the African Union, so I will highlight on that. The role that we've seen at the department as the Nepad STI Flagships playing and then also just to remind ourselves in terms of how the Nepad Flagships are responding to the various STISA priorities, as well as how as in terms of quantifying the DSI's investments in brief over the years. So, in terms of my introduction I will indicate that as far back as 2003 the African Ministers which are responsible for Science and Technology had also acknowledged the role of Science, Technology and Innovation in terms of advancing Africa's socio-economic development. So, through a series of beating meetings as well as preparing working agreements, South Africa was awarded the opportunity or the responsibility towards the what I would call the Nepad Science, Technology and Innovation Flagships. So, in terms of flagships that I'm referring to at the moment, I'm referring to specifically to SANWATCE, I'm referring to Southern African Network that is responsible for biosensors that is SANBio and I'm referring also to the African Institute for Mathematical Sciences – AIMS as well as the African Laser Center (ALC). So, we are also very grateful for the support that has been provided by Nepad and currently AUDA, and it was great to hear from Martin in this meeting, because Nepad is playing a significant role in terms of providing strategic support to the flagships, and they also have a number of Memorandum of Agreements that they have signed also with the Nepad Flagships. So, like I alluded earlier, currently as South Africa we are currently the Chairs of the African Union and we assumed this role in February 2020. It is for about only a year and we will hand over the baton to the Incoming Chair of the African Union which will be the Democratic Republic of Congo in February, 2021. So, when we assumed this Chairship, the Head of the State – President Rama Posa highlighted what are the key priorities for us as South Africa, as we assumed AU Chairship, and one of them is the economic development trade and investment on the Continent. We are all aware that the issues of inter-regional trade in Africa is still very low. Hence, the first tracking of the operationalization African Free Trade Area agreement is very imperative, from our point of view. Also, with regards to that is that the interface between science and trade becomes very insignificant at the moment, because we know that science, technology and innovation serves as an enabler for us to become competitive, but mostly also for us to industrialize and be able to trade and be able to produce and consume goods that are also made in Africa. So, hence the operationalization of the AfCFTA becomes very significant. Also, one thing is also a priority for us as South Africa is the promotion of peace and security. And then with regards to that the promotion of gender equality and the empowerment of women as well. Because we know that currently the issues of gender inequality within the continent are a priority. And from a sector perspective as the Department of Science and Innovation, we have also identified the support for Science, Technology and Innovation Flagships as a key priority during AU Chairship as well.

So, the Nepad Flagships, SANWATCE and the other flagships have continued to play a critical role over the years, in terms of strengthening research capacity within the region and within the continent as well. And we all know that the issue of evidence-based policy is very important in terms of assisting as policymakers to make decision within the region and within the continent as well. So, through the various networks, the flagships are able to link research as well as research institutions that are working on similar initiatives across the continent, as well as at the regional level to also form collaborations as well as synergies between existing research programs. And we are all aware of their Consolidated Plan of Action that we adopted as the African Union, as well as key now is the science technology and innovation strategy for

Africa, which are key programs or frameworks that we have, or strategies that we have at the Continental level. But we are all aware that without the programs, without the Centers of Excellence like SANWATCE, we are unable to implement some of those key aspirations that we have stipulated within the Consolidated Plan of Action (CPA) and also now currently within STISA. So, the Nepad Flagships, they play an important role in terms of helping us as the region as well as the continent, in terms of us implementing those key strategies.

So, just to remind ourselves in terms of what are the key priorities under STISA, and then under STISA we know that we have the Eradication of Hunger and Ensuring Food and Nutrition Security within the region. And we are all aware that there is no way we can eradicate hunger if we are not a water secure continent or and a water secure region. As the role that is played by the Center of Excellence, SANWATCE it becomes very imperative in responding or striving to respond to the issues of STISA. The second priority is on prevention and controlling of diseases, as well as the insuring of wellbeing. And currently we are all dealing with a pandemic in Africa worldwide, we are all dealing with a pandemic of COVID-19 and the Centers of Excellence have been hard at work in terms of identifying research that will help us to respond, not only to this current pandemic, but also to future pandemics as well. And then another key priority was on issues of communication, as well as the issue of the protection of our space and under the protection of space, SANWATCE also plays a critical role in terms of creating knowledge within the water cycles as well as the river systems, and the river basin management within the region and within the continent at large. And then also the issues of Pan-Africanism and regional integration are key in order for us to achieve the priority that talks to living together and building the community. And then last but not least is also the role that SANWATCE is also playing in terms of the management of water resources. In this effort, we're trying to create wealth and achieve this is as priority on wealth creation in this regard. So, from our perspective, the flagships have been very instrumental in terms of assisting us, in terms of responding to these STISA priorities as well. So, as the DSI, our wish is to invest in science, technology and innovation. We strive to do that and to create an environment where as additional department we are able to reach out to other member states and have regional integration, because the issues of regional integration are very key for us. Because also, as part of our key priority within recent 2019 White Paper on Science and Technology, the acceleration of Pan African agenda is a key priority for the department as well. So, over the years, we have identified resources and allocated the resources in terms of providing investment to support the operationalization of the Nepad Flagships, and also, this was covering issues of biodiversity, biotechnology, indigenous knowledge system, energy, water, laser technology as well as issues of mathematical sciences. So, to this regard we can estimate that the department has invested about 70 million Rand over the years to support all directions that I'm referring to, including SANWATCE. We are also aware that as the department we have also faced with limited financial restraints as well because previously we used to have multiyear agreements with the various flagships where we were transferring funds directly to the flagships. But from 2015 we realized that we also need to partner with our implementing agencies such as your National Research Foundation and also co-fund in terms of providing support to the Nepad Flagships. And what we are also grateful for their role or their instrumental role that the flagships have been playing in terms of leveraging funding from international partners, for instance, the support that SANWATCE has been getting from the EUSE as well as from UNESCO as well. We are really grateful for that support because we do acknowledge that the resources that we are providing as a member state, they are not enough but through our partnerships and working together, we can be able to provide more support and be able to reach the much-needed support where it's required.

So, I will also conclude by emphasizing the critical role that the Nepad STI Flagships, especially SANWATCE continue to play in building research capacities in the region. And also, we are grateful and also

acknowledge that through the flagships, that is how as a member state we can be able to document or outline that this is how as the region, or as the continent, we are able to achieve the aspirations that we have set out under the Science, Technology and Innovation Strategy for Africa and that is STISA. And like also the previous speakers have already indicated the issues of SDG-6 that is specific to water and sanitation, we are able, through the flagships to make inroads in terms of assisting as to make progress, in terms of achieving SDG-6 as well through SANWATCE. And also, our aspirations that we've made and outlined under the Agenda 2063 through the flagships we're able to make inroads in terms of achieving those aspirations. And we are all aware that the challenge is that Africa's global contribution to their research output at the moment is still very low, however through the Nepad Flagships and through the support provided to SANWATCE as well we are able to produce a lot of peer reviewed publications to also host the technical exchanges and all of these are contributing extensively towards increasing Africa's contribution to the global research output. And currently, whether we are in Africa or elsewhere in the world, we are also confronted with issues of the fourth industrial revolution, and currently we all need to adjust rapidly to the new normal. Hence, investment in human capital is still very crucial for us to leverage on the opportunities that are provided by the 4IR.

And last but not least is that by investing in the Nepad Flagships, we are investing in Africa solutions for Africa's challenges, because when we provide support, when the research is done in Africa, we are identifying that these are the problems that we have as a continent. And these are the solutions that are also aligned to the challenges that we have and we're also able to respond collectively.

So, thank you very much for the opportunity. In a nutshell, this is what I wanted to share with you. Thank you, colleagues. Thank you!

Dr. Nico Elema: Thank you very much, Mandry. I really appreciate your words of support. I always say whenever we engage with the Department of Science and Innovation, it's not just in terms of a funding partner, but also partly in terms of guidance, and so yeah, the department has really given us a lot of guidance over the years. So, thank you very much for your remarks, Mandry! I appreciate that and also send our regards to Mumbai – the director who's always a very big supporter of our activities. Thank you very much.

Mandry N: Thanks Nico, I will do.

Dr. Nico Elema: I think we are perfectly on time.

And because we are aiming towards one o'clock for a lunch break, which will be about an hour, but you know, when I sit here as the program manager for the Southern Africa Network and I hear all the speeches on all the comments made from the JRC, made from UNESCO, made from European Commission, AMCOW, SADC in their absence, also, a Department for Science and Innovation. You know I'm just acutely aware that that's a partnership – a partnership that is being built and nurtured. We, as universities and research institutions are knowledge partners, but we also engage with our funding partners, and also engage with our Member States in order to seek guidance, in order to find the priorities. And working along with UNESCO and all the colleagues throughout this project, it is really heartening for us. I think Prof Canisius has indicated in a sense as it's a bit of a sad day, but there are so many opportunities as well, that we undealt with and that we open up, and then we are realizing that we are just part of a long journey and we identify the priorities. I can open up the floor for about 10 minutes for some questions and answers. And if there are any questions, then we can address them.

I will also have a look at the chat if anybody you're welcome to use the chat box as well. Or you can raise your hand and we can take some questions.

It seems like all the presentations were very good.

Any questions and comments?

Ash Seetal: Nico, I don't see the hand raising sign anywhere, but just two quick comments if I may...

Dr. Nico Elema: Sorry, I cannot hear well. I'm not sure who's speaking at the moment.

Ash Seetal: It's Ash, Nico.

Dr. Nico Elema: Ah, I see hand from Martin from AUDA Nepad

Martin Bwalya: Yes, thank you, Nico. I think Ash was also trying to speak but let me speak then you can also ask him.

I'm actually not asking a question as such. But I want to acknowledge actually the massive, not just work and I don't want to use the work being done but the results being delivered and actually the agencies underneath that act together. The focus should be on how are we grounding a lot of this work through those connections that are being mentioned between the policy and the science, between the science and practice and actually get things happen in terms of demonstrating results and impact on the ground. I think you have mentioned several of the presenters talking about human capacity which we acknowledge also in AUDA and is something that definitely we need to prioritize together and build the human capability, both in terms of quality, as well as the numbers or critical mass of players that actually are necessary for us to make a difference.

So, Nico, what I'm saying is that the presentation from everyone so far actually gives me a lot of optimism that we have...that definitely a lot of new areas we need to impact in terms of solutions, in terms of understanding the problems. But we also have a lot of small lights here and there which we need to pick up and focus on expanding in terms of critical mass of application and scaling up and scaling out. So, thank you very much and I'm looking forward to learn a lot more.

Dr. Nico Elema: Thank you, Martin. Ash, just before I give you an opportunity, I can maybe just briefly want to respond. But just to mention that, I think, working with the universities and the research institutions, we've got a very strong focus on research, but also something that we should and could focus on very much is innovation. And that is often where our, you know, the "rubber hits the road" and through our innovation, we can really make a difference in society. I can also mention AMCOW. I mentioned briefly that over the last three four years, our engagement with AMCOW is really accelerated. I think the foundations were there, but for example, within the last month, more or less, we've had a meeting with AMCOW where they are launching the AMCOW knowledge hub. I'm not sure if that's the exact right term but that is really a platform, which we also see that we can as academics and research institutions contribute to. And for AMCOW to play a continental role in collecting and disseminating and feeding knowledge into the policy frameworks and then, you know, so that it can also lead to societal impact. So, there are a lot of very interesting initiatives going on.

Ash, I see your hand is up.

Ash Seetal: Thanks Nico! Hopefully you can hear me a little bit now.

Dr. Nico Elema: Perfect. Thank you. Not a ghost in the wind.

Ash Seetal: Okay. I was going to take off the video but you might get scared, so I'll leave it on.

Very quickly look I like to point Martin raised and I think this is actually complimentary to the points he raised. And critical for me, you know as Cesar mentioned, there's going to be this technical report coming out with over, closer to about 80 of the project works being showcased in the technical report. I think the key issues given the time in the investment the energy we've put into a lot of the work we've done, and it's not only ACEWATER-2 project, I look at other projects that we've had historically. It's a good thing to see all the work coming together but the follow up and the uptake of the results and some of the work is what always bothers me. Giving the investment we often put into this a lot of intellectual capacity, a lot of energy that goes into the assessments, etc. That needs to really be taken up a little more aggressively in the future I think that's the one point...(noise) That wasn't me by the way.

Dr. Nico Elema: Sorry

Ash Seetal: And Prof Canisius actually mentioned, I'll say some very concerning issues about the extent of our progress in relation to SDG-6, that's actually very scary. It's very disheartening when we look at potential and prospects on the continent. That's something I think if we ever get into a phase-3 - ACEWATER-3, or any other projects, we need to be very mindful of that and how all of what we have done can actually feed into to, you know, these initiatives on the continent. We can't keep saying we've got the suitable potential economic workforce on the continent and we're not really investing in things that we need to do to enhance our prospects for our economic development, for our social development, etc. Last but not least, Nico, what still bothers me is that I still see this big disconnect between again the science and the policy, and I'd say, the political interface. And that's what needs to come out a little more strongly as we move forward with possibly ACEWATER-3 or any other initiatives.

How do we bring the politicians closer to the researches? There's a big gap. Research has long lead times. People take a lot of time to do things, politicians don't have it largely. Research requires a lot of money; politicians don't often have a lot of money in the government space. How do we close those gaps? And I think those are two key things, if we can bring that together, we will start to make major inroads into the implementation domain. Thank you, Nico.

Dr. Nico Elema: No, Perfect! Thank you very much for those comments! And I can mention that within a specially within both the activities, within the science activities and within the HCD activities that we did, we really engage decision makers throughout the process. And you know, we were, for example, ZAMCOM and we sat with him as the decision maker from the beginning and see what are your priorities what was strategic plan. And based on that strategic plan, we aligned our research activities so that the chances for policy uptake is much better at the end of the day. Also, within our HCD component, all these validation workshops that everybody went through involved decision makers, so that we, you know, we did a needs analysis, we validated the needs, the gaps. And at the end of the day, we were able to come up with pilot courses to say they are aligned with water needs and, in that way, close the science policy gap so that we don't just go away as academics and after three years come back and say "oh, here is some research output". I think to a certain extent we've achieved that but you are quite right. You know, that gap is always there: there's a lot of turnover not just amongst academics, but also amongst this. And we constantly have to work very hard to engage with all parties. But through this partnership, I think, through

the years we've established very good relationships with AMCOW and all the bodies, you know, in terms of I said SADC, within the SADC as well, within the Department of Science and Innovation within the SADC Ministers for Science. And that those engagements really help us to ensure that our activities, our research activities are aligned and we try to close that gap between science and policymaking. I actually see, I don't know, Martin your hand is up. I'm not sure if it's all – the end. Do you still have another comment? And then I see Cesar's hand.

Martin Bwalya: Let me put it down. Sorry.

Dr. Nico Elema: And then I see Cesar's hand. And then I think we should wrap it up because we are standing between everybody and lunch now.

Cesar Carmona: Yeah. (Speaking French)

Dr. Nico Elema: Thank you very much. Um, I think if I can maybe ask...I think we should probably wrap the session up. According to the program, it is now one o'clock. But I still want to encourage everybody if you have a question or a comment, maybe even over lunchtime, please, feel free to maybe just type something within the chat. It might be a question or a comment that's also relevant within the other networks and we can, you know, address it throughout the day.

So, I think it's now one o'clock – Central Africa time. According to the program, we have an hour. If we were able to meet each other in Addis Ababa, as we planned, we would have gone out to the foyer and the tickets, you know, the lunch tickets would be available at the door. But I think, unfortunately that's not available and not a possibility. But let us break for about an hour. It's now as I mentioned one o'clock and let's be back at maybe just before two o'clock, maybe five minutes before the time, so that one can just try and stick to the time so that we don't finish too late this afternoon. And I think with that, I handed over and enjoy your lunch!

Fabio Farinosi: Sorry, Nico. I think there are two comments on the chat: one from Fred and one from Arnaud.

Dr. Nico Elema: I think... Let's try and address it, maybe later? Otherwise, we are going too much into the time of the lunch break, as well. Because I think these questions, you know, could also be relevant to the other networks. But please, continue to post within the chat as well.

Ezio Crestaz: Sorry, Nico! I am Ezio. Just a logistic comment that I spoke with the organizing company that everyone may stay connected or may even disconnect. And then they will reconnect in half an hour or one hour. So, there should be no problem. The meeting will be left open.

LUNCH BREAK (13h00-14h00)

Afternoon Session on WESTERN AFRICA (14h00-15h00)

Dr. Nico Elema: Cesar, Colleagues, are we ready to continue? Almost? Can I maybe just ask Awa? Are you online, are you almost ready?

Jacob, always good to see you! Thank you very much!

Can I just confirm Awa from West Africa? Are you online?

Mbayang Thiam: Hello, Sir!

Dr. Nico Elema: Yes?

Mbayang Thiam: Awa, will be here soon. I am her colleague but she will be here soon. I am texting her right now.

Dr. Nico Elema: Perfect! Perfect! Thank you very much!

Dr. Nico Elema: Thank you! Merci beaucoup.

Yes?... Abdoulaye, how are you?

Abdoulaye FATY: Good morning!

Dr. Nico Elema: Good morning! I'm trying to see who is also saying "hello". It's not always easy with the interface.

We hope everybody had a good lunch.

Interpreter: Good morning everyone! - says the speaker. I don't know whether you can hear me. The interpreters are having a difficult time – fall and go.

Dr. Nico Elema: Okay. Yeah, we have not started the meeting yet. We just started trying to get everybody online. Thank you very much for that!

Ezio Crestaz: Hi, Nico! It looks like that there are quite a few persons that have still to connect because we were 44 before and we are 32 right now.

Dr. Nico Elema: Perfect! Thank you for that Ezio.

Cesar Carmona: Prof Gamal? Just to switch to English...We need first to activate the sound. You go down on your screen and to the left there is an icon suggesting that you use computer sound or a system sound. So, please, connect to computer audio. Switch into computer audio, please.

Dr. Nico Elema: Ezio, if you guys can just let us know if we are ready to continue, if the colleagues are online?

Ezio Crestaz: Well, Nico, actually we have still 31 participants. So, it looks like that few of them have still to connect back.

Dr. Nico Elema: Sure, but we can make up the time.

Ezio Crestaz: So, let's wait for 1-2-3 minutes maximum.

Dr. Nico Elema: Perfect!

Ash Seetal: Are you providing coffee, Nico?

Dr. Nico Elema: Oh, strong coffee.

Cesar Carmona: An Italian coffee for everybody.

Ash Seetal: Thank you!

Ezio Crestaz: It looks like you are improving your French every time more and more?

Dr. Nico Elema: (Speaking French)

Ash Seetal: And without African accent, Nico.

Dr. Nico Elema: (Speaking French)

Cesar Carmona: (Speaking French)

Dr. Nico Elema: (Speaking French)

I hope we are not confusing the interpreters too much with this little conversation.

If somebody can just let me know if Awa is online because they will need to present the next session.

Mbayang Thiam: No, she's not. But I think Mr. Faty will do the presentation.

Mw_biedler: Abdoulaye?

Mbayang Thiam: Abdoulaye Faty. Yes!

Dr. Nico Elema: Abdoulaye? Ok.

Mw_biedler: Okay, I remember Abdoulaye how are you?

Abdoulaye FATY: Thank you for giving me the floor. I will be presenting the Western African case.

Interpreter: I'm afraid the sound is very poor. There is no possibility, listen to the speaker. I'm really sorry. Please, ask the speaker to speak closer to the microphone, please.

Dr. Nico Elema: Pardon! Can somebody in French just alert the speaker to speak in the microphone, please? Maybe Marie? Can you help just say that he can speak into the microphone and we can hear?

Mw_biedler: (Speaking French)

Cesar Carmona: (Speaking French)

Dr. Nico Elema: Pardon! One moment! We have professor Awa Fall online. Maybe she will just give the introduction for the session and then one can continue. Awa? Would you be able to give the introduction and then your session? Thank you!

Awa Niang Fall: Okay. Thank you! Let me first of all introduce the speakers and then you will be able to elaborate on the sending aspect and then I will be concluding with the HCD aspect, if I may.

Ezio, are you ready to start our presentation?

Ezio Crestaz: Yes. I don't know if I have the last version of the presentation but I can check. Just a second.

Awa Niang Fall: In case, Abdoulaye can share, also.

Ezio Crestaz: Yeah, if Abdoulaye shares that's much better because probably you have made some minor – last minute modifications.

Awa Niang Fall: Abdoulaye?

Abdoulaye FATY: Yes?

Awa Niang Fall: Abdoulaye, could you please be so kind and share the presentation? Try to use your computer to share the screen, please. You see there is a button allowing you to share the screen. Can you share the screen?

Abdoulaye FATY: (Speaking French)

Interpreter: Yes, we can see the screen but the sound is very poor, I'm afraid. Would you please so kind to tell Faty that he can use the computer microphone? It's impossible to listen to him.

Abdoulaye FATY (UCAD/Senegal): Good morning everyone! This is the presentation about West Africa and the HCD outcomes overview (Pause)

I will try to elaborate on the scientific aspect of this activity. It is the Senegal River Basin as well as the Niger River Basin. And this goes under the priorities established by the Security Council. It is the climatic variability. According to AGRHYMET it is a Polish developed within the context of the validation, correction the organization for the betterment of the synagogue zone.

Interpreter: The interpreter is trying very hard to speak to the speaker. It is impossible to listen to the speaker. Could you please ask the speaker either to use the microphone of the computer or speak closer to the microphone? It is impossible. The sound is very poor. We won't be able to perform. We're sorry, we are signing off now, waiting for the speaker to correct the sound.

Will you please ask the speaker to use the microphone on his computer? It is impossible to listen to him.

Abdoulaye FATY: ...to update the climatic condition data and other data, relevant to Senegal. The Niger River Basin and the Senegal Basins... then work on the variability and the climatic changes throughout this region from one basin to the next. Also, to identify the climatic impact as the level of hydrology, including measurement stations and last but not least, it's hard to come up with material useful for tailor training. This is to enhance capacities and this obviously is about vulnerability. We should be retaining two points. First of all, the things that were working on two watersheds and two countries were very critical. There has been a plethora of data available with some very different climatic zones which is also quite close to sail. And this climatic paradox was conclusive, for example, there are areas where pluviometry was very-very pronounced. And then, when it comes to it, pluviometry is about 200 - 250 millimeters per year. So, you see, there's a major difference, the variation is very pronounced and this happens throughout those basins. This variability was then a circumstance taking into account, although it more seems this variability has a very hard impact on the whole situation.

The flow rates are also affected by this pluviometry and different circumstances, also worked on the need to update the climatic modeling we have been applying so far, it is on the basis of the short model. We did that by way of calibration, validation and simplified simulation and we took into account topography and it wasn't always easy to obtain all the data because of the circumstances and also, we had to take into account some economic data. There has been a variation of data, because some stations were not up to the level of the requirements and therefore data was affected, the core data was affected. There are four countries sharing in the Senegal Basin and that also affected the outcome. The outcome of this mobilization was translated. As you can see in the lower part at various scales. In this context, we have also worked on the various scenarios and climate circumstances, especially when it comes to water behind the dams and not always the case in Senegal. In implementing the scenario, we try to evaluate three different scenarios. First scenario which is the reference scenario. Then scenario-2 which is the medium scenario and scenario # 3 which was truly affected by the need for arrangement of the territory. And this table is very cumulative as it takes into account all users in all sectors that are affected by irrigation.

Besides the contribution of this situation, we may also take into account AGRHYMET's contribution, the Research Center. They have worked on the requirements for modernization, and especially at the level of Niger, there was a calibration model of 28 stations and various data utilized through the coverage of the territory, data referent to flow to the reservoirs and also, we took into account modelisation through these various flows, validation and calibration altogether.

And then some issues relevant to the optimization of the use of water in the Niger watersheds on the basis of the various scenario were developed throughout this process. If we take into account the issue of contribution of the University of Nigeria, they are going to be a part essentially contributed to the development of state-of-the-art validation. By establishing a climate database update, the update database... and taking into account the variability and the climatic change in the light of extreme events, water availability versus water demand are competing use rates. As far as the major reservoirs are concerned, management rules, sedimentation, hydropower production, flood control and environmental flow. Farming in terms of crop, irrigation expansion, irrigation techniques, adaptive cropping patterns, rainwater harvesting techniques; and of course, water level and flood prevention.

According to data obtained in danger, we realized it was the major availability of water. There was some flood, but it was managed through the abrasion of dams and other arrangements. Consequently, there have been some constraints, especially with respect to obligations in the mud in the domain of irrigation and flood prevention, and there have been some health issues in major because of that.

Mw_biedler: Sorry, Mr. Faty. I have a question. Could you please, a bit closer to the microphone a bit much closer, because the translation is very-very problematic, having difficulty falling to the translators and having a very difficult time. Thank you very much!

Abdoulaye FATY: When it comes to the conclusion to draw and the recommendations for Senegal, especially when it comes to the contribution of the various agencies... Given the geopolitical position of the hydrosystems of the Senegal River Basin and the Gambia, given the multiplicity of languages and will have Gambia engaged because there are various languages spoken: Portuguese, French and English. There is a complexity in terms of managing data from that area. It took a great synergy of efforts to obtain the data despite the presence of basin organizations in order to put the value the Gambian river, especially on OMVS and OMVG.

The following actions have been identified. Some pluviometric and hydrometric stations as well as data from Mauritania and Guinea were practically inaccessible while we were trying to assess the contribution of these areas. Most of the stages are not updated because of the difficulties under the COVID-19 pandemic and the health situation. The absence of climatic data temperature, humidity evaporation of basin scale in Senegal and Gambia. And problems having to do with the acquisition of rainfall pluviometric and social economic data constitute a major constraint of the Senegal and Gambia river basins. There has been an agency that practically refused to take part in this investigation. And especially in the case with Nigeria there has been a problem of transfer data or data transfer issues, another problem was the adoption of a more effective climatic change, adaptation strategy to contrast desertification and soil degradation. We needed to tackle data availability issues and but despite calibration some stations, we have taken note of that and the O&G companies in the delta area have generally a non-sharing data policy. And last but not least, the Nigerian Meteorological Agency was unwilling to share data for free. Although the Benue city, diversity and other universes tried to talk them do it. Now about the Benue city, we may sum up by saying that there have been some conclusions drawn: the Niger River and Benue have built up the huge River Delta due to the combined action of sea waves and depositional actions of the rivers emptying into the Atlantic Ocean. River system within the study area present the large runoff due to high annual rainfall from 1500 to 2000mm. The large flood caused by high rainfall intensity brings flooding problems to most urban centers in the lower Niger delta river basin. And a higher focus should be placed on data collection and management by agencies such as the Nigeria Meteorological Agency, the Nigerian Hydrological Science Agency, the River Basin Development Authority and other related agencies and about the contribution of Centers of Excellence.

And at this point, I would like to thank you for your attention. Before I enter into the presentation of the contribution of the Centers of Excellence. Thank you very much for this first opportunity to intervene!

Awa Niang Fall (University Cheikh Anta Diop): Thank you very much, Abdoulaye. I will take over for this presentation. I would like to speak about Human Capacity Building. Therefore, we have been working on this aspect throughout the sectors that has been as a Phase-1. And then we work on the identification of gaps in terms of human resources. When it comes to water sector, more or less, everywhere in our subregion, there have been investigations. All of them reached more of the famine conclusion, the conclusion being... there is a need to work on human resources in both sectors. The Centers of Excellence purposefully while dedicated too hard to implement the land tag declaration, both the African Union and the Centers for Excellence developed jointly a program for the enforcement of human resources and capacities, especially by building on young professionals and technicians active in this sector.

In our West African network as you very well know, we have some five Centers of Excellence. As of the first stage, the four Centers have already carried out this evaluation. We further dealt into this second phase into this evaluation by going beyond the identification that we try to determine the priorities this sector can pursue while developing national frameworks for the enhancement of capacities, as well as pilot projects, but the term we use pilot projects by which to arrange training modules, by which we would be enhancing the sector of water in the various countries.

Following slide please. Thank you!

The first outcomes of this activity led to various conclusion. There is always an insufficiency in human resources. We establish this more or less everywhere, and by saying insufficiency, not just in matters of number of persons available, specifically, an insufficiency in terms of qualifications. We need to have staff

qualification levels and there are some disciplines, some specialties that are not fully covered. And this is something we're suffering in our countries. Various issues are present in terms of how to obtain qualified people, especially in very basic provisions as our drillers in Senegal, plumbers are in scarce into problem or qualified ones. And then there's another sector that is very attractive. Many people may be trained do work in the vein of water origins but then they go away because of more steady and stable remuneration as well, then there is an issue of the lack of control over the management of water project problems in terms of refurbishment of infrastructure. And the problem of the reinforcement of capacities because we definitely, we are in need of a development of training sessions that are better focused and sector specific. And on the table, adjustment column you see a numeration of points decenary aspects in various countries, water quality data and modelling groundwater. Data problems are all recurring problems in terms of obtaining data on groundwater state. The latest studies we had – they are 20 years old or more. And this creates a problem. And then the problems have to do with access to water, hygiene, integrated - integration issues and, yes, sanitation is a problem everywhere and water treatment as well. It's very difficult for all four counties of this zone. Probably there has been a study which was carried out in Burkina Faso when it comes to water. It was carried out by INERA in 2018-2019. It was an idea to evaluate a gap in all countries' members of the network. I believe that that study was carried out by INERA and didn't contribute somehow palliating the differences, and that by having to implement those outcomes we had from the past. What we were able to realize in this company, in the subregion is that, generally speaking, institutions of higher education. Technical training and education institutions are not always capable of fulfilling the aspirations of the sector. Because there is such a lack in specialized people and indeed in Senegal because of the change institutional infrastructure, everything became more difficult. There has been replacement of the previous system. Now this, for example, the former water sector has been undertaking, they say, it undertook to train base technicians in order for these issues to be gathered and the existing directory are not adjusted to the expectations in the sector. We currently have to redesign, reconceptualize so as to reflect the realities. There is a need to develop a more focused training. Whenever there is an issue of establishing and installation, we'll need to post training instinct in order to allow engineers to have a first-hand contact with their missions in the future. Furthermore, the university should be reflecting on how to enhance capacity by way of certified training allowing for this gap as well to be filled. Now the problem of professional vocational training schools is another issue that we have to raise here. Of course, we have the school of Engineers, those faculties that are expected to train technicians and engineers, but we need further specialization possibilities, especially in the sector of water. People who are specializing for water and water treatment because water treatment remains as very critical issue in our countries. Next slide, please.

For HCD national framework for Ghana and Nigeria and based on these national frameworks, we have had some pilot projects. And we worked on those, if you see down there below, in Ghana we worked essentially on the difference between the training available for technicians and engineers and the training dedicated to young professionals coming out of our universities, holding master's degrees and doctoral degrees, not necessarily ready to undertake real action in the domain of water. And then you see the various possibilities for pilot training available. This is about us catering to the needs of each country. There's always the issue of water treatment and sanitation reoccurring problem, a very acute one. The hydrological modeling, which if not working properly might undermine the whole process and this is very critical for our national institutes. In Nigeria the problem of management of a virus project is an issue we do not know how to best manage and administer these programs. From the moment of design down to the moment of implementation these are new real needs that have been manifested by professional sector and institutions acting within the water and have to be catered urgently. Next slide please.

Unfortunately, there were all those pilot projects we expected to have them implemented before this project was over. Still COVID-19 slowed down considerably the activities in that domain as well. Especially the third wave concern since March and all the way through now. So many-many activities...

So, now we need to have a mixed solution, some lessons that may be taught in physical presence and others have to be done remotely. And to this purpose, I would like to express my appreciation to all those colleagues who were able to help us so diligently in developing these activities. There was no one not willing to help us under this COVID-19 pandemic. Our colleagues from the National Water Institute were very diligent they were able on their part to develop their pilot project that was very helpful. In Senegal, unfortunately, we have been unable to complete our fourth pilot project. There have been some constraints, you had to drive around, but the universities were there to provide the solution in the beginning. There was no possibility for us to utilize people coming up the universities and we needed to do that and the universities were very flexible, they adjusted to that. And in terms of conclusions about what we can retain at West Africa ever since 2013-2014 problem studies were realized there is a lack of qualified human resources, capable of carrying out activities from the sector. There is a deficit of equipment in financial resources, this is a regular and recurring need. And we need to do it differently for Senegal, Ghana and Nigeria, also for Burkina Faso.

And next to this problem we are stating on top of that, there are other issues having to deal with the lack of access to data, difficult basically for the data to be exceeded and the cost and the lack of quality information. This is very problematic.

That is situated in the training agencies as another problem. Sometimes, the difficulties for agencies and services consists in conforming with the norms and requirements, especially for the financiers and problems in terms of coordination amongst diverse intuitions. I'm always having in mind the Senegal case, where water is not a transfer competency. This is a competency of this state, it always pertains the state, which is responsible for the sector. The environment, on the other hand, is something the local governments are responsible for. But there is always a difficulty in distinguishing between what pertains the state and what pertains competence-wise the local governance. We have all seen figures for the various SDG's. The reality under which will presently reveal how difficult it is to operate when there are maintenance issues, and all those problems, having to do with lack of adaptation and some discrepancies, especially the discrepancy between what to expect, what we're meant for, and what we can actually do and how to eventually be able to achieve the various indicators when it comes towards the treatment. As I want to insist too much on how important it is. The environment is an issue proper to local governments, water remains competency of the state and this is creating a problem. It is very difficult to work with water issues within territory where the state is the main factor. These are more or less the problems we have and that was the end of my presentation.

Before thanking you and that is not the last version of our presentation. In the meantime, I would love to be back. It was mostly about recommendations; I think we skipped one slide. I say so because upon completion of the various work we carried out in Ghana towards developing project studies and conclusion drawings in Senegal and Burkina Faso, we believe that these are of paramount importance, who work on these pilot projects. And the Centers of Excellence should make a point of integrating this conclusion since curriculum will be established for the training of people. Therefore, prepare custom-made training programs for specialty. I would also like to say that it is very important for us to see a development of the initiative towards the reinforcement of human capacities, such that would be definitely financed by the government. So, but such initiative, our first aid is a very emphatic institutional

frame. Then there should be training sessions and curriculum developed along for total immersion of engineers and scientists entering the sector because they're not always well-prepared to do so. They're not conversant with the realities of these domains, they're just freshmen, and greenhorns are right out of those faculties and they are met with a totally different reality. School minorities is one thing that react to another. This capacity reinforced strategies in the water sector need to have also be translated as the original per African level. If we really want to achieve the SDG indicators and the SDGs applying sector, we need and definitely have to rely on human resource quality without which initiative we might wish to tackle and doomed to fail. If not doomed to fail, at least will be horribly fragile. That was more or less what they would like to share with you. Thank you very much for your attention. And indeed, I'm so sorry not to be able to meet you as we did last year and the year before that because of COVID. I know it is because of COVID but wherever we are, wherever you are. We're near you, next to you. We are all part of the same family for Africa. Thank you very much.

Dr. Nico Elema: Thank you very much, Awa! I just want to confirm, is there a presentation from ECOWAS and SEDEAO on the priorities in the West African region?

Awa Niang Fall: Yes, Janvier Bazoun will do – will deliver the presentation for ECOWAS.

Dr. Nico Elema: Perfect! Then, you can continue. Thank you very much!

Awa Niang Fall: Thank you, Nico! Nice to see you!

Ezio Crestaz: Yes, go ahead. You may share with us your PowerPoint presentation.

Janvier, please share your screen at the lower part of your screen.

Janvier Bazoun: Thank you and thank all the responsible persons for all this program for having carried out this effort! A very critical project for the West African region. We were able even to enjoy the fact of emphasis being placed on very critical issues referent to the development capacity in our area. Hence, there is need to also thank all partners for having associated SEDEAO to your activities. My presentation will be very-very brief. I will try to rely on the interpreter and hopefully this will work as my presentation is not always bilingual. So, I'll try to speak slowly in order to help everybody understand me better. Having said that, I will be very quickly highlighting the issue of the establishment and the implementation of the mission with respect to water and then some aspects on which we're still working. Some priorities that are ascribing the scope established by the world forum on water, because in reality we're echoing those principles.

This thematic, indeed, is part of the whole debate underway within the World Forum and the 2021 Perspective. I have already spoken about in the past, the critical thing to retain is, as far as agent concerned, the establishment of a permanent framework for the management of water resources, it has been a very important step towards managing resources in West Africa, this IWRM. Ever since 2018 this allowed for the creation of this permanent framework. Something that since the Summit in 2001 or something had promised to do, which framework is now currently functioning and then, there is an issue of management sub-regionally by the agency that does in consultation with technical committee and the follow up committee at the Ministry level. These two institutions are those that definitely are in charge of the implementation of whatever happens with respect to Water Resources Management. In 2014 we

started doing this initiative at the center, we created this charge of putting in place and implementing the original policy of the group. This framework is followed up by technical committee of experts, and then the committee of experts coming from countries and organization active within the basin. Meeting every two years and then the ministerial committee, grouping those ministers in charge of water.

So, that was a very brief outline of how we're operating within the basin and within the domain of water management and how the whole edge developed from its inception on present day.

Our mission is to coordinate and implement decisions adopted by CIVIS. Then, it is about coordinating the implementation of projects programs and action plans of GIRE in West Africa, follow up and supervise activities of CEDEAO within the domain of the management of water resources, especially when it comes to integration by the IWRH for sectorial and CEDEAO programs, ensure and continuous ongoing association amongst members of the CTE and the CRCRE, ensure the association with agents in active in water sector and others. And then I would like to further elaborate briefly on the implementation of water resource policies in West Africa. This policy has been developed in 2008. And here we are in 2020, there have been so much change and developments. So here we'll try to have a synthesis of certain milestones, for example, we have had three axes: first of all, the direct assistance to countries about water. And the second axis was in the form of the integration development of the water sector and then a part of the coordination follow-up, and there are some sub pillars of activities, look like to make some comments about the assistance directly available to countries or organizations of the basin in West Africa, there has been much development. 13 out of 15 countries are not benefiting from direct assistance and this helps to manage droughts and other dry period problems. And then we have OMVS, OMVG, ABN. We have the creation of three new organizations. And actually, in all the four basins and there is also a director and an agent working full time throughout the year. So, we are working on various applications.

We are trying in collaboration with UMEOA and CILSS. This is the main document in Water Sector. It is directive on the major hydraulic project within the sector of water. This shared by CEDEAO in West Africa. In West Africa when it comes to the integration, we have the regional observatory for water, which is about to be implemented. Then we are in deliberation, a document to be provided guidance for financial the GIRE other way said the IWRH in West Africa. We are now at the phase of elaboration of a plan towards the reinforcement of capacity. I have to insist on the drafting of this document provide guidance for financing. It is about reinforcing our human resources capacities. It is linked to our effort to develop this observatory. And we have ensured the availability of funds contributed by various CGRE partners towards financing portfolio programs. CGRE ensures the operation of the Technical Secretariat of the Conference of African Ministers for Water, COW and the coordination of the process of sub-regionally speaking of the world water forums. There has been agreement of cooperation stricken with major institutions that are active in the sector of water in West Africa, especially the pan-African agency for water. And when it comes to priorities, as I explained already, there have been various projects that are of major critical importance. There are programs dealing with drought as a help, for example, this is critical. And you can see here what the region is.

The specific objectives of the program are to improve access to drinkable water for populations, by way of implementation of 2000 different drillings within zones that are definitely affected by either violent conflict and drought as is the case of Burkina, Mali, Niger, Nigeria and another country that may not be under conflict presently, but is stricken by drought. And then it is also important to implement an institutional and the legal mechanism, efficient enough so as to ensure the implementation and follow up

of the IWRH with participation of states benefiting from such funds and various other public agents beat of the private or of the public sector.

Another project that is worth mentioning is the creation of the observatory. We have indeed been working on a project launched since the early 2015 and it was about the creation of the observatory. The outcome is a module a follow up and evaluation of the sector. This is a platform that is now available and which comprised the definition and identification of indicators country by country and indicators of the organizations active in the basin. The organizations are those that already dispose of their own observatories. These are observatories active within that context, when it comes to this project we have acquired also, digital module allowing us to follow up very diligently all active level observatories. In the long run what we aspire to is to render this observatory fully operational. So, but all countries involved may benefit from major activities and in order to benefit every country has to furnish their data and keep you updated at all times. These will definitely properly help Centers of Excellence and this is a very important component in the whole activity. This is about being able to definitely getting such a point as to provide good organization and make these modules truly operational.

Another very critical project is a project of the CEDEAO. CEDEAO has been trying to work ever since the inception of its program on the establishment of legal and institutional framework towards fulfilling this mission – a mission that has been launched by the UN. And what is now about implementing an action plan, and together with other organizations acting in the basin established module for implementation we have the framework, convention towards the development and modernization of infrastructure and module. It is a very ambitious project. This food-arrange and the water tower on top of which range will be best utilized for water, to be best utilized in the area, which is also about preserving these arrange a very important West African infrastructure that allows for enforcement of water of the entire western African region. And last but not least another project that is of major importance is the implementation our strategic plan for the enhancement of capacities and restate the project is available, and we need to find some aspects, before it becomes fully operational. This is a critical program and we need to do that by taking into account what has been accomplished so far. We need now to fine soon, and hence, improve the achievements and be able to put into bring it ahead and it's complicated in terms of excellence. This is important to be able to capitalize on what has to be accomplished to go further. In the next years, hopefully, we will be able to improve all of those aspects, this project is meant to better in the West African region.

Concluding, it is our action to the benefit of the cross border-cooperation. It is about us being able to improve cooperation on both sides of our border lines. We have been working on various treaties as to Helsinki and the New York treaties. These are legal texts under which countries, sharing borders are meant to cooperate towards the betterment of conditions of life of the populations on both ends of the line. It is about follow up and help to countries, members of the CEDEAO and organization, to the basins. And then, access amongst resources made available under the organizations towards fulfilling these objectives. There's a project other way for the development on the initiative of UNESCO where it's about us, establishing a hydrological mapping of the zone. We believe that through this mapping, we expect to have completed soon. Will we be having an overall global picture of the situation. And some final thoughts in terms of perspectives...First of all, it is about helping improve the quality of drinkable water and the treatment of water. Member States, we as far as completing the process of promotion of the two new basin organizations that are operating cross-border basis in West Africa. Then we're aspiring at demand of knowledge on the underground other resources, as well as promoting a rational management thereof. Then, we are aspiring to helping towards the enhancement of capacities of the water basin organization

sector in the region, as well as to ensure a better involvement of these organizations in the regional IWRH process. The enhancement and further implementation of institutional mechanisms and legal modules, regionally speaking for IWRH in West Africa, and by that having in mind working better in the light of a directive on water infrastructure, directive in the matter of shared water resources, hydrological standards and further harmonization. We are also working towards an improvement of the task of coordination, as well as establishing synergies at the regional level. By that, I mean that we need to ensure an incentive evaluation and activation of for the lines worldwide on water. I have in mind CILSS, CEDEAO or BAD and some other activities that was more or less what I had to say. Thank you once again for bearing with me and thank you for your attention.

Dr. Nico Elema: Yes, thank you very much, Janvier! Thank you for the comments.

Cesar Carmona: Nico, we have another presentation from Aram Ngom.

Dr. Nico Elema: Ok, we're running a little bit overtime at the moment. So, maybe of colleagues can just help to communicate that we're a little be tight. But yes, I think the presentations are important.

Cesar Carmona: You can go ahead with your presentation, madam.

Aram Ngom (OMVS): Yes, here I am ready and willing to carry out. Can you hear me?

Cesar Carmona: Yes, we can hear you very well. You may therefore go ahead with your presentation. At the lower part of your screen there is a button, where you may share your screen with us. We can see that, not for the moment. For the moment, madam, we don't see anything on the screen. Please, share your screen.

Aram Ngom: Right! So, thank you very much for having invited OMVS to take part in this very critical event. As Mrs. Fall very well set yourself, we are accustomed to meet physically somewhere. That was the state of play until very recently because of COVID. However, we're now obligated to work remotely. I really apologize, it was only last night that I was able to complete this presentation madam Palma spoke about this, so I had to very quickly respond. Hopefully the data you will receive will be your agreement. Here is the plan of presentation I am proposing some fundamental elements about the Senegal River Basin. I will tell you about OMVS: its inception, the mission and some conclusion. As far as the presentation OMVS is concerned, maybe these are things you already know very well through your activity in your respective organizations. This is an organization active within the Senegal River Basin. 1800-kilometer-long, it is a river long enough to be shared by many countries like Mali, Mauritania, Senegal and so on. It is Inginia that this river springs from and you see the current territories it crosses. There is a surface of 300,000 square kilometers. Our mission, we may retain that is about achieving the odd sufficiency in alimentation for the people of the Senegal basin to reduce vulnerability of the states' economies with the climatic changes accelerating the current economy, maintaining the balance of ecosystems in the sub region and especially BFS and ensuring and bettering revenues for the populations, living along the to the basin. In order to achieve these goals, we have been equipped with legislative framework. There is OMVS founding convention, you know that, it is how we were creating it back in 1972. Then there's another framework about the legal status of the basin. It is at the convention about the public Work Project, and that another legislative framework governing the financing of these activities. Under this convention we see that all this is a true system of those we had back in 1997 being equipped with two companies: one company is a managing public worker and another one administering and further exploiting the basin. So, briefly speaking we have had the management of waters for Senegal and then in 2006 the international code for

navigation transports, in 2010 we have had the establishment of SOGENAV for the navigation operation. And in 2017 there was established the SOGEOH for the public works administration to retain almost all of legislative texts endorsed by the statesman have been ratified ever since by the national parliament. After the regional level, we and... first of all, regionally speaking, we have the conference of heads of state and government, the Council of Ministers and the High Commissariat, which is the organ for the execution of the organization. If they implement the decisions adopted by SCG and CM in conjunction with the company. And then there are the consultation advisory agencies, the parliament commission for water the consulting... sorry, the Advisory Committee of Partners. And also, it is important to retain but all these committees and agencies are very active also coordination-wise.

Here are our achievements. You see this map of the various work sites, but they'll be neither materialized nor under way of being implemented. They are the hydroelectric dams in various areas and with those dams you have to add the greener dam is the under construction and two more dams on the way of construction. Here's what we have said as far as the priorities today. Given the watershed problems so far, over the last 50 years work on the environment because of this degradation that may even undermine the well-being of population which is why we need to have good management of a drought that has been tormenting us since 70ies through to the 90ies was the same time deal with... Africa has their own tradition of exploitation on a craft the basis of water resources.

Interpreter: We are, sorry but the sound is very poor now.

Despite the problems we've had, we should not be discouraged from working towards bettering situation. Water waste that is directed discharge in the natural environment and the use of chemicals is an issue has been with. Nowadays, placer drilling and other activities are in development. The extraction treatment of gold are also current practices in the Southern Bakoye. And as in some areas there are so many machinery and activities that this has a very destructive impact on water. There is therefore risk for the health of population, there is threat against the water resources and the falling flora, there is a risk for perturbation in all waters, there is a distortion of the hydraulic state and other problems. So, our shared basin in general and a Mali and Senegal, more particularly are victims of this practice. Nevertheless, all those countries have legislation necessary for these three sectors to be better managed which is water, environment and the mining. This is why the OMVS after its mission has been able to organize itself better.

These are awareness creation, so inclusive, there have been awareness creation mission in 2019. There has been a trip organized for reporters that were there to sensitize people further on the need for better management of waters. There's also, a problem of some invasive flora. There is another problem we have in the watershed in Senegal. The aquatic plants that are invasive in general are very critical when it comes to the WEFE and to that OMVS has been placing quite high urgency.

Another priority is to become further acquainted with cold ground waters and the way they're affected. Research in that sense will have to be monitored accordingly. About office in Senegal, we were able to establish a state of play to stop tagging and then carry out feasibility studies and planning on those sides selected for priority action under the Senegal program - (the names) and high basin of Mali. Always with Senegal we held the research project within the context of the scientific support against the degradation of land, the level of the Senegal River Delta. There have been research actions on the way. And there was a quality assessment study for the water in cooperation with JRS, the national services and certain laboratories in Mali and Senegal.

So, in conclusion, because of what we have explained so far and despite efforts already carried out, research will still have to put emphasis on priority issues concerning research in quality of water. Knowledge of underground water, there has been an effort towards managing better the climatic change events. And thank you very much for your attention. You see there are various sectors that are affected by our activities from stock raising to irrigation, power generation and you see these very lovely leverages are endemic region. And also fishing, all these sectors, activities that are affected and should therefore be able to benefit from better water quality. Once again thank you for your attention!

Ezio Crestaz: Sorry Nico, may I make a comment?

Dr. Nico Elema: Yes, please!

Ezio Crestaz: We are quite late on time. So, I would suggest to anticipate presentation from Eastern Africa and then focus on the question and answer session at the end. What do you think?

Dr. Nico Elema: No, no, I want to propose that we...Um...I think, maybe one can handle the questions and answers in the chat. People can post in the chat some comments. But then we break now for a tea-break according to the agenda. And then we continue after the tea-break with Eastern Africa. That will help us to just to keep the packages together. So, I think I want to make a suggestion that we put all the chats, all the questions and answers in the chat. And then we break for tea and then after the short tea-break, we can maybe make the 10-minute tea-break, we return for Eastern Africa.

Ezio Crestaz: Should I only point out that we have already quite a lot of questions in the chat and so, we should also address the questions that are still pending there. Okay. Back in 7 minutes.

Dr. Nico Elema: Perfect!

Ezio Crestaz: Okay, thank you! Bye!

Tea break

Eastern Africa Session (14h00-16h15)

Dr. Nico Elema: Thank you, everybody. Thank you for making contributions also in the chat. As I indicated we are running a little bit late. So, we just need to respect the time also of the other presenters. So, I want to suggest that you continue to make your questions and answers in the chat. And I think for the last session, we will focus on the Eastern Africa. If I can just recall: we've had the opening remarks this morning of all of our colleagues and then the presentations from the southern Africa network. And then after lunch we had the presentations from the West African network. Now for the last session, we will have some presentations and also from our colleagues in Eastern Africa. And for that I would like to hand over to Prof Gamal Abdo who is from the University of Khartoum and also, Dr Mohammad Bashir, they are within the Secretariat of the East African Network. So, Prof Gamal, can I hand over to you and could you also just manage the time and all the presentations during your session. Thank you very much!

Gamal Abdo (University of Khartoum): Okay, thank you very much Nico. Can you all hear me?

Dr. Nico Elema: Yes. Perfect. Thank you very much.

Gamal Abdo: Okay, Good afternoon everybody and welcome on behalf of the Central Eastern African Network of Centers of Excellence, which is basically Addis Ababa University, Makerere University in regards to obligation center in Kenya. I also take this opportunity to, you know, express my sincere thanks to our colleagues in JRC, UNESCO, IHP for their gained efforts in leading these two components: science and HCD components, and also colleagues in the Eastern African Centers of Excellence for their great effort, the excellent work they have done. We will start the presentation by Mohammad Basheer. Muhammad Basheer, are you there? Hello!?

Mohammad Basheer: Yes, yes, I am here.

Gamal Abdo: Mohammad will start the presentation with focus on science component outcomes and I will follow afterwards. We tried to make a very simple presentation without too many technical details just for raising the main issues, outcomes and conclusions because of time. Okay, Mohammad can start.

Mohammad Basheer: Thank you very much Professor Gamal. Can you see my screen? Can everyone see my screen?

Everyone: Yeah, yeah!! We see!

Mohammad Basheer (University of Khartoum): So, I am going to give a quick overview over the scientific component. There are three main focus areas: climate variability/climate extremes, hydrology water balance and hydropower, and other water related livelihood: agricultural, health, etc. All these focus areas have been formulated in the form of scenario-based analysis supporting WEFE Nexus in the directive towards decision making.

So, in general in East Africa, I think these are also common problems for most part of Africa. There are some key challenges including a growing demand for Water, Energy and Food (WEF) resources and these are mainly driven by a growing population, driven by urbanization and economic development and climate change. All these are putting pressure on these resources. And these growing demands highlight the need to adopt an integrated approach like the Water Energy Food Ecosystem (WEFE) Nexus approach. And the need for adopting this approach is due to growing interlinkages of the three resources as a result of their growing demands; and then the failure of using fragmented management approaches of the water, energy food ecosystem sectors; and then they need to use the available resources more efficiently due to their limitations.

So, within the scientific component, we have two geographic domains: we've got the Blue Nile Basin and then the Lake Victoria Basin and these were handled by the different East African Networks. So, the Blue Nile was studied by the Water Research Center of the University of Khartoum and Ethiopian Water Research Institute and the ICPAC which provided the climate analysis by Lake Victoria Basin was produced by Makerere University and the ICPAC as well. Each of these institutions had different roles, different methods, different deliverables. As I mentioned, for example, the Blue Nile data was actually installed by the two different institutions which was divided. The upper part of the division was started by the University of Khartoum. Sorry, the lower part – by University of Khartoum and the upper part by the AUU. Lake Victoria was by Makerere University in addition to ICPAC, and then the climate variability was ICPAC. There were also different topics, they're all around WEFE Nexus assessment, but there were slight differences depending on the region. So, for the University of Khartoum there was a general assessment and also including how we can better go to impact WEFE Nexus in the lower part of the basin. In the upper part, there was also an exclusion of water quality and health; and in Uganda, with the real focus on climate

change impacts on maize yields, plus the case with land use and land cover; and ICPAC produces the water balance model for Lake Victoria and also looked into climate variability and extreme events. Different tools were used to achieve this. Just goals and different deliverables were also achieved in this project.

In the Blue Nile Basin, the University of Khartoum and Addis Ababa University worked towards developing baseline databases on hydrology and water uses so this is the basic information on some water related parameters, developed water location models for the water, energy, food and ecosystem Nexus in the upper and lower parts of the Blue Nile Basin, and also in the upper part there was a development of some water quality assessment guidelines. Different tools were used to the MIKE by DHI, RIVERWARE, HEC HMS and others. And on the right-hand side, this is just a sample figure of a number of water, energy, food, ecosystem metrics that are plotted in a parallel axis, this is just a sample of the results that we produce for the Blue Nile Basin.

Regarding the Lake Victoria Basin, the ICPAC and Makerere University developed water quality and quantity hydrological models for Lake Victoria and looked into also land use land cover changes, and the impact of climate change of mass production and that was combined by Makerere University. And they're looking at how climate change is going to impact on water availability and hydropower. And on the right-hand side, these are plots of the observed and simulated flows that for the two models that have been produced, so, the upper one shows Lake Victoria Water Level and the lower one shows the Water Flow appointed in the region.

Regarding climate analysis, the ICPAC Center provided climate analysis for the two SADC regions. So first, they started by conducting a historical assessment of droughts and floods looking at the frequency of trials on floods, and then they looked at projections for how climate change this is expected to impact floods and drought occurrence in the two situations. And then they also provided access, and also developed databases for hydroclimatic evidence. On the right-hand side here, this is just a sample plot which shows the frequency of climatic events in the history to the historical frequency, using two different rainfall produces, this is looking at the CRU product and looking at the CORDEX regional models.

So, the conclusions of this work... so the lower Blue Nile. It was found that there was an assessment of several supplies or import products due to a scarcity of ground rainfall data, and it was found that the African Rainfall Climatology Version 2 performs the best in the basin. And it was also found that there is a strong association between environmental flow provisioning, irrigation water supply and hydrologic conditions, so when there is enough water, environmental flows are satisfied and hydropower and electric are maximized. But when there is scarcity, then all these metrics suffer. And then on the GERD or the GERD analysis, it was found that the steady-state operation of this town was going to improve quite a number of metrics in the lower part of the basin. In the upper part of the Blue Nile, it was found that the amount of water generated by the catchments in the upstream is actually sufficient to satisfy the water demands environmental flows and hydro power, except for the lake Tana catchment.

Lake Victoria. It was found that when water demands increase in the future that is going to put, to impose more deficits on domestic irrigation water uses. And, then also number of plant hydropower plants were identified and it was found that implementing these plant hydropower projects today will increase hydro power generation significantly. On the land use and land cover analysis, it was found that there is a rapid growth in urbanization with over 800% between 1985 and 2014. That's pretty high compared to agriculture expansion. Then also looking at the impact of climate change on maize production, it was found that climate change is going to negatively impact maize yields.

Now looking at the climate analysis, it was found that the frequency of wet/dry conditions whose future is going to be. Sorry, in the passage, while there are three years, and these are mostly attributed to El Nino event. And in the future, in the projections between 2021 and 2050. It is expected that, you know, to have high frequency of wet/dry conditions.

Finally, my last slide on recommendation. There is a need to conduct an extensive evaluation of satellite-based rainfall products in the lower Blue Nile basin due to a scarcity of ground, meteorological data. So, satellite-based rainfall can be quite useful there. And also, climate change is also expected to have some impact on WEFE Nexus in the lower Blue Nile Basin. So, that still need to be investigated and referenced towards JRC. There's generally a need for better river flow and hydropower data, rainfall data, and that's for both the upper Blue Nile and the Victoria Lake Basins. And then this recommendation is based on the climate analysis which shows that climate projections are quite significant that should be considered in country's national strategic plan. And lastly, there's just a general recommendation that in the future, it's better to start the study in collaboration together, rather than becoming between different institutions; rather than waiting until the end to bring everybody together and coordinate the work. So, in future work it's better to start from the beginning the coordination and collaboration.

Thank you. That's all from my side for today.

Gamal Abdo: Ok. Mohammad can you continue presenting? I will take over. Just show the slides.

Ok, now for the HCD component. I mean the main task; the main objective is to develop Human Capacity Development Frameworks in the countries. The process is very similar to what have been shown before in other centers. Needs Assessment: for the identification of the Human Capacity Gaps in the water sector and then development of Pilot Courses based on Sector Priority Needs. Lastly, the implementation of Pilot courses. There was a very important component that involved a Program for Student and Staff exchanges between the different centers but from the beginning it was canceled because of COVID-19. Mohammad, next slide.

The challenges from the different reports submitted by the different centers. Challenges are more or less the same, what you have heard before:

- Lack of adequate human capacity in all countries to develop and manage their water resources sustainably.
- Lack of policy framework and adequate funding for human capacity development.
- Lack of training institutions that provide high quality training especially for technicians. Most of the institutions for the technicians have been upgraded. As far as technicians' trainings, there is a big problem in most of the countries.
- There is also brain drain affecting the professional and skills capacity of both the water sector and the training institutions. I mean, just after being trained, they just leave the country because of the poor environmental conditions. This is a very big problem we suffering in Sudan as it's in other countries.

- Some challenges regarding the administrative and financial procedures, especially in Sudan. Here we have a big problem financially because of this we have delays in contract signing in Sudan. But this is very special type of problem and we manage to solve it.

Here are the priorities for different countries and for the region as well. Of course, there are many priorities but we have grouped them into four categories: Water supply & sanitation, IWRM, data and modelling and water quality issues. As you can see the water supply & sanitation area shows the highest priority not only in different countries but also for the region as a whole. Country-wise it's the same, as you can see in the plot here. So highest priorities are water supplies and sanitation. Of course, water supply and sanitation, there were so many issues by service water, ground water, water supply, water treatment, water network and all these things. IWRM involves so many areas as transparent water management, institutional aspects, environmental and economic issues of water resources management. Next slide.

So, then the frameworks have been successfully completed for all the centers. And also, the priority pilot training courses have been identified. For Sudan we have identified 4 pilots. Two for young professionals and 2 for technicians. We managed to implement 4 pilots, that was before COVID-19. We had about 120 trainings from the different institutions whether professional institutions, universities and research centers. In Ethiopia, we also identified pilots for the detail of the courses but implemented only 2 pilots, face-to-face, I mean. In our case they are all face-to-face i.e. pre COVID-19. Next slide.

Uganda identified 5 pilots: two for young professionals, two for technicians. But they have identified fifth one for senior professionals on water diplomacy and negotiations. They managed to convene this pilot course for about 30 senior staff members and it was implemented face to face, plus E-Learning using zoom.

For Kenya courses had been identified but they could not implement any one of these courses because of COVID-19. Next slide.

So, the conclusions: Human Capacity Frameworks for all the centers had been developed and they have been completed. Most of the Pilots could not be implemented due to COVID-19 and delays in administration and financial issues.

Recommendations:

It is very important to complete the implementation of other courses which have not been implemented.

The students and staff exchange, we think, is very important components in enhancing collaboration and exchange experience with different centers. And we plan to have it not only within the Central Eastern Africa Centers but within all the Nepad Centers of Excellence. So, I hope this component is implemented in the future.

Collaboration with key Regional Actors for the sustainability is very important like IGAD and NBI and other characters in the region. We hope that these regional actors can support implementation of processes that had not been implemented.

Another recommendation is the output of the project should be used as a foundation for developing comprehensive Framework for Human Capacity Development for the Water Sector in Africa. The work

that has been done in this regions and other regions. I think there is a need to compile all these efforts in one document for Human Capacity Development Strategy Framework in Africa.

Also, Framework should further shape the current curriculum at different training institutions for technicians and professional levels. Most of them, they don't consider this. They do trainings but it's not a part of student evaluation or the final evaluation of the students' performance. It's very important to fulfil this component also. Next slide.

Here are just some photos, documentaries of different activities carried out in some of the centers.

And thank you very much!

Dr. Nico Elema: Thank you very much prof Gamal. I just want to confirm. I see there's a gentleman online from the Nile Basin. I take it. Will you maybe just do the introductions, please?

Gamal Abdo: Yes, yes. I think, I mean, the Nile Basin Initiative is a very important basin wide the institution mandated for water resources development and management in the Nile resources. And we are very happy to have with us here Professor Seifeldin – the director of NBI. To tell us more about this institution, its objective, its mandate and also the priorities and future programs related to water issues.

Professor Seifeldin, if you are with us, you are welcome and the floor is yours!

Prof Seifeldin (NILE BASIN INITIATIVE): Thank you Prof Gamal, and thank you all for the invitation.

Good afternoon! I have a brief overview about NBI. I'm going to share screen with you so I can manage from entity. Let me make sure that I have shared the screen with you. Is it shared?

Gamal Abdo: No, not yet.

Prof Seifeldin: Ok, just one second! Let me share the screen with you. Is it shared now?

Cesar Carmona: Yes, your screen is there. It's your presentation that you should launch now.

Prof Seifeldin: It's here now?

Gamal Abdo: Yes, now it is OK.

Prof Seifeldin: Ok, thank you. I will start from... It is the Nile Basin initiative. This is a brief review. I'd like to talk about who we are and what we do. The Nile Basin initiative is an intergovernmental organization. It is a partnership of ten countries. The countries are Burundi, DR Congo, Egypt, Ethiopia, Kenya, Rwanda, South Sudan, The Sudan, Tanzania and Uganda.

NBI was established on February 22, 1999 by the Ministers in charge of Water Affairs in the Nile Basin countries. It is the only basin-wide institution that is mandated to facilitate the cooperative development and management of the common Nile water resources on behalf of the 10 countries. It is the first time when 10 countries agreed shared on one vision. It's the first time in the history of the Nile basin agreed on one vision. It is to achieve sustainable socio-economic development through the equitable utilization of and benefit from the common Nile Basin water resources.

So, the objectives of the NBI is to develop the Nile Basin resources in a sustainable and equitable way to ensure prosperity, security and peace for all its peoples. To ensure efficient water management and the optimal use of the Nile water resources. Also, to ensure cooperation and joint action between the riparian countries seeking win-win gains. The last objective is to target poverty eradication and promote economic integration.

The structure of NBI is the secretariat and this the high level of governance. For the time being, it is the Council of Ministers, assisted by Technical Advisory groups, you see. With the headquarters of the Secretariat indeed there are two arms, the Subsidiary Action Programs, we have got it really easy. One arm is representing the Eastern Nile with the office in Addis Ababa and the other Subsidiary Action arm is for the equatorial region located in Kigali, Rwanda. And also, we have Regional Expert Working groups and these are mainly dedicated for these projects including Technical Advisory Groups and other experts depending on the project. And we have also four components which are represented by the Transboundary Water Affairs Units in the countries. And as you see there is an interlinkage between the expert groups and focal points.

Mandate of NBI – Three Core Mandates: facilitating basin cooperation, water resources planning and management, water resources development. And mainly to facilitate cooperation is to undertake, to provide a common platform for countries to engage, consult and deliberate with each other and also with other Nile stakeholders on a regular basis. It aims to build broad political and civic support for transboundary water cooperation in the basin.

And the other core part is the Water Resources Planning and Management. This is to provide critical services in building Basin-wide technical competencies and capabilities and supporting science/knowledge-based decision making to monitoring and sustaining the Nile water resources.

The last core mandate is the Water Resources Development. This mainly focuses on identification and preparation of cooperative water resources investments that demonstrate to the basin population the benefits accruing from cooperation.

Our strategy for 10 years from 2017 to 2027. It is focusing on six goals.

- The first goal is Water Security because of the lack of time, I will only give a brief overview. It is mainly focusing on meeting rising water demands.
- Goal 2 is Energy Security. This is about unlocking and optimizing hydropower potential.
- The Goal 3 is Food Security, which is increasing agricultural productivity and production.
- Goal 4 is Environmental Sustainability, which is protecting and restoring degraded ecosystems.
- Goal 5 is Climate Change Adaptation to prepare for climate change impacts.
- Goal 6, the last goal, is Transboundary Water Governance, which is mainly dedicated to bringing people together to build a common ground for win-win benefits.

Achievements from 1999 to 2020 is mainly, you see, the confidence and trust, which is built through Nile cooperation. You see, we have one vision that brings all the Nile Basin countries together: 10 countries and 20 years of constructive cooperation.

Achievements are mainly in knowledge and capacity: in empowering countries and people to manage their water resources efficiently. The main achievements: 16 strategies provide policy directions for Nile Basin countries, 10000 knowledge products are produced by NBI, 30000 people have benefited from capacity building activities through the NBI. Also, on the issue of joint investment. This is mainly to transform lives and sustain the environment. 6.5 billion dollars accumulated investments which is the volume of all finalized projects. 3 Centers, the secretariat and two subsidiary action programs to leverage its unique potentials. So, from the 84 investment projects 17 are in the identification stage, 18 are in the pre-feasibility study stage, 11 in the feasibility study stage, 23 are prepared, 8 under implementation and 7 operational.

Key challenges are divided into 2 categories. The first point in category 1 is to the health of the Basin, the river and the people, which is scarcity in the region, vis a vis population size and the demands as food, energy, urbanization, economic growth, etc. and the potential impacts of Climate Change.

To the Institution, there are four challenges: legal foundation. We all know that the Nile Basin Initiative is a transitional institution and it is to transform this transitional institution into permanent Nile River Basin Commitment. Also, one of the major challenges is to bring Egypt back to NBI, which we always call inclusivity. And we know that Egypt and Sudan froze their activities in 2010 after upstream Nile countries decided to sign the cooperative framework. And then sustaining and consolidating the gains is also a big challenge. And then ownership and resources which is the commitment of the country and the visibility.

Lessons learned. Main lessons are here because of the lack of time I have only opted for two. While multi-country, multi-level and multi-sectoral consultative processes are complex, lengthy and expensive requiring consistent, predictable and flexible funding, they are key to ensure relevance to country needs and ownership.

And the last one is inherent slow pace of realizing joint investment projects means delays in meeting demands of growing economies and populations. This, in turn could lead to unilaterally planned and implemented investments and ultimately affect the spirit of cooperation on the Nile and the sustainability of the River Nile itself. This is the last slide. Thank you very much!

Gamal Abdo: Thank you very much professor Seifeldin for your very informative presentation of the Nile Basin Initiative and the big role you are taking. I think for the sake of time we move ahead to the final, presentation of this East African network, which is a presentation about IGAD, IGAD activities and the future programs related to water resources and environmental management. I'm happy to call on Fred Mwangi to give this presentation. Maybe if we have time at the end, we can just get a chance for just one or two questions because, as I found it is four o'clock now. We are almost at the end of today. Fred, welcome!

Fred Mwangi: Thank you Prof! I won't take much time to say. I thank you very much and I 'm really happy to see Professor Seif. Thank you very much for very good presentation. You have covered all what I wanted to say, ah? We have been together for many years.

Let me just download my presentation. That will be very fast.

Dr. Nico Elema: I think, if Prof can just unshare his screen at the moment. Then other presentation can also be loaded.

Fred Mwango: Yeah, Prof. Seif, please remove your presentation.

Gamal Abdo: Professor Seif are you there?

Fred Mwango: Can you see my presentation?

Gamal Abdo: Yes, we can see it!

Fred Mwango (IGAD): Thank you! My name is Fred Mwango from the IGAD Secretariat. I was very happy to have been associated with this research work. I was very happy to see what the East African organizations were able to do and I think for me there is need for a strong recommendation for the success of this program, pretty sure that exactly one Gamal said is done.

I was told to talk about water priorities within the region and what we may be doing next.

So, to say the truth, the leader what Prof Seif said is exactly more of ourselves. And I'll just give a few of what we're doing at the regional level there are more towards issues related to water governance and cooperation. And there we are talking of a program transboundary water governance and the cooperation. And this one we started in 2016 up to 2018 but it continued with some funding from HDC. And the main objective of this program as it is also in the regions like SADC and ECOWAS, mainly to strengthen regional frameworks and stakeholders' inclusiveness like what Prof Seif was saying in the mechanism for operation in managing transboundary water resources and also here, strengthening next position and the problem solving because I don't know how it is in the other economic communities, negotiation skills are not given in other countries in terms to that there is a more of a playing ground. There is a deliberate effort to ensure that we strengthen this aspect through capacity building, and therefore capacity building in hydro-diplomacy negotiation and also towards benefit sharing. Benefit sharing is very key because instead of always going to narrative form of metric sharing, you can easily to share the benefits and everybody will be satisfied.

Of course, the main objective or the main aim of this program, also regional level was also what we do is through promoting and strengthening of the legal institutional processes. We are to do that through capacity building, via more training and also study tours to ensure that people see exactly what happens here in occasion of taking our technical colleagues to a summary to see how people can see our water without complaining, without problems and also to the Rhine River. And also, the main thing is also to promote investment because why should we have resources and then we don't use for economic development. I mean that's a key. So, when we're managing the resource might be transboundary or a national resource, can be also investment that we also move ourselves from issues of poverty and that kind of thing. Then we had another program also building bridges and governance. I ended talking much about governance because in this region water governance is a problem by itself. But I think you don't share out the problem; you really talk about it and then you look at the aspects of how you can improve the water dominance for it not to be an impediment to development. And we want to ensure that whatever we do with our transboundary waters, we have benefits out of what we have. A capacity building also, you can see some other people who are within here being capacitated in terms of water governance, in terms of negotiations and in terms of hydro-diplomas. Hydro-diplomas is also a very complicated thing but it's very necessary in a region like ours. I studied like I said to the summer and also to the rain. It was a very key. A capacity building, we had capacity model talking about a hydro diplomacy. We really work with International Water Law because we discover that some of the countries within our region, capacity is very low and you heard Professor Abdo saying, talking about a brain drain, this is very

true. We have got a number of very good International Water Laws but they are not within the region, they are gone. Yeah, so I really don't know what we can do, but I think we have to continue to capacitating countries to ensure there is understanding of international legal frameworks when we 're talking of the UN water convention. What does it mean to countries, what does it mean the role of transboundary aquifers, so that we don't fight over issues when they are those instruments, which can help us to settle disputes' ending?

Now we are on Horn of Africa groundwater initiative project. I think, like another region you find a number of countries facing with droughts. But this broad water is too costly resilience, mostly in the periods of droughts. Those are benefits that we want to have. We want to get knowledge of groundwater in the region, I discovered that majority of the countries have not done enough of a groundwater assessment and therefore, they have no knowledge of the ground water potential in individual countries. And therefore, I think it's a program that we are running up to a next year, and they suggest that we may even go beyond.

What we want to do in the future again as a region: we want to continue with the issues of ground water because of the resilient aspects. Resilient – because in every or two years we're watching droughts which clear we're against, and I think we want to ensure that water groundwater becomes like a pillar for the sort of thing. Transboundary water governance we want to continue with it to ensure that they will never fight our water. Instead, we should develop our region and then get the benefits. Also, we want to ensure that we continue with capacity building in international water law and it's good enough that we have got a lot of institutions where we can easily do this. Currently we are cooperating with Makerere University for some of these things, but also, we can do with other universities to ensure it's all inclusive. We are seriously considering the use of water infrastructure development mostly through the Nepad so that we mitigate issues through the climate change droughts. Again, we also want to emphasize issues of study towards at least to learn from those guys, or those people who have gone ahead of us. And with that, I want to thank you very much for your attention!

Gamal Abdo: Okay, thank you very much Fred for your presentation. I can see a lot of commonalities between what you are doing and what different Centers of Excellence have done. And I hope to enhance collaboration between IGAD and the Centers of Excellence. And as you remember we already have had MoU between SANWATCE and IGAD. Unfortunately, we haven't done much on this but we need to activate this MoU and have some collaboration in the future. Thank you very much for this!

Fred Mwangi: Thank you Prof!

Gamal Abdo: I think now we are almost at the end of time. Maybe I can allow just few questions, if somebody has burning question to Fred and Prof Sief. Just few questions and then we'll close because it is already time.

Dr. Nico Elema: I can also maybe just mention. I think in this time, we can also provide Ezio for the opportunity. He's been moderating the questions in the chat and there's one or two that one can also maybe just highlight that, you know, within the session. So, it's not to hijack the SANWATCE question and answer but we can maybe combine. If there are any questions in terms of East Africa but and then maybe also just give Ezio the opportunity.

Gamal Abdo: Ok! Go ahead Ezio.

Dr. Nico Elema: Ezio, are you there?

Ezio Crestaz: Yeah, well I am here. Okay. Look, I will try to provide a short overview of the issues that are being addressed in the chat. I would like first of all to mention the comment from northern side this morning that it provided some links about projects that can complement a shorter, that the links are in the chat, but we will capture them in a text file and so this will be ready for being distributed. So, no need that you try to copy and paste yourself, you will have all these links. All is from Arnaud; a generic comment that some have already been addressed by interesting presentation, which is mainly related to the gap with private sector and the need to fill the huge financing gap that I'm currently reading as the need for good projects based on good science and training. I think that this is an interesting topic to be addressed also tomorrow and somehow, it will be at the core of the discussion and future actions that we will have tomorrow. Of course, I would mention and I'd refer to the comments regarding the HCD, and particularly the mismatch or the manpower shortages that have been mentioned. I'm thinking particularly to the presentation of Awa and to the issue that most of the time the teaching initiatives, addressing needs in terms of graduates and technicians that in the end they are unable to find employment. As Awa mentioned they find employment that are underpaid, so they finally migrate to other sector, which is a big issue because it has been also mentioned many times in the past. Actually, I'd say some most of the time we have trained a genius walking the streets. Well, I don't know if the situation is so negative but anyway, there is this kind of problem, of course. Hydrogeology has been mentioned and by CEDEAO as well, and so the topic of groundwater somehow stepped in the comments, in the chat.

Moving on, there is a comment from Professor Jacob Ehiorobo. I looked at the presentation and realized that part of the work that has been performed by the University of the Nino has been not properly recognized or credited in the presentation. So, it's basically an error, that would be corrected, but please, when you go back to the presentation on the scientific component in Western Africa, take care that one of the activities performing Nigeria was focused on southern part of Nigeria on the Delta area and challenges have been focused on climate variability analysis in the region.

Then moving on, there is another issue that I think it is general interest that a question if the presentations will be shared. Of course, all the presentation will be shared and we are collecting the last versions of the presentations from all the participants. As Cesar clearly mentioned, it also in the chat there is a large amount of activities, reports, manual databases and even modules. So, as long as there will be no any constraint or specific constraint to share, for example, the data because there is a confidentiality issue or something like that, of course, all this material will be shared and we will speak about that in the session of tomorrow morning. And again, there is a last comment which we first need for constant and sustained investment of time and effort and ongoing communication to complement the scientific efforts, and this is again food for thoughts for the debate of tomorrow. It's all on my side.

Dr. Nico Elema: Good, thank you, I think. Do we still have some questions also for East Africa? I did see some comments about the presentation from IGAD and so forth. Ok.

I must say we are only 15 minutes late. You know sometimes when we have meetings, we have a very long overrun. But I think, given all the presentations that we've had, I really want to thank everybody for keeping more or less to the time, so that we can also respect each other's time during the day.

And I think we would like to...we should conclude the meeting now. But I would, I'm not sure if there are any other logistical highlights. But I saw in one of the emails that the zoom link for tomorrow is a different link than we used today. So, please remember. I think, just check the emails. There is a link or an email from the organizing company that actually indicate the different link for tomorrow session. So, tomorrow we're going to focus on beyond the ACEWATER-2 project and we are also going to have some presentations from the European Commission, from UNESCO and just to wrap things up a little bit.

And remember that we start at 11 o'clock Central Africa time tomorrow. So, 11 o'clock that's what... nine o'clock, more or less in West Africa; nine o'clock or eight o'clock, depending where you are. And then also, around 12 o'clock in East Africa, but it is 11 o'clock Central Africa time. I'm not sure Ezio, Cesar if there are any other logistical comments for tomorrow meeting.

Ezio Crestaz: Yeah. Well, just a brief comment the presentation that cannot be delivered today from South Africa, it will be probably rescheduled tomorrow that we have space to do that. So, we will slightly modify the agenda and we will communicate tomorrow. Of course. from the logistical point of view, I would recommend all of you to connect, well, in advance. And I would like to remember you that the waiting room will be open half an hour before the starting time. So, you have the time to check for any issue and try to address, and of course, we will be there to try to facilitate solve any issue that you may have in connecting.

Dr. Nico Elema: Ezio, I see that there is a comment from Yazidhi, just to ask the organizing company to resend the link; and I see Cesar has copied it. So, I'm not sure if this comment will be concerning the email as well.

Ezio Crestaz: Yeah! No-No, that's a good comment – the comment from Yazidhi. We already spoke with the organizing company and they are aware that they have to send – to resend an email today with the link for the connection today morning. So, I think that if you look at your previous email, you will have your link. But for whatever reason if it's better for participants to have a look at the mailbox today, they will have another email by today.

Dr. Nico Elema: Thank you very much!

Fred Mwangi: There is one more comment.

Dr. Nico Elema: Yes, Fred.

Fred Mwangi: Yeah, I'm not sure I'm attending tomorrow. But there's one thing that I must appreciate when you look at work done by universities. I appreciate this input very much and also support from Ezio and colleagues from EC but this is being a very good initiative, I'm not seeing beyond, I'm not seeing a recommendation or the success of this initiative. In fact, it is very nice to have universities working in the south, in the east, the north...you know, wherever we are working. It's a really very good initiative, and I would love to see a success of this issue, not be the end of this. So, I think there must be some perennial put into this, we can continue.

Dr. Nico Elema: We will address that tomorrow Fred, I think. Tune into the same radio station and you will hear the songs, what we sing in terms of moving forward. But always good to hear your wisdom and your clarity to keep us on the straight and narrow that.

Thank you everybody and we will see each other tomorrow. I see, Cesar wants to make a comment but he is on mute. Cesar, we cannot hear you, you're on mute.

Cesar Carmona: I just want to say that the Fred has made a very good introduction for tomorrow. So, we will speak about the future, we will speak about activities that we'll be implementing for the coming years. Together with the collaboration of our colleagues in DEVCO and also with all the Centers of Excellence of the UNESCO as a partner. So, thank you very much, everybody.

So, I hope to see you tomorrow morning or together for speaking about this future. So, for tomorrow, The European Commission, fund JRC and UNESCO will introduce the essential activities because most of these activities have been mentioned by you during this day like the hydrogeology issues like also other capacity building activities, regarding concrete topics that have been addressed. So, hope to see you there tomorrow morning. Thank you!

Ezio Crestaz: Ok. Thank you all!

Dr. Nico Elema: Thank you, Everybody! Bye-Bye!

Everyone: Bye-Bye!

ACEWATER2 FINAL MEETING 2020
Day 2
4 November 2020 - Video Conference

Intro Day 2

Murray Biedler (UNESCO): Ok, thank you very much. Cesar, and everything and as I put up in the chat box. Now, that you finished discussing, we can begin the discussion for today. So, but interesting points, Ash and something to address later. I would say that I've observed that some of our exchanges with the Centers of Excellence in the regional meetings that individual centers have identified uni-sector wide analysis, a closer relationship and opportunity to start building active relationships with political actors in the sector and do they byproduct of an activity and I agree with you and I think it's really worth emphasizing and putting to focus on that in future activities.

For today, we have as Cesar says, interesting discussions coming up, we will start today with a very fortunately a presentation from SADC, which we were not able to benefit from yesterday. But we will have a presentation today from Dr. Patrice Kabeya from Southern African community, development community, and he will be presenting, if I am correct, on the regional strategic action plan for SADC, that will be followed by presentations from the JRC and it's you on behalf of JRC and myself on behalf of UNESCO IHP on the science and the human capacity development activities set, it will not be a recap of the presentations of yesterday, which are our partners in the secretarial very nicely presented in detail the results and some of the outcomes of their targeted activities. Today, it's you and I will present rather cross-cutting elements, cross-cutting issues that we have seen moving across the, of the activities from day one and also any parallel or extra inputs that have a reason from the program in the project. Then we will take a small tea-break or an emergency break, whatever you required and that will be followed by one-hour session, which Cesar mentioned briefly, where we will address quickly priorities within African Union and European Union, like the water, climate and political issues, which they prioritize for their future developments, scenarios. We will look at some key questions that we can address within our experience and profile on our expertise linked from the ACEWATER activities to our individual specialties from the Centers of Excellence some questions that we can address and we look for answers there and it will be essentially discussions on the future. Future priorities, future scenarios and potentially future actions for all of us is what network. So, I think that's it for the moment. Can someone confirm whether Mr. Patrice Kabeya is available online?

I'm looking for names.

Patrice Kabeya, are you there?

Perhaps a different time zone, right? But I'm not... yeah, go ahead Nico.

Nico Elema: I will try and send him a WhatsApp message, also, with the link of the so maybe we can continue and...

Joanna Fatch: Hello, hi. He is joining in just now. Because he was in another meeting and program had so, yeah.

Murray Biedler: Ok, thank you for that Joanna, so, yeah, we will standby.

So that, interesting scenario Ash on the diarrhea's during the apartheid year. I remember, honestly a number of people that I knew that we're doing these kayak marathons down the rivers, especially in the town and the number of them that were moving back with dodgy stomachs and diarrhea's that having to have special treatments, which sometimes went for days and days. And clearly nobody ever spoke about

the people who lived there day in and day out. So, that's definitely part of the history and clearly reflect the politics of the day as well. That's sure.

While we're waiting for Patrice to get logged in, is there any other observations, are any points from the discussions of yesterday that one would like to raise quickly, if we have a minute or two?

Ok, well, no need to rush. Patrice will be joining us in a moment.

Cesar Carmona Perhaps I can make some comments on the discussions that we had yesterday. Among others, I would like to thank you all, the different regions and the different institutions that are part of the regions and the representatives of the different regions for the quality of your presentations. That is a first thing. The second aspect I would like to raise it that there had been serious of points that has been identified and that is more than interesting, as it will motivate the discussions we will have later today on water diplomacy as well as it's marker of the underground water, which is the very critical topic, always, very actual and all presentations more or less help touched upon based on as a high priority basis. I therefore, rejoice in the fact that recent acknowledged and all these specialists in underground water, who took the floor knows in the matter of underground water I assume the presence of the specialists that announced in the matter of hoping with us. Capacity building was doubled very to the point and is closely who out taking other activity describing the context of our project. Whole thing is that appreciated to political issues a hand that needs for the politicians to be well framed inform them fully aware of our activities. So, about we all go in the same direction. There are policy makers that are on the board or they are members of the technical committee, so that we are aware what is happening on there before starting the second stage, I don't know what needed time, is there part two?

Murray Biedler: He is on the list and he is there. Patrice, welcome to join us today. I've briefly introduced you and nice to see again since our last meeting, which is quite some time ago now, it's more than a year ago. So, welcome and we look forward to having your presentation. Can you run the presentation from your side? Can you share the screen over?

Patrice Kabeya: Now what I will do, thank you very much, what I will do just make a brief highlight and maybe later on I will submit the presentation. The highlights to the committee. Hallo?

Murray Biedler: Yes, sorry. That will be fine. Please, go ahead.

Patrice Kabeya: So, then, you want me to start? Can I wait a bit? And then, make.

Cesar Carmona: Yes, please, you can use the share screen in the bottom of the window

Patrice Kabeya: Now, I need first to reorganize this, because, these are just some few notes, I need to format it properly. I will submit it.

Murray Biedler: Ok. If you want to submit a noted document later, that's fine. If you prefer to rather present your points in the discussion, please go ahead. Over.

Patrice Kabeya (Southern African Development Community (SADC) - Regional Resource Person):

Yes. Thank you, very much, and dear colleague, and for really giving SADC the opportunity to highlight some of the key issues for the water sector in terms of research agenda. Dear colleague, ladies and gentlemen, SADC recognizes capacity development research, innovation and technology as a key building blocks for the water sector or for water management. For institutional strengthening and for inform the policy formulation and implementation decision making and advancement in the regional water sector. We know that as the region comes to the end of the implementing the regional strategic plan 4 and we are in the process of consulting state waters to design the new regional strategic plan 5, which really take into account the component of research seriously in terms of capacity building and we need really to see

how we can come up with some of the strategic innovative ideas, which can be captured in order to advance the SADC water research agenda. Achieving the SADC ambition of industrialization. Industrialization can only be achieved, if you have had a very good water research potential and outcome and very good capacity program put in place. And that to land pass to really in return reduce poverty and improve our socio-economic development and promote the regional integration. For that we require very good sans, inform policy formulation and decision making where acquired manpower delivers the regional aspiration with innovations and technology adding in realizing the regional potential. In the current context, the SADC water research agenda as containing the program of RASAP 4 represent the regional commitment research, innovation and technology. The agenda promotes evidence-based implementation of SADC water program and the project through multi and interdisciplinary research, and synthesis of existing new information. And all this research output being generated under the program, we need those research output to be compiled and disseminated to member state, so that they can use it as part of the policy formulation and develop strategy using innovative research ideas. The water already food and ecosystem wet on the Zambezi water support as the region effort in the same direction. Other regional level SADC will support from the European Commissions as developed a way of governance framework, which was really adopted as the just approved at the ministry of meeting strategy in October 2020. Continuing support is not targeted towards the ways of project in the region and run out in 2022. Thus, the water cooperation Zambezi River Basin project provide evidence for understanding their interdependence among these resources and help us to arrive at the more nuance understanding of the shared water resources; inform integrated planning in management and realize benefit for the people in the best implication in the region at large. We hope that output from this project can be translated into knowledge and information product fit for policy input and uptake. As you are aware 15 transboundary basic transfers the region, moving from similar ways, studies can be conducted in other transboundary basin and must include the post graduate researches from basic country and Centers of Excellence in order to impact skills and build local level human and ensure capacity. The region remains committed supporting somewhat in this regard. Other areas of research can include the human rights to water and sanitation innovative financing mechanism for water infrastructure development, which remain challenge. Water and agenda Nexus, which need at least further improvement. Economic accounting for water, which is not really, which also remain under development, under developed, so which require new insight in order to deal to account for the water. Coming to the human capacity development program, the program is fitting especially needed conceptualization to replace not only the regional priority, but especially the real need at national level. Again, made in this phase I don't face critical, but somewhat under emphasize entry point, junior professional technician we need to pay due regard to the type of knowledge he is required by the region to achieve its objective. There especially critic not only in meeting human capacity, but also achieving region obligation to increase youth involvement in the water sector in order to reap the benefit from the young group. The value of human capacity development lies in its being responsible to national regional water sector need. I hope that subsequent phase also will on gain met in this phase and especially in supporting regional building skills pipeline targeted at various level in the water value chain. Internship and apprenticeship program will therefore be key in this regard. Furthermore, I would like to comment the process in pride in the capacity development framework in the five pilot countries and hope that subsequent phase of the ACEWATER project can also support the region in replicating this in other SADC member states in order for us to have better understanding of what excuses for capacity needs of the sector. In conclusions, let me take this opportunity to gain appreciation the support of European Union, European Commissions to the joint research center on the technical support of UNESCO IHP, as well as they continue afford of water Centers of Excellence in somewhat quite job well done. Again, let me retreat SADC places the research innovative technology as well as capacity development at the core of water management infrastructure planning development in the water sector for the benefit of socio-economic development poverty alleviation, regional integrity in line with southern

region of 20 people. And the region of indicatives strategic development plan 2020-2030. With this period of remarks, I thank you.

Murray Biedler: Ok. Dr. Patrice Kabeya, thank you very, very much for that. We have a few minutes for anyone who has any specific questions at the moment to address to Dr. Kabeya and if or any observations you want to contribute? I am not saying any media ends. However, there will be another question and answer session following on the next set of presentations and there will be more than enough opportunity to contribute outstanding questions for our colleague from SADC and also any questions which maybe reasons from yesterday. So, Dr. Kabeya, thank you very much for your presentation, very appreciated and as for the messages of support in the added value of the work that we've been doing in SADC region. Thank you very much. I think we can move on to the next session now and I will hand over to my colleague Mr. Fabio Farinosi, who will introduce to presenters, Fabio, please go ahead.

Fabio Farinosi: So, okay, good morning everyone. And in the next session we are going to discuss about the experience, can you hear me? Yes. I got silly message on my screen. So, we are going to discuss about the experience that the JRC and UNESCO with the Centers of Excellence and with the network in the past years and throughout the projects, so, there will be a discussion about the achievements and let's say the larger project on both the scientific and human capacity component. So, I think that Ezio will start and Murray will complement with the HCD component. So, Ezio, please.

Outside ACEWATER 2 & Beyond (11h15-12h15)

Ezio Crestaz (JRC): Thank you, Fabio for the introduction that I am going to share my screen right now. Please, confirm, only if you can see the presentation. [Yes]. Ok, that's fine. Ok. Well, my presentation will be focused on some cross-cutting activities scientific research activities, further actions related to the scientific research, basically, I will provide some information on few activities of the studies focused on geothermal industry, on the state of the art of the groundwater, industry in East Africa, and some modelling the activities that is still ongoing with the central Zambezi river basin, and I will go through regional and pan-African HCD priorities, that's quite different views respect to countries scale analysis that Murray will focus on later. And I will briefly resume also papers, factsheets, policy briefs, the documents that we are currently preparing based on the scientific research that has been conducted in the framework of the project. And definitely, I will try conclude with briefs summary of role of water science in supporting policy making in Africa and brief overview of some recent research that has been conducted on the links between WASH and water borne diseases and specifically on COVID-19 implications. Well, most of the scientific research that has been conducted in the framework of the project has been led by the identification of priorities from African Union, AMCOW, RECS and RBOs. Detailed presentations have been delivered yesterday and I will not go through any further details. I must try farther to the contribution of the network of Center of Excellence, there have been also other key research Institutions that have been stepping in during the since the early phases of the project, I would mention here AGRHYMET, ICPAC, Rhodes University among others. And other leading experts contributed their specific knowledge on geothermal energy, groundwater, water governance and hydropower among the other topics. Very briefly, this is a topic that has not been addressed in early presentations, so, it's worth to provide some key figures on geothermal energy is quite relevant along the East African Rift Valley, also, we must distinguish between Eastern Branch, where we have much of the potential up to 95% of the estimated potential. Kenya is one of the most developed countries. It has a very well-established geothermal market with total installed power potential up to a 865 MW right now. But planned installation up to 5 000 MW by 2030, what is interesting is that there are public companies KemGen and GDC, that they are playing a key regional role. They are actually providing support in many other countries in the region and they are promoting that kind of a partnership with private companies, that have been addressing among presentations yesterday. I will now go through the details of each other countries, that

I will leave the presentation, that you left the presentation and of course you have asked for the documents for all the details, it is worth to know that the potential of geothermal energy is quite different attending upon the countries. But in some countries, as for example, the Comoros, as for the potential is relatively low, it's much higher than current, and even future load of the country, while countries as Ethiopia, Djibouti, Eritrea here mentioned, they have high potential up to geothermal energy is not yet exploited. Western Branch, on the other hand, also, including some countries in the Southern Africa and Zambia and Malawi much lower potential and most of the time vision of phase studies are required before in order to plan deep exploration wells. Basically, geothermal energy is quite potentially relevant, because it is stable power source, the cost per kWh is relatively low and it's mature technology and but there are also drawbacks basically concerning mining risks, as you cannot proceed from the left bottom picture, the resource risks at the beginning are extremely light, non-project, the project cycle is quite long, you need specific expertise and of course you need private public partnership and a specific legal framework. By just to give you rough idea, what we are speaking about, the current potential of the sector, the current the longer sector accounts for 2% of total produced energy in Eastern Africa and it is expected to rise up to 4% in the next year term. Groundwater, groundwater is a key resource. We are all aware about and we are also aware about the difficulties in assessing this kind of valuable resource. We have been promoting the specific study on the assessment of the state-of-the-art in groundwater modelling all over the continent. The documents will be ready soon. And basically, a review of more than 400 reports, referred papers and detailed feedback has been collected after more than 200 leading African experts, that have been contacted based on their scientific deliverables and few key points have been highlighted up to now, that's basically high need for capacity building. A sort of preference for open source and free software solutions that become quite available in the most recent years. But also, few key issues that are related to data scarcity, data quality I would say and also somehow issues related to poorest skills and somehow poor internet connection, that is impacting on the rather a lot adoption of this kind of technologies. A specific analysis is underway in terms of groundwater modelling over the Zambezi river basin focused on coupling the groundwater and surface water. And assessing the future scenarios impact, basically starting from climate change scenarios.

Specific activities have been conducted on the identification of the regional and pan-African strategies and on science-policy interface. And I will go through all the details of this point. But, it's worth to stress that this kind of activities adding quite different from the activities, that Murray would focus on later in his presentation addressing mainly the regional and pan-African scales. Of course, the perspectives always with WEF Nexus perspective, the specific issues related skills, technological empowerment, e-education and adaptive learning have been addressed. Among others space science and astronomy research have been identified as key areas of interest, as well as the need to strengthen the business case for water investments, to promote the role of water in jobs creation and generally speaking in economic development. And somehow to promote the analysis of water and environmental governance addressing the basin scale. And particularly this last point is quite cross-cutting topic that has been addressed by other Centers of Excellence, by other colleagues, particularly, in the framework of the Zambezi river basin.

Based on scientific research that has been conducted in the framework of the project, many actions are [00:32:42??] and many products will be delivered before the formal and before I mean, in the coming month. Basically, JRC technical report collecting all extended abstracts from the scientific research provided by the Centers of Excellence and other stakeholders that I mentioned before will be delivered. Fact sheets and policy briefs are underway on geothermal energy, on water science-policy interface, on WASH and health with a specific focus on the COVID-19 further to other water borne diseases and WEF NEXUS and SDGs. Papers publication on peer reviewed Journals are also in process right now.

So, moving ahead, Water Science across as much to do to support policy making in Africa, but obviously poses many challenges that are mainly related to skills gaps across countries to the need to promote the use of research-prototype tools. And key topic of the data knowledge scarcity and also data quality.

Ok, moving ahead. A just last slide on my side, some specific analysis has been focused on the right in the last month on the implication of WASH and COVID-19 further to other water borne diseases. Yeah, you have only few key messages about more detailed documents will be soon available and shared as for example, strong correlation between remittance flows and significant improvements in Healthcare and WASH services. There are recommendations that are already arose from this study, for example, promote a coordinated Official Development Assistance-Remittances investment focusing more strongly on health and WASH services. And generally speaking, much well can benefits correlated benefits in terms of fight against the water borne diseases as malaria, tuberculosis and diarrhea. And we are all aware that all this kind of diseases they are responsible for a large number of deaths in Africa, 1 million has been reported alone in 2016.

So, having said that, I think that I was, that I've been on time. I thank you very much and I will give the floor to my colleague Murray or Fabio.

Fabio Farinosi: Thanks a lot for being in time. And if there are not, I don't know, if anyone has compiling questions for Ezio? Because, otherwise there will be another Q&A session immediately after the next presentation. So, I don't know, if anybody has very urgent question, we can accept it right now, otherwise, we can move forward. Doesn't seem so.

So, Murray and I will present the cross-cutting activities on the human capacity component and then later on, we will have the Q&A session and open discussion. Ok. Murray.

Murray Biedler: Right, thank you. Is my presentation visible, Fabio?

Fabio Farinosi: Absolutely.

Murray Biedler: Ok, absolutely is fine. Ok, let's start from the beginning then.

Fabio Farinosi: That would be nice.

Murray Biedler (UNESCO): Okay. Thank you very much. Wait and I will do my best to follow Ezio's example and this time these possible, welcome everybody, this is in similar vein to achieve presentation is a presentation on some of the additional results in any pending issues, which have arisen during the time of the HCD activities, which have engendered considerable effort and work not only from UNESCO inside collaboration JRC, but most definitely with our partners in the Centers of Excellence, but essentially, to recall that it was not just capacity development activities themselves, that was the core objective of the project. It was a development of a process, which was a step away from the traditional, the historical, the usual approach of sector-wide analysis for human capacity development needs. Are they one of the classic responses from some of our Centers of Excellence partners is that when you ask individuals in the sector what the problem is in the water sector, what's the most important issue for them? They will never tell you what the most important issue is in the sector, but they will tell you what their specific burning issue is and this is an attempt to move away from that and engage in a consultation with our stakeholders in a vertical from ground government all the way up to ministerial and horizontal sector-wide analysis with private sector service providers, consumers in some cases and including the educational sector of higher educational and technical vocational institutions. And this process brought together policymakers sector actors research education to assemble, what was considerably long list of priorities that needs addressing human capacity in the water sector and, and coming together for a common agreement of what these top priorities were and those top priorities were then to be engaged or framed into a national human capacity development framework and these priorities within to be addressed in higher education at events educational platforms. And we also engaged in parallel other activities are Centers of Excellence are familiar with it. Monitoring and evaluation is a fairly common activity in any project. But in this one we specifically developed fairly rigorous and detailed M&E tool we circulated to all Centers of Excellence are contributing to which will allow us to do a much better analysis than individual monitoring and

evaluation are diverting. And finally, we have engaged in actual impact studies a proper academic research of the impact on the activities of the ACEWATER-2, essentially, the current impacts that could be measured, where the arise but keeping an impact is something which is very much a long-term concept. We've had the opportunity to go back to a number of our actors from ACEWATER-1 to identify some impacts, which have arisen as far back as from those very first actions in our first network activities. The other elements, which we have adjusted in the project originated Eurasian was some 30 months and if so, was it extended fighting to 44 months for a variety of reasons implementation and operational wise, but the last imperative was based on need to go beyond and adjust and adapt to COVID-19 process.

We began with also a new network in central East Africa 2018. The original course design was 412 pilot courses, we discussed with the JRC, with European Commission, with the DEVCO and they allowed us to reformulate the project to engage in a much higher number much broader number of AT&T VET pilot courses. There was, also collaborations outside of the network with UNESCO, HCD and the Centers of Excellence and at some of which we've just heard about this morning from our counterpart in the regional economic commission of SADC from Patrice Kabeya on Regional HCD policy we've had inputs feedbacks. Also, on that from our counterparts in EGAD and from CDAO, ECHO WASH West Africa. We have been collaborating also with River Basin organizations in exchanging in discussions on given capacity development needs and also very actively linking up in discussion with [saninspection], JRC on AMCOW and the decorations. And the most recent one will be looking at migration not just migration of population, but migration and movement of skilled capacities as well. And we've also been working very actively with the JRC on UNESCO, Nexus water energy food security and ecological Services Nexus case studies of exchanges and we will be continuing with that. One of the biggest adjustments we've had to make after following the reformulation and adjustments, the pilots is adjusting to COVID-19, which moves through a series of steps which brought us where we are today. But initially, if we all recall those days of in March, early April for a number of countries, which was almost at least shut down following that we implemented a risk mapping exercise, which was a quick survey on the state the status of our Centers of Excellence at that time during the shutdown on what was happening in their country and their ability to move forward with implementing HCD activities, which at that point in a project consisted of implementing pilot courses at University traditionally, an operational plan to be face-to-face lecturing, laboratory and field work. Obviously during the shutdown almost none of these activities were able to move forward. Any pilot courses that have been delivered by the time of the shutdown or implemented in a face-to-face in field modality. This was followed by online E-Readiness survey about a month later to find out what would be required from the Centers of Excellence, if they were going to continue to implement pilot courses on it on a distance learning on modality. This was set out with some specific questions on what materials might be required that we're not required previously. What kind of a budget adjustments might be required in this in turn was folded into new Pilot Course design summaries. Still following the priorities identified in the consultation process, but in a new implementation modality and then followed by a collective amendment for implementation was our partners, which is where we are today.

The risk mapping exercise shutdown was at the end of March and in the risk mapping challenges we can see it, there were some key challenges identified across the board for all our partners, internet data access was clearly a problem, absence of students and staff was the highest problem, that was also a counterbalance a limited mobility and some schools were completely shut down. Although not all of them were. In terms of mitigations request for mitigation from the Centers of Excellence partners and suggestions to adjust the challenge was to extend a particular duration which we did up until mid-November and project will officially close for us on HCD in mid-November. Although the requests were to extend beyond the November daylight, contracting that's not possible for us to achieve.

Decentralization of delivery instead of delivering at the University in a classroom venue combination of distance learning or maybe decentralized views, where students are not required to travel as far or in

such large numbers. Students staff and exchanges to try and continue that, but that would have been acquired and extending of the project duration, because at that point of the risk mapping almost all international travel was not allowed. Long distance learning clearly the highest mitigation response for both. What were the needs identified by the partners? The largest need was pretty much better internet data access with followed closely by some training of trainer, coaching of staff, who would be involved in providing distance and online courses. Hardware and software pretty much the same new types of hardware primarily communication-based laptop. Sometimes GSM mobile phones and all with a need to address the budget. The E-Readiness survey followed online in June/July and turns it e-learning this was to explore what was the capacity of the Centers of Excellence at the time to move forward on a distance learning modality and we found that in the regions that for the southern Africa area that there was quite a bit of e-learning capacity already online pretty COVID-19, but considerably increase on that. In East Africa, the online distance modalities were wrapped up. There was some previous experience on that, but it was mostly coming from the COVID response. In West Africa already they had quite some capacity beforehand, but increase capacity from COVID response. Internet challenges, connectivity primarily, identified very highly in a very strongly in southern Africa, connectivity not such a problem apparently in East Africa according to our colleagues, but of equal problem with data cost in West and East Africa, but it's were adjusted, were proposed for new materials link for online e-learning it and this included not just hardware material, but also communication data, platforms, and reformulating courses for online presentation. Impact studies, as I mentioned earlier, this was something we brought on board earlier on, are in the middle of the project and impact primarily on the HCD activities and the pilot courses, that were being provided to a number of participants and ranged from students to self-employed to formally employed, unemployed participants and the number of pilot courses, that were rolled out during the period. And we find that in terms of the main occupational status that most of the participates in a number of the courses were formerly employed, the second-largest were students unemployed and self-employed participants were quite a low number. In terms of perception of training leading to employment or promotion or improvement of status about half stated just they expected that these trainings is pilot courses would have, took impact on the employment promotion possibilities. And maybe possibility very small group thought that training wouldn't bring any direct benefits to them immediately. And in terms of contributing to the knowledge, such as updating the understanding of their particular sector and specialization new information was observed by 56% of the population.

And the question was asked out of a large number of questions, whether they thought that the pilot courses provided knowledge gained in the training to benefit the environment, ecological, health. Vast majority said, yes, absolutely the pilot courses address these aspects across-the-board. Monitoring and evaluation is ongoing, but in terms of the structure evaluation everybody looking at their courses, in terms of the location number of students. Whether it's higher education or Technical Training gender and age. So, these are all profile element. We also want to know what budget being expended on this in terms of the courses, which are now online and distance learning compared to the face-to-face. So, we'll be able to do a comparison between the original budget estimates. We received more than a year ago, ongoing trainings, which are occurring right now. So, we're looking at budget breakdowns disaggregation into materials cost of equipment and this would include also fees for platforms, for learning exchanges and Human Resources cost. So, for teaching assistants, extra Human Resources required extra administrative support and we find that in terms of delivery costs were considerably higher than they were in previous design. Cost of materials and equipment though remain the highest component. Some outputs in parallel to the HCD activities, we have developed a fact sheet for the European Commission on request from DGED Africa, that's been circulated to everybody. If you've not received that, please let us know and we'll make sure you have a copy. You can also find it on the web page online. That link is at the end of the presentation. We also present produced at the beginning a two-minute animated video to explain human capacity development at our work in collaboration with the Centers of Excellence in Africa. That's also linked online. The animation is, I think much better presentation of the concept and a written document

or a direct video interview of individual. It is worth having a look at to remind us - where we started from. And finally, I think something of interest is that in June, we had a meeting, in HCD meeting to discuss the results of the risk mapping and E-Readiness survey. And ways forward, and it was the first online meeting we've had with all the Centers of Excellence partners. It was elongated that it went fairly well and we had considerable inputs from that. Future collaborations were looking at UNESCO is part of this broad EU, African Network, which comprises of the African Union, the EU, European Commission, JRC with AMCOW, African Minister Council for Water, Regional Economic Commissions, African Union, development agency NEPAD, and the Centers of Excellence and the pan-African universities. The topics that we are looking forward to addressing within this broad partnership within this broad network are promoting Green Economic Development Patterns on African continent. We will adjust knowledge and skills demand, a migration in order to look at strengthening the resilience of Africa's Water Resources Sector at National and transboundary level. This has quite some relevance to the to the Reps to side of he got ECHO WASH at their Regional HCD priorities and also to promote youth employment.

Other future collaborations include the Digitalization for Green Economic Development and Managing Water and Climate in Africa. Digitalization and moving onto digital platforms clearly has a residence with the response, where we're doing right now with online distance e-learning modalities, collaborating further on the water energy, food security, ecology Nexus in Africa, and as has been identified as an important point by not only the Centers of Excellence, but our reps partners as well roll out human capacity development building for is for built from ability to exchange the skills, knowledge and ideas.

And there we have it. Thank you very much for that. And I think as per Ezio I may be on time okay, over to you, Fabio.

Fabio Farinosi: Okay. So, now we have about 20 minutes of discussion session. So, you are, you can ask question about the previous presentation, but we also would take this occasion to accept question about the sessions we had also yesterday. Since yesterday, we didn't have like so much time for open discussion. So, please, feel free to hear, ask your question by raising your hand, I will do my best to monitor all the participants. So, I would just remind you that rise the end is a bottom that is on the participant top on the bottom right or you can write the question in the chat. I will do my best to monitor also the chat.

Please, can we ask you to specify the personal destitution? You want to address your question too, in order to allow me to better me administrate the questions. So, please, we can start.

Ezio Crestaz: Sorry Fabio, just a brief comment on my side. I saw that Mr. Moshood from AMCOW joined the session from the groundwater desk of the AMCOW executive secretary. So, we would like to acknowledge his presence and perhaps, he will be interested also in the groundwater topic, which is quite cross-cutting topic and extremely relevant.

Fabio Farinosi: Mr. Moshood, your microphone is off. It's muted.

Mr. Moshood: Thank you, Ezio for that recognition, and it was a point I wanted to make some comment and ask a question, possibly to address to you and the last speaker, too. It is a good initiative AMCOW, also clearly support of capacity building in water management both surface and groundwater. But my specific question is what is the attention that we are giving to the resources itself? It could be developing capacity we are talking of water, for sanitation and so on, as you mention in your talk, but then the resources saved could provide basis for the sanitation, to what extent that we are investing on that resource's assessment, especially groundwater. To what extend we even understand and characterize the aquifers we have. So, I think that this is my worry to develop the capacity, but to manage our groundwater resources or surface water resources to meet the WASH demand, water and sanitation. But, then this basis, the sources, the resources I think, I don't know, I have a feeling we need to invest more in that. Maybe a kind of comment and a kind of question if there will be any of the speaker can respond to that.

So, otherwise, there is no doubt capacity building is needed. But our thinking is also we need more investment in the resource assessment for us to properly be able to manage the resource assessment for sustainable development. Thank you.

Fabio Farinosi: Thank you, Mr. Moshood. Ezio, you are going to take this question?

Ezio Crestaz: Yeah, thank you very much for the question. Of course, we, one of the focus of this meeting is, end of the project is on science as a support for policy making and in order to meet science of course you need quantitative information, and you need to build and to promote quantitative assessment. I think that your question is [00:59:30 voice lost], and will be quite a lot of people they could address somehow, I will limit myself to mention that as for groundwater you have to face quite a lot of difficulties related to the local specificities, to the lack of data, to the lack of integration of geophysical prospecting near borne prospecting and even more I would say the availability of groundwater resources shows also in a very short distances. I don't know, if Fabio, you can add something on that? As we have been spending quite a lot of with the Centers of Excellence, quite a lot of time on this issue.

Fabio Farinosi: There are like many of the TVs done in coordination between us and Centers of Excellence. There will be like some scientific studies, they will be published soon hopefully. In the interaction between surface water and groundwater. But I want to give the possibility also to Murray to complement with the human capacity component and I see that Cesar wants also to add something. Murray.

Murray Biedler: Yes. Thank you very much, Fabio. And thank you for the question. I think it is extremely relevant. One of the things, that we noticed in human capacity in the sector wide analysis on a country by country basis, that there were regional trends of priorities, which for Southern Africa one of the main priorities water resource management. On the national level we find some countries prioritized groundwater more than other countries. And I suspect that, well, we are fairly sure, because of two reasons. One is that, the knowledge of the groundwater resources may not be sufficient to actually have informed decision making and, in some cases, we know that some political decisions as has been as is part of your question. Mr. Moshood is [01:01:56 voice lost], that politicians in political decisions are sometimes uninformed and groundwater is definitely with those issues. The other water as groundwater has been identified as a core already is in twenties groundwater is a major water resource with actively taken and applied not even not just for some domestic consumption, but for commercial and economic benefit in use. And those countries, because they have such a solid experience in the water and they have much higher priority on that. Over.

Fabio Farinosi: Cesar please.

Cesar Carmona: Thank you very much. Thank you, Fabio for the question. On my part, I would like to add something with respect to the capacity building and management of underground water. As we have already said at the beginning of this presentation, management and capacity building are two aspect equally important than this being comprehensive in this process. We have therefore put in place the knowledge and this knowledge will be leading to more capacity building and these maybe ensured by the Centers of Excellence. So that, enhancement they pay towards better management. The received that one to another without separate elements a process together going joint as such should think jointly, we have to enhance them both. One project that next activity doesn't direct we have got we have to say in grace. I hope I have answered to your question or part of your question.

Fabio Farinosi: Okay, thanks Cesar. I seem professor Gamal wants to say something.

Gamal Abdo: Thank you very much. I think the issue of groundwater is very interesting and very important. Because, groundwater is the main source of water supply. Water supply comes from groundwater for domestic use and irrigation use. Actually, in the past a lot of focus was for surface water, but groundwater was completely neglected. But nowadays after the I mean, Sudan has almost exhausted

its share of the line water, the interest in groundwater is now growing. Actually, last week we had, what we call here science policy dialogue conducted within the water resource center, it was mainly about the importance of the groundwater and whole science reform policy makers about the aiming groundwater resource management on development. And this type of dialogue we invite key policy makers, the level of ministers, actually, that was very good discussion, very good dialogue actually we managed to convince some of the relevant ministries to support our project on groundwater resources and its management in Sudan, we are actually start making on this, we got some support not big amount of money, but it's okay. Try to characterize different aquifers and I mean suggest some management scenarios for sustainable development of groundwater in small volume of equipment and big equipment like [01:06:12 not clear] for actual, is very huge aquifer shared by 420s. The reality workers done on movement of aquifer and a lot of work is to be done to characterize this aquifer on to develop management transboundary water groundwater management. Actually, we have some other transboundary aquifers between North Sudan and in South Sudan, it was one country before, but now two different countries, they are very big aquifer shared between the two countries. So, transboundary aquifer management is also one of our main interest. We have done a lot of work in the past, myself worked in my place with groundwater, I will be happy to share all the ways, I spoke with Ezio about this before, but will be happy to share whatever we have done on grassroot methodologies for groundwater management for example modelling, use of space, technology and lots of ideas for characterizing that groundwater resources. Thank you.

Fabio Farinosi: Thank you, professor Gamal. I see another comment about that in the chat, where it is raised a point that there are many organizations that are involved in the water study. And probably, this is one of the reasons why information and data are source cutter in this topic. So, the question is, I don't know, if Mr. Jeoffrey Pukan say to whom this question is addressed, but the question is related to what other steps that need to be taken to consolidate the information towards more integrated analysis of the groundwater resources.

Ezio Crestaz: Yeah, maybe I can comment on that. Well, among the activities that I very briefly presented, so, no time to go through the details. Specific studies have been conducted, and is currently close to be finalized. Focus on the assessment of even more specific issue that the role of groundwater transboundary modelling all over Africa. And basically, it is true that all the information is quite scattered. And quite also different issues that hanging up on the geographic area. There are quite a lot of reports that address specificities on the ground, the specific geophysical studies. But I think that definitely one of the key issues is that generally groundwater requires a more local focus [01:09:27 voice lost] And for example, there are areas in Africa we had a research, very few, even no reach at all, when you come to such advanced topics as groundwater modelling. Basically, for many reasons data lack is one of the most relevant about. There are shortages in terms of expertise and so on.

Fabio Farinosi: Thanks, Ezio. I see also Murray wants to complement on this.

Murray Biedler: Yes, Thank you very much. On issue of fragmentation, fragmentation of knowledge was one of the underpinning principles behind launching of the HCD program, which in itself was based on the AMCOW Declaration of the Cairo Declaration, which requested and approached with HCD consolidated approach and that came from a study coming out of AMCOW Commission report at a previous IWA study internet Water Association study looking at Water sectors all around the world and why there were these gaps and these in human resources and infrastructure and budget etc. The conclusion came from this concern is considered studies; gaps come from fact that the everybody is asking one question to one person. Nobody is in control of the studies that are being done. There are a lot of projects that are going on and the recommended approach, which came to AMCOW eventually which they requested we employ, in a country basis is to make the issue of human capacity development in the water sector a political priority. And I think we could do that with groundwater, make it a political priority, a sector wide priority, then everybody who is engaged in the ground water sector much as we have human capacity

development. They will have a certain obligation to start conforming and collaborating and exchanging on the groundwater sector. So, in dealing with fragmented information our experiences that it's more of a political solution that needs to be applied rather than a technical or literature gathering data.

Fabio Farinosi: Thanks, Murray. Cesar, I see your hand. Your little hand, you want to say something?

Cesar Carmona : Yes, indeed, just to say that one of the latest declarations on the part of AMCOW has been in fact, we also had seen as yesterday in the presentation and discussion was the fact to be able to furnish a joint database for the whole of Africa. The other things were, the projects we had should be focusing. We are already working on that. Already, we have been trying to collect data among the resources and there is series of results coming up with analysis that would be shared, compiled by AMCOW. So, there has been also, so mentioned we have to have the state-of-the-art of underground water in Africa. Then professionals said that he himself for paradox, again this is definitely something would be shared. Through discussions we had as of the last week and then these are ongoing discussions. You've heard that underground water should be longer the trust. Which are the key element and we had worked on that? For many centuries of study of this could be extended before this goes hand in hand with training and capacity building has to be ensured, so as to help better management. Thank you very much for your attention.

Fabio Farinosi: Thank you, Cesar. Ok, I see that there is another comment on these from West Africa. We see also strategical for the Western Africa region, because the knowledge is not up to date. And all the studies are fairly old. I see that there are like two more comments, one from Rudy and one from Kawawa. I just set back you to be very short, because, we are running out of the time. So, please, Rudy.

Rudy Rosetto: Yes, thank you for giving me the word. I will be very, very short. A fragmentation is really a problem. And it's basically related to two facts. First of all, is that many studies are still run under, let's say a proprietary license. Ok, and if they are published under scientific journal under this proprietary license, they are difficult to be accessed by those are not within academic environment. This is the first issue, because, many of these studies they collect, they present several data that would be helpful to everyday water management. So, this is of course an old view that is going to be overpassed by the present push to publish to open access. This is also one of the commitments of the European Union in enforcing the researchers to publish in open access. Second point to overcome fragmentation could be that of having large data requisitory or study requisitory, and this is what we scientific community we are currently doing, also, you have the aqua now database. Yes? But this is not enough. Because, once the database is there and data access is open, we need to communicate these data are there. This is not always easy. Because, dissemination of the fact that data are open and available on, for example, on the web, it is the task rarely performed by the researchers and there is off, there is no, in my opinion, dedicated sources to that. So, I would suggest that once the databases are there, findings are also located to promote the presence of these database. That can, this activity cannot be stand alone, once on a time activity. It should be ready, ready, from time to time it should be promoted presence of these databases. That's my comment. Thank you.

Fabio Farinosi: Thank you, Rudy. Kawawa?

Kawawa Banda: Thank you so much, Fabio. I will be also very brief. I know we are running out of time. But my comment was more to support what Rudy had mentioned. And to add that really the quality that is in databases. Also, it needs to be checked. Because, most of the data is at a very cost scale and what happens is that we have got at least very few places in terms of quality data that is available in these databases. So, one of the priorities in my opinion, should be also looking at find, at least to, looking to technologies that can either support, now what is available in terms of trying to prove, the quality of this particular data. You are going to agree with me, if you are here on the ground that some of the countries within Northern Africa, even most of Africa may not even have strategies that define how this grown data should

be collected. And there is no support even from the government of the day. We say this is the strategy that is supporting water resources, you know, data collection. It is very different from the water supply and sanitation inside. Which seems to have a lot of programs that no support data collection. Thank you.

Fabio Farinosi: Thanks, Kawawa. So, maybe we can restart with this from here in the next session. Now, if Mr. Moshood want to say something?

Moshood: Yes, just a quick intervention, I mean regarding the dissemination of the database if they are available, I think AMCOW discretion knowledge management of, I will use this platform to say that there shouldn't be any fear in terms of making data available. AMCOW is ready take any database collaborate with any organization or such institution that have generated any database that are created in knowledge hub, which we call hub of hub to provide this information from different sources and create bigger hub for groundwater water related issues in Africa. Now we can disseminate to member states. So, I think that is what AMCOW can do to facilitate. Thank you.

Fabio Farinosi: Perfect. I am really happy to hear this being a scientist. It's always data, lack of data, data scarcity is always the main problem. So, maybe we can restart from this topic. In the next session there will be discussion about the future. So, maybe we can propose like some strategies to cope with this problem. In the meantime, I would like to thank everybody for the nice discussion. Now, we are a little bit out of time, we are a little bit late, but we, I think we can still have 15 minutes break. So, we will convene in 15 minutes now to have for step. Thank you very much.

Ezio Crestas, Moshood MNT: Thank you, Fabio. Thank you for the coordination.

Tea break

DISCUSSION ON THE FUTURE (12h30-13h30)

Fabio Farinosi: In the meantime, we wait for Murray to come back, there was final comment on the previous discussion from our colleagues from West Africa. They suggest that with the development of new hydro climatic databases for each region. We will be able to facilitate the coordination different studies of from different areas. And this will make a confirmation more of regions available and facilitate the development of policy.

Ezio Crestaz: Thank you, Fabio. Just to complement, well, somehow, comment on this comment, it's true that regional databases exist in other areas that we come from the experience of Southern Africa particularly, of the Zambezi river basin, but still most of the time we face the issues that Kawawa pointed at related to data quality, data consistency and most of the time also to lack of time series and difficulties where you have time series to properly interpret this time series, because any installments could be somehow related to local conditions, and no other conditions, efforts as for the estimation of groundwater deflection, trends based on satellites, mainly thinking about the previous project, most of the time come short to be in order to capture the nuances of what's happening, I will not say at the local scale. But even relatively large scale compared to the objectives of groundwater analysis.

Fabio Farinosi: Yes, as always with this kind of data you don't have a product can solve all the issues. You cannot like to have everything with local observations, you cannot do everything with satellite observation, but yet to combine different sources in order to get a full story. So, groundwater is always more difficult. See, I don't know if Murray is back. I don't see him.

David: He was just logging out and logging back in, because, he had lost his screen.

Ezio Crestaz: Sorry, he just wrote me that he is experiencing problems with the link and he cannot connect. So, please let us try to address this issue, Athina that I see you are online, could you please give support to Murray? Athina?

Athina Ignatieva: Yes, I am here. I will.

Ezio Crestaz: Yeah, Murray is experiencing some problem with the link and cannot come back. If you can support him.

Athina Ignatieva: Yes, we will see what we can do about it. Thanks.

Cesar Carmona: While Murray connects very rapidly, as of the part one discussion today, this will be about the reminder to point out to work on priorities, documents after documents of strategic nature and what are the priorities are of AMCOW, and European Commission expected to pursue, when it comes to establishing the links with between two and this is the point of departure would be trying based on the experience, which we have had. And on the feedback, which we have had as of the limitations with these activities tackle certain issues and questions eventually will be helping us then to make proposals rather to AMCOW and our colleagues from the European Commission, Brussels, as well as each hearings of automatic units that might eventually be tackled in due course and here some within a context of Centers of Excellence, while hope to identify the priorities next to be pursued. Then see how reinforcement relevant aspects of our network might be comforted, we have already discussed the last year ideas about expanding the network of Centers of Excellence in the North Africa. And I have seen much interest expressed by several people which could take part in that event. And as I have already explained, they were meant to insist on series of topics, because they are always actual and which have been identified as critical priorities, as of discussions we have had with various policy makers. So that, this complex will be further utilized and the policy brief. I don't know whether meantime Murray has been able to connect, nearly there. I do not see. Not is yet, I am contacting three men and trying to remedy the problem. We will be sending out the access code to Murray, so it would be a matter of couple of minutes, that's all. Fine. Well, I want to go ahead of what we will do having said we hope that there are these aspects of expanding the network, we have already seen that there is a very relevant issue, that also management of extreme climatic events we need to tackle that and this both in the West and South of Africa. We have seen this happening very recently, there are indeed extreme events, but besides climate there are health extreme issues like COVID, malaria and all infectious conditions that are otherwise associated to access to water resources and quality of water. These topics that of the highest possible relevant to all of us. There has been quite a lot of very interesting exchanges today and discussions on groundwaters, of course, without forgetting water management, generally speaking in various regions, which of course paramount importance, having said that, if we could say one more thing that would be about the private sector. It is more than interesting to have the private sector for qualitative indicator in our activities, especially when it comes to financing, this is a critical aspect to have to work on. There is some internal issue timelessly carrying problem of data scarcity and it is very critical, which is allow us to really be able to make disputed jointly, Murray is now here and I will be giving him the floor. Thank you very much.

Murray Biedler: Thank you, Cesar. Apologies, I'm not sure what happened. I came to the office to ensure I would have any connectivity problems. Looks like I have problems that I should have maybe stayed at home. So just stand by. I will find a SlideShare to join and we'll be able to move forward. Okay? I have this one, I believe. Ok, let's get screen. No.

Fabio Farinosi: Murray, if you want, I can load your presentation for you. I have seen the last version.

Murray Biedler: Yeah, let me ensure, yeah, you should do it I send it earlier. Okay, I uploaded, it crashes.

Fabio Farinosi: Okay, if you stop sharing your screen, I will do it.

Murray Biedler: Okay. I'll try. No, I've lost the screen of the rest of the meeting again just completely collapsed. It's got a lot to sign out and sign back in. Okay, go ahead.

Fabio Farinosi: Wait. We actually see you. Can I?

Murray Biedler: Go ahead, yes. Okay, you have access.

Fabio Farinosi: Give a second, it is coming, do you see the presentation?

Murray Biedler: It looks beautiful.

Fabio Farinosi: Okay.

Murray Biedler: Okay. Thank you very much everybody and apologies for the small delay or the longest delay, I hope you are able to profit at least to have some, some coffee with that or tea, which is as you as you like. Okay, the presentation this morning, we'll be looking at two broad lines of strategies from coming out of the African Union priorities for generally around the water sector for future economic development and those of priorities on similar, similar topics with the European Union. With the priorities, it looks largely for water and environment sector at the AMCOW priorities and strategy and for EU we're often looking at the economic development strategies or the new European Union big deal. Next slide, please.

Right, just briefly, I'll run quickly through the different strategies that are similar between the EU and the AU for AMCOW priorities, clearly water, water charity is the main one and it's linked to agriculture and management and that's linked to water storage capacity and also enhancing disaster risk management capabilities. And also, quite aware of the multi-sectoral approach, and what was a water energy, food, environment and ecology, Nexus approach very start to the EU in terms of the green deal. They are interested in water and sustainable agriculture, which is fine. They, they roll this priority of water security into actual social and national medical security issues as well. There we're looking at also elements of governance and peace and water policy for the water the green deal sustainable Water Management, agricultural sectors, go hand in hand and very much the EU supports the WEF Nexus approach

Next slide, please.

Following on AMCOW priorities we're also looking at climate change-related priorities and related disaster and risks both the EU and AU, from AMCOW there is a strong interest is to reduce the vulnerability of people in that ecosystems with on the face of climate change and climate variability and at looking at water-related disasters and risks. So, in that there's a risk management and that corresponds directly with the EU priority is building resilience and looking at adaptation measures of climate change. The information systems are also important in all of this. This has been mentioned number of times in the presentations, we heard yesterday and, in the points, raised earlier this morning, and also from our counterparts from AMCOW the need for information systems for resource assessment monitoring. The support at the national level for scientific data, hydro-meteorological data, groundwater data.

From the EU, in terms of water digital sector is to work on the political mandating and support and prioritization of strengthening the information system, and this includes Partnerships between public authorities and the science and non-governmental and private actors, which, which address, can address this, this issue of limitation that was mentioned earlier. Next slide, please.

Finally, we're looking at improving the mental integrity looking at issues of waste water, water quality and water quantity and quality improve the functioning of the ecosystems. So, this is the second EU and WEF Nexus water energy food and food security and ecosystems for the EU priority also are quality waste water management and efficient use of water. That could be in terms of consumption. Also, in terms of abstraction, transportation IE plumbing pipe Delivery Systems and storage systems and also in terms of water and digital monitoring & evaluation of infrastructures to manage them much more effectively and efficiently and that allows not only better management, but also transparency of water quality quantity management and that helps for better allocation of water use efficiency. Next slide, please.

So, what we have been able to do in a synthesis of these priorities is keys at three key questions and I see that Fabio, you maybe have the second to last presentation, but I will try and adjust to that. We on these

three questions, what I'll do is I'll allow roughly 10 to 15 minutes of time to address the questions, posed a question and to field any answers or responses and comments and we'll move on to question 2 and question 3 and from that point we should have 10 minutes left. So, if some reason any discussion needs to be closed down to move on to the next question, we'll offer 10 minutes after that, will always be the possibility of uploading any further comments and questions on to the chat box. And also, to send them along to us. They will all be addressed as we, as we can do later following the meeting. Okay. So the first question is on just priorities that in order to update an increasing capacity of the water sector to address growing domestic and economic needs and I would also including here environmental and climate risks and disasters such as extreme events, losing biodiversity and environmental health issues and diseases such as on the continent of Africa were often confronted with Ebola and cholera, which has been problematic for many years and more recently the COVID pandemic and, and how these needs can be quantified and addressed in a targeted way. We need to have this quantification as information and at trying to overcome the fragmentation or the gaps in data. So, the question is what is could be the role of government, education or research institutions and the private sector in addressing these challenges? And what institutional changes or adjustments might be required? So, that's the question and leave the floor open for any contributions now, so the floor is open. And I am looking, Fabio, I'm not able to see anything on the chat box. Give me a second. Okay, chat box is open.

And I don't see any hands moving on the questions. But basically...

Fabio Farinosi: I see Ash wants to contribute.

Murray Biedler: Okay, please, go ahead. Over.

Ash Seetal: Thanks, Fabio. Thanks Murray. It's more of a comment than a question this point and it's kind of addresses both the question on the screen. Probably the third one that you had in mind. One of the things I'm not going to share my experience as part of this comment is that the principle of subsidiarity and I think that's key from a governance and from like you've got the highlighted in green to address growing domestic and economic needs, but preferably, how does one start this at the lowest possible level as one bubbles it up. I think that's a one what is called bottom-up approach. But more importantly that's from there are using the subsidiarity principle that means government essentially at the lowest functional level. Converse to that is what we have kind of embraced in South Africa's water legislation and policy is a policy of something we brought from the state's Public Trustee principal. So, you might allow subsidiarity to in fact happened at the lowest level, it has to be aligned in terms of National priority, so, government has ever since the Public Trustee the responsibility the mandate for ensuring that the national environment is in a sense adhered to in whatever form happens even at the local level. So, I think of a governance, when you talk about institutional changes and the adjustments that is key. We've kind of built it into a lot of the legislation here, but how effectively it's being implemented and rolled out has been very slow. Maybe, that needs a bit of examination is, can that happen? And I think we've spoken about in the in the manual of debating the Zambezi, these two elements actually come in, but not in the words I've used now, but they are implicit in that approach of acknowledging a lot of African indigenous knowledge systems, local systems that work in terms of offsetting the potential reward disputes conflict etc. And one can scale this at the various levels, but I think that's, that's the one point I want to make, does exist. The second one is Joanna, I think is in, in the group as well. She's put one recently about lectures or training on PPP'S. It's a big thing here, even in South Africa in relation to Wastewater management, wastewater treatment, and how does one bring in the private sector? So, we've got particular forums like the Strategic Water Partners Network a few multinational companies that have come together to assist with issues relating to management technologies or interventions financially and resource wise with wastewater management and also with potable water supply issues as well. I think I park there for that now just some food for thought about the possibilities that do exist in this particular area. Thanks, Fabio.

Fabio Farinosi: Murray, there is a comment from Mr. Moshood on the chat. I don't know if you can read it. Otherwise it can do it.

Murray Biedler: Yeah, I see that. Yeah. Well, that's fine. I've got it now. So, from Moshood, thank you very much that for me. Sorry can finish the chat and then you go ahead, okay, Joanna? From Moshood, the role of government is to invite the political will that needs to be addressed.

Joanna Fatch: May I comment, please?

Murray Biedler: Hello, can you hear me, Fabio?

Fabio Farinosi: Yeah, we can hear you, Murray. Joanna, please. Wait a second.

Joanna Fatch: Okay, sorry, okay.

Murray Biedler: Okay, so, to you return to the chat, the role of government, we need the political will to address the needs to meet the growing order demands. Okay, political will definitely. Secondly, political to invest in infrastructure and capacity building on the side of research educational institution, there's a need for focused training of human capacity with new innovative technology to ensure Water Management. So, thank you very much for that. We'll put that on to the list. And, Joanna, go ahead, please. Over. Joanna, you can make your point now, if you are available. Over.

Ezio Crestaz: Perhaps, Joanna is experiencing problems with the connection.

Murray Biedler: And I think so. Yes.

Joanna Fatch: No, I am here. I can hear. Everything is quiet. I can't hear anything. I was told to wait. So, that's what I'm doing.

Fabio Farinosi: Yeah, but now Murray just called you to start so probably you just don't hear everything that we say.

Joanna Fatch: I can't hear Murray at all.

Fabio Farinosi: Please, go ahead, Joanna.

Joanna Fatch: Okay. No, so, so my comment is really in line with what Ash was speaking about, especially regarding public private partnerships. And yes, we are as a network, I think I'm going to start and supported by the department of Science and Innovation with developing a course of public-private partnerships for the region and but, as much as I think as much as we all know that you know, financing for the sector is key. I think the biggest thing and even as we are going to developing this course, I think the biggest thing would be will be, you know, the issue of regulation of these kind of arrangements and also the need for strong institutions with the ability to negotiate these kind of you know, financing mechanisms, because I think the biggest problem has always been the way in which the negotiations I, you know, than and the understanding especially from the water utilities part of what the deal entails and what exactly it means for service provision for tariffs at for sustainability apart from you know returns for the for the private entity. So, I think that will become very, very important and these things are important both in terms of water supply as well as in the sanitation profession. So, I think going forward these, these are key and they are I think they are coming up especially even in terms of some of the issues, that have been raised at the regional level in terms of RSP or at least RSP-5 in thinking through RSP-5. You should just you know, public-private partnerships and how to accelerate financing and achieving the water and sanitation goals are key, but I think we as the academic institutions a Centers of Excellence become very, very important in terms of how we understand these issues and then how all the kind of capacity or support its kind of capacity supported research support that we give to water utilities and to governments together, you know, in terms of negotiating and understanding the implications of public-private

partnerships. Otherwise, we run the risk of moving back from PPP one day and the next day of municipalities, you know offering the service because of that problem in terms of how we negotiated how we get about implementing these.

Murray Biedler: Okay. Thank you very much for that Joanna. I would also like to contribute on the aspect.

Joanna Fatch: I'm not sure if you could hear me. Thank you. I can't hear Murray at all.

Fabio Farinosi: You can't hear Murray, Joanna? Can everybody hear Murray? Because, Murray is talking.

All at once (Nico Elema, David etc.): Yeah. We heard you, it's perfect. Thank you very much. Yes, thank you.

Murray Biedler: All right. Okay, so, I guess you're getting special treatment from me today Joanna.

Joanna Fatch: Oh, no, I can hear you down. I got you. So no, no.

Murray Biedler: Okay, it's all right. On the private sector, I think, there's an aspect that has shown itself in the work that we've done last almost four years, three and half years and it's related to the private sector as played at times in the sector-wide evaluations and how they've contributed and where issues such as has been identified in the presentation from Sam Watson yesterday on how private sector can collaborate with, with the global Water sector in terms of working with capacity development, work with young professionals and young technicians. I think you know that, that's all part of a bigger package of these partnerships that Joanna is just referring to. The other thing, that's, that's quite important and hasn't really been highlighted in the presentations as such, but the second one is assessment, which every Center of Excellence is it, is in all of the countries where they participated in the project was a very comprehensive exercise, where a lot of consultation, a lot of broadband capture of stakeholders and very much deeper understanding of the challenges across the sector after, what the private sector challenges are and including the educational institutions as well as the government sector actors, one of the contributions that has come out of almost every consultation report, that we've received from our Centers of Excellence is that the government would like to repeat this analysis every three to five years and that helps in understanding what is the nature of the problem in the privates, in the water sector itself every three or five years we take a new picture, new update on whatever regulatory practices need to be done, on whatever technologies need to be rechecked and tuned or upgraded or updated and trainings etc. So, there is, there's a strong role in there. So, and that also reflects and is it, is a, Avenue for the political institutions to actively engage on a regular basis on a full sector wide review as not just promoting its and supporting it participating in it. So that's, that's contribution. I have any other hands up you can see Fabio anywhere?

Fabio Farinosi: Ezio.

Ezio Crestaz: Yeah, very, very brief comment that come back to the topic of data, enforcement of open data policies, these would be absolutely key. There are quite a lot of experiences of a private and public participations, but also in those cases it's absolutely key that the outcomes in terms of databases or data on which the decisions are taken or even the information systems are built, are made available to the larger public. Okay. That's all.

Murray Biedler: Okay, thank you very much. I would like to point out and I was hoping to have some inputs also from one of our colleagues who was with us yesterday from Professor Abdoulatif Zerga from the Clemson Algeria African University for water energy and climate study. They actively engage in placement of students into the private sector. There is this promotion of bringing the private sector closer into the educational sector that initiative is there and it's very interesting one watching and we're looking at avenues of collaboration between the Centers of Excellence and the Pan-African universities around that approach to engaging with education and the sector and also with our programming originally with

planning exchanges of staff and students between regions. Okay, we're almost on the time limit on that. If we don't have any more questions or comments coming up on the chat, we can move on to the next question. Can you bring that up please, Fabio? Over.

Right. Hey, Fabio, I'm really having screen troubles here, if you...

Fabio Farinosi: Okay. I have on the corridors on the African continent transboundary River basin question.

Murray Biedler: Okay. That's fine question. Okay. Thanks, unfortunate, but we'll work our way through it. Okay question for the future and this is a reason for my number of discussions arising from the concept behind exchanging of staff and students and research and maybe professors moving back and forth bringing expertise between countries and institutions and universities and Centers of Excellence to share the abilities and, and not just on a country to country neighbor to neighbor basis, but on a longer distance and it addresses a concept called corridors and often referred to as economic corridors on the continent Africa, but corridors represent other things. On the African continent dealing with, they've challenged activities of people their impact on culture and ideas and make activities agriculture transport energy migration of politics and clearly along these long corridors on the continent. These activities are transboundary. And there, where transboundary issues arise in terms of corridor participants there needs to be a consensus between countries and management. I have the screen now, thanks Fabio. Beauty. There needs to be a consensus for smooth transition between corridors of policy or joint resource management of movement of ideas and exchanges, whether its political ideology or religious, cultural or simply economic Good Services. Now, so, historically populations on Africa and has many [02:08:03 word error] in the world. No, I've used rivers, river valleys, lakes, river basins to define a [02:08:09 word error] boundaries and corridors of movement of call these content helps of economic activity. So, the question is to be looked at for future activities in terms of how we want to address skills migration and exchange of ideas and moving HCD around effectively and with a framework in the original basis. Can transboundary river basins serve as a framework for identifying corridors of knowledge and on that in terms of what we're looking at for the future for expanding to our colleagues in North Africa. For a more for a pan-African scope of human capacity development, of science and research and technology for the water sector can the Mediterranean be seen as a corridor of knowledge also between Europe and Africa and I'll leave that open for any response or comment, standby, over.

Murray Biedler: Okay. Thanks, it looks pretty quiet, Fabio, do you see any hands or comments coming through?

Fabio Farinosi: No, at the moment, Murray? I see Joanna wants to say.

Murray Biedler: So, the reflection is that... Okay, go ahead, please.

Joanna Fatch: Okay, so, it's the support that and especially to give some examples especially with regard to SADC and I think dr. Patrice spoke a little bit about that in terms of aligning with see for example, the SADC vision between 2050 and the regional indicative strategic development plan the 2020-2030, where they've actually, you know, so, the issue of industrialization, the issue of trades that you should come as connectivity originated integration and more broadly in with regards to the African continent or Free Trade Agreement and how water in a water becomes a key and critical component to enabling those things. So, I think right now we have some examples of projects like transboundary cross-border projects along those corridors and how all the kind of skills that are required there becomes key in terms of how we think about HCD and how we think about exchange especially aligning to those kinds of thinking. I think it would be very, very interesting also to for us as much as yes, we have a, you know, the technical aspects of understanding whether it be from a water, energy, food, ecosystems makes us perspective and what that means especially enabling that I think that, that has a lot of attraction especially at the regional level, at the continental level more broadly and also in terms of enabling certain ambitions of the

continent in terms of skills and capacity research and innovation, required for those, you know, for those corridors to be more functional, but also for the water sector to be placed properly within that conversation.

Murray Biedler: Okay. Thank you for that Joanna.

Fabio Farinosi: Murray, Cesar wants to comment, sorry.

Cesar Carmona: Thank you, Fabio for this. Indeed, in the frame of the actual program, we have indeed tried to reinforce the exchanges between the various institutions, we have seen something critical, one very, which means that. When come to exchange programs, concerning students, researchers, and professors, working on a cross-border basin, could facilitate a lot the whole process and the decision making, taking into consideration the common interest, in some areas where in a political view, there is some difficulty to decide, so, we are definitely in favor of such a thing, which is something we start the approach to implement within the context of this program, and indeed something we expect will be able to materialize, we will be in the context of this green deal agreement for us to develop, now, whereas could be the aspect associated to be assistance that to be provided to the Centers of Excellence, yes, it is more than clear that a shared water basin is a critical factor, a factor which is built upon, will be able to contribute to the enhancement of joint knowledge, knowledge available to all generated by several parties all continuity to this pooling of northern accident. These Centers of Excellence, also from Europe could take part with process to reinforcing and bettering the whole experience. This has been concentrating within the horizon 2020 research project, yes, I definitely believe it is worth the effort of exploring further. Fine.

Murray Biedler: Okay, thank you very much for that, Cesar. We have a comment from Moshood, response to two questions on transboundary quarters is yes, but the need for effective collaboration on the management and sustainable utilization of the transboundary waters for development is also critical and there should be respect. Clear understanding from riparian countries sharing the river and or aquifer. Okay, and included that's indeed bringing on the aspect is being studied right now with some of our project work is looking at [02:14:56 sound error] or transboundary aquifers and then a further comment on the Mediterranean question as a quarter. Mediterranean could be a regional quarter also, again from Moshood, but the regional cultural and historical perspectives are key and ensure effective collaboration and fair enough, the base over log of transboundary where conceptually Mediterranean with the European Union, European Commission ongoing on variety of issues, political, economic, environmental. And also, from Arnaud De Vanssay from the DEVCO there is appetite also to further pursue work in nutrition knowledge on water and in the past UNESCO did a great job on this to bring results on the ground. Thank you for that. That's obviously a question that someone like myself could ask from UNESCO. The judicial knowledge of water has its role at its place and it ranges from technical knowledge and local knowledge of Water Resources links to other sectors of activity where its seasonal climates are related activity, whether it's migratory [02:16:19 sound error] are agricultural other forms of economic activity. So, traditional knowledge has as its role for sure in that. And also, something is gaining a lot of attraction is not just traditional knowledge, but engaging with citizen science, where citizens now are also being brought on board to work a lot of key important studies for climate related issues or economic issues and bringing up a much better opportunity [02:16:55 sound error] of data information capture in a small-time frame to allow much bigger detail photograph to be taken. Okay from Manta coming from the ocean, from the coast. Do add to the discussion I would like to share research and innovation are also associated with Enterprise development. If we are to promote sustainable development and consumption of water, we have to address disaster risk reduction on the phase of water related climate disasters and in the field of the WEF Nexus, you know indeed, thank you very much for that.

Right in on the chat box. Ezio, you are seeing anymore hands out on framework?

Ezio Crestaz: No, no more hands.

Murray Biedler: Okay, no more hands. Right, well the concept of the corridors in terms of movement of scales and activity which are historical, geographical on the continent is a framework that were, we are reflecting on this with our partners since some time as an approach for the next framing of activities with our partners. Not necessarily ACEWATER is satisfied with the Centers of Excellence for the JRC with UNESCO, European Commission with AMCOW, AU, DA, NEPAD.

Right. Well, we're catching a little bit of time up here. So, we can.

Ezio Crestaz: Sorry Murray, there is a comment from Gamal as well on UNESCO IHP

Murray Biedler: Okay. Alright, the friendly UNESCO IHP project is an excellent example demonstrating transboundary basins can provide platform for Cooperative joint research and Professional Training. Now, thank you very much for that and linked to the frame project is also the UNESCO project around Lake Chad, which always it has its security, security issues. But exchanges on Research and information and Professional Training between the riparian country surrounded Lake Chad river basin of managed to keep dialogue open in the face of security challenges and then from Ash, what is the timeframe to visit for the development process? How Centers of Excellence will be involved.

Could you clarify that Ash, please, and if you want to see please go ahead, but are you looking at timeframe for starting next collaboration and partnership with next Innovation or a timeframe for the next duration of an activity? Can you clarify that please? Over.

Ash Seetal: It's that exactly, Murray, as you said you know, you gonna be engaging with the partners to Frank particularly the question to, yeah, for the next phase of this could be good, as you said you know to get us involved. I'm just looking at what are the timelines for that process to happen and how we would be involved. It would be very nice to be involved. Thanks.

Murray Biedler: Okay. Thank you very much for that. Perhaps, Cesar, you contribute some information on anything linked timeframes for future activities of Partnerships before you do if you can I just like to say that for the next activity collaboration all of the partners there will be definitely a high focus on conservation and that is moving, that's already started in discussions city of... Go ahead. Cesar?

Cesar Carmona: Thank you, Murray. Now, policy brief that will be distributed together with recommendations to address to CPRs and the economic region of the world water basin organizations, AMCOW, and European Commission. When I say European Commission, I refer to DEVCO, and my, we would be able to have a for presentation then will definitely need to further exchanges on how to establish a schedule of activities on the Centers of Excellence.

Cesar Carmona (via translator in another video file that starts at 02:14:28): Thank you, Murray. Now, what needs to be done if to finish all documents. There will be a list, as we have said of policy brief documents that will be distributed together with recommendations to address to the economic region of the world water basin organizations, AMCOW, and European Commission. When I speak about the European Commission, as we are also European Commission, I mean our colleagues, I refer to DEVCO, there is also Mr De Vanssay who is currently present. We will make a formal presentation of the conclusions and the recommendations, which will give floor to discussions around the possibility and potentiality of an activity on the Centers of Excellence.

Murray Biedler: Okay. Thank you very much for that, Cesar. So, I hope do things for you Ash, that your translation is working to that it addresses your question. Fabio, from your side you are seeing any more hands up anywhere? And if not, we can move.

Fabio Farinosi: No, Murray. We can move on.

Murray Biedler: Next slide, please.

Fabio Farinosi: Can you see that?

Murray Biedler: Yes, I can. Transboundary River Basins. Thank you very much. Okay, in the updated version this has been consolidated into a question. But basically, following on the corridors concept of river transboundary river basins have been and still are main venues of local transboundary activity as is already mentioned economic resource sectors, as you can see water, energy, forestry, fisheries and agriculture. They are defined by their characteristic ecosystems of climate, topography, biodiversity and culture and they provide an opportunity for understanding the relationship between all of these sectors of economic activity of the resources as seen in the list and biodiversity in the culture. So, the question here is key as a background or framework for looking further into more detail into the WEF Nexus can have a transboundary by river basin. He uses a laboratory framework to collect and share lessons learned on policy, whether it's national policy or local policy or transboundary policy, with resource and Environmental Management and brings those lessons learned to start developing and describing how a Nexus approach either exists and to what degree it exists or how it can be forwarded and promoted to approach better political economic decision-making and ultimately for Green Economic Development. So that's the question. Can we use transboundary river basins as a Nexus laboratory and then in that prospective what skills and capacities with these Nexus laboratories need looking at human capacity, research capacity, financial resource capacity political capacity, institutional capacity. So, and that would be to address economic and political challenges, because the Nexus approach to a transmitter, transboundary river basin management system would indeed be seeing all these multiple sectors and as well as at a distance economic challenges, the political challenges would be paramount in looking at common water resources, common energy resources, common transport, common forestry, common fisheries, common agriculture and dealing with the specific characteristics of the climate, require biodiversity and culture, so there is a question and we open the field for the floor for any comments on. Over.

Okay, no immediate comment. All right. Some of the questions from Ash coming up. Right. Question to continue to work done in Zambezi corridors regarding all kinds of developments, sorry, that's a chat from the previous questions, but Ash you are welcome to contribute on the last question as well. But essentially,

Ash Seetal: You had the questions Murray were excellent questions for continuity particularly, the work we've already done and existing water courses I am looking at Zambezi example, if you look at and you talk about Green Economic Development appointed Manta raised about you know, research and Innovation and how it can contribute to Enterprise development. That would be good as well. You know with the small/medium, micro-enterprises that can start. You know, I think these are excellent questions for that element of continuity. Thanks.

Murray Biedler: Okay, thank you for that. Well, in fact the aspect of transboundary river basins being laboratory for Nexus, has as its relevance dealing with transboundary. There's no doubt about that. But inside the river basin itself inside the component member states of a river basin is still be lessons learned and that can be derived from the Nexus of your approach. And some of them can be scaled up, but some of them could also identify the specificities of the Nexus framework in that country and putting them side by side with the specificities of a neighboring member State and in common transboundary basins would may be able to identify already where there are complementarities and whether potential conflicts. They have a comment from Mr. Moshood, of course the river basin can be used as a laboratory to show lessons, but the resource is needed are adequate investment and capacity building infrastructure from monitoring of rivers and groundwater resources. Clearly. The resources are needed. Right. Okay, any other comments or observations on standing by? Over.

Fabio, do you see any hands, coming through?

Fabio Farinosi: No, Murray. Here, Ezio wants to say something.

Ezio Crestaz: Again, just a brief comment, of course, WEFE Nexus concept brings quite a challenge, opportunities, but also increasing difficulties because the perspective different perspective on water, whether surface or groundwater, climate, agriculture, energy they are still quite scattering, in terms of competencies and one of the measured difficulties is really to come up with WEFE Nexus exercise fully combine all these different views in a unique framework. And from that point of view once more I'd like to go back to the needs, to the opportunities that are provided by the common shared knowledge platform that would somehow will deal with these intrinsic difficulties. Just to mention one the time framework, which is completely different between surface water and groundwater, or even the fact that we have quite a lot of scientific research, which is focused on agriculture, but sometimes, are you not said in regret, but it doesn't properly taking into account, how water can be provided or difficulties that this link somehow loosely addressed. This is effectively objective of the WEFE Nexus, but it's worth to stress that such perspectives, such an approach is not really easy to implement.

Murray Biedler: Okay, thank you very much for that, Ezio. Few comments coming in from both Gamal, from Kartun, from our experienced Abdoulaye Faty now greatest challenges to obtain the transboundary data needed for quantifying, evaluating and optimizing the Nexus and that's definitely point that is shared by our colleague Fabio from our, to everyone there were five beautiful years together. We have learned a lot from each other and are convinced that this experience we continue. Well, that is our sentiment. Thank you very much for that. I'd like to take a moment to come back on its use comment on the Nexus of the complexities of that and an in workshops and studies on the WEFE Nexus that taking place over recent years and one particular that European Commission hosted and was contributed to, by the management of joint research center, JRC and a number of other partners contributed like IFCN and UNESCO IHP. It was clearly identified as problematic the concept of modeling exercise of trying to get a Nexus model of water, energy, food security and ecology together and just in terms of pure modeling mechanics that observed by number of are the professionals and contributors once you get more than two colors together. So, if we have water and energy or water food security modeling can be achieved with certain degree, but once you put a third pillar in there the modelling is very fuzzy and difficult to advance with. And some observations were that instead of trying to pursue this modeling approach from a quantitative modeling modality will take a quantitative descriptive modeling and some of the terms for have been made by a couple of the partners and presenting case studies on that and if we think about the approach of qualitative and descriptive modelling taking a description of the challenges and then maybe try and quantify between two specific not symbols of that pillar of water and they're not supposed which will be surface and groundwater, which add to the complexity. If we look at the descriptive approach then we have a platform where the political contribution has much more relevance in terms of modeling, a multi-sectoral, multi-pillar Nexus approach. So, that's the experience that we have from there, but it's definitely the components if we want to build on. The work that's been done in ACEWATER-2 on the Nexus work, the collaboration at UNESCO also done with JRC on Nexus and working underneath or working within the European Commission support. Okay, Fabio, any more comments?

Fabio Farinosi: I see Cesar wants to comment.

Murray Biedler: Please, Cesar, go ahead. Over.

Cesar Carmona: Thank you, Fabio. I would like to intervene and make some comment as a respond to certain comments raised about the data, which is having indeed I do acknowledge this is something we have always been dealing with maybe that corresponds to them true for Africa, but it is also by stating there is no other place in other world, where there is no such problem briefly. Having said that what we do see that at least we are able to settle the need database on data based and coming from research

institutes and laboratories, even in academic level that are able to answer some questions, questions that are raised by politicians, government and agencies and which may make it easier to management to happen. There is another concept I really like to raise about how we come up with to enhance water diplomacy, otherwise that how, through issues of a pure technical and scientific character, dialogues can be established in a way that would facilitate discussions carried out by political sectors. And sometimes this facilitates a lot this type of dialogue. This is something that deepens the concept of the cross-border basins and the laboratories, how we can practice this approach. This is the case of NEXUS where there is water in place and we need to apply some diplomacy, as there are sectors which are sometimes are in conflict, because there are interests that might be opposed to each other, and how a scientific and technical approach can pilot differences and amortize restrictions coming up with the compromised, so both parties needs are covered. There is also an important element coming from the different comments, as I could see, which is very relevant to the cross-border basin. This is about the traditional knowledge. This is also an experience that showed us that this traditional knowledge which is not necessarily translated into a quantitative knowledge, but is mostly referred to qualitative which comes to complete and add, the range of knowledge we have already. This has been raised at our discussion on cross-border basin in the Northern Niger, which came to complete the number of the available data. And it has been used to feed and appropriate databases and how to establish priorities and how to feed dialogues of political level. This was something I wanted to mention. There is an aspect which I believe we should also be commenting and I think, Ash raised that, and it is a shame that Abdoulaye Faty is not present at the moment, is the question relevant to the economic challenges. We have to admit that this is something we haven't touched upon so that, and I am convinced that we should address this in the near future. This is definitely the topic to seek to put in our agenda and the recommendations already towards our discussion need. It is to establish, a with think-tank that we need to build between water sciences, the political level and the private sector, as a sector which is capable of providing funds, to put on the table, define and address the problematics and the priorities regarding the cross-border basins throughout Africa. Thank you very much.

Murray Biedler: Okay, thank you very much for that Cesar. We have a comment in just now from Ash for the CSR, who has recently embarked on a project of water sector Big Data itself in South Africa. We have a high-performance Computing Center, possibly the only one in Africa, where they are considering as a repository for sector data. But also, for its use for particular applications COVID-19 is provided an excellent opportunity to re-examine our relationship with data, issues relating to data collection privacy issues, data storage, management and access etc. Indeed, there COVID has served as a magnifier on a lot of these issues and raised them up too much higher profile across the broader public and I think that has been for many years and COVID-19 may be pushing us towards what you say could be an opportunity to look at the relationship with data issues, data access, open access, open science. Right. Thank you for the comments, Fabio.

Fabio Farinosi: There is a comment from Ezio. Remark. Yes.

Ezio Crestaz: Thank you. A very last comment. It's also a matter of standards that adoption of standards. This is for example an issue that has been discussed with [ZANKOM] and I think that is quite common, as you are for example a single states reporting their own data, if you lack standards in terms of electronic data deliverables, you are probably come to the point that you are in trouble that your databases are not consistent and are not robust enough to support your analysis. And at the same time, it's a matter of tools that they should enable this kind of cross experts collaboration, that we have very good examples about the open source and proprietary platforms arena, also, we have very good examples of the implicit increasing difficulties that may arise, that I'm thinking about for example, the [02:42:25 not clear word] platform that tried to keep together surface water and groundwater while coping with climate challenges. And of course, one of the major difficulties, is that the kind of time frame work, the kind of problems and also the kind of details you may need to address each single component is often quite different and I'm

also thinking about project, that's ongoing by the [02:43:01 not clear word] unfortunately, the Ruby Rosetto is not anymore here, because he had other commitments, but basically the attempt to make use of open source platforms to cope that specific case the groundwater component and the agriculture assessment. This kind of platforms have the potential to be cross captains and to take together to bring together different competencies and to promote, somehow the collaboration and the proper understanding of the specific, the specificities of each domain and somehow to contribute to cut this kind of cultural barriers that still exist. That's all.

Murray Biedler: Okay. Thank you very much, Ezio. Right, any more hands out there, Fabio?

Fabio Farinosi: No, Murray.

Murray Biedler: Okay, thank you for that. Great. I think that's close to session. That's the timing up on that. We are 10 minutes behind overall agenda. And we normally would offer about 10 minutes now, if there are any other questions or comments, but let's just leave the floor open for a few short minutes, five maximum, and if anybody has any questions, they want to bring to the table either on this presentation, the earlier presentation this morning from our colleague from SADC or any of the presentations yesterday, any comments that were not able to be provided or addressed. We leave the floor open for you now, if you wish, I see from the MNT we have Mr. Moshood, do you have something to contribute? Please, over.

Mr. Moshood: Thank you. I think I want to come back to the issue of the resource assessments in many of these issues that we are talking about, especially also related to the transboundary water management, transboundary aquifers and so on. And to me, I think most acknowledge UNESCO efforts in West Africa, which I think and maybe, possibly could be a standard order the region. Currently, they are trying harmonize the regional map of, either geological map to map aquifers and so on. I mean this could be downscaled down to the national level where could be additional data make more digit with national level one, local level, but to me this agenda is also good if there could be a way where the national geological service, could be completed to this idea, because I am a member of geological survey, also in charge of the groundwater system in many of the countries. So, I think there can be national geological survey, now provide better services on geology and so on, that we assist in getting a good geological map is a very important aspects in that way, we could look to this, AMCOW is ready to partner with any organization in Sudan and at national level we can facilitate the collaboration with the national geological survey to do that. So that, regularly each country can build the capacity in terms of having adequate data and information about the groundwater resources. That's my comments and consultations. Thank you.

Murray Biedler: Okay. Thank you very much for that. Any additional comments or questions?

Okay from Nico, thanks, the session is clear. A lot of work has gone into this from all role players to get us where we are now, if Centers of Excellence and the implementing partners with guidance from the right structures. Thank you for that, Nico.

If there are and also early from AMCOW provided they will stand by as well, I think everybody has mandates that they would like to push and achieve the and I think great things can be done. If we can achieve the also the support some of our other partners. Arnaud, please go ahead, over. No comments. Okay. All right, I think, we can bring this session to a close. [Cesar in French]. Sorry, I didn't hear that, okay, please go ahead, Arnaud, go ahead, over.

Okay, audio problems from Arnaud that is unfortunate.

If you can present something in the chat box, it's most welcome.

Arnaud De Vanssay: Can you hear me now?

Murray Biedler: Yes, that's excellent. Please go ahead, over.

Arnaud De Vanssay: Okay. Thank you, sorry. Just to thank you very much for the nice questions for the future and just one thing that I was asking myself maybe interesting to consider, because we are adding climate change more and more. And this takes a lot on the sea level rise, and we need tremendous amount of investments to control its being on the coastal areas or in the collectivities related to the flood control. And these flood control activities are transboundary [02:49:38 not clear word] because it would need to have expansion areas confirmed in, conserved in the upstream areas of the rivers, so, there may be a lot of let's say externalities related to this conservation of this expansion areas, plus some costs that could be that should be shared between the countries in the way in another. And so, there are many, many questions there. That's for which I think, we don't have much answers today in African basins and I like to know if there is someone that is already planning or will be planned on this type of things? This could be considered also for the future. Over. Thank you.

Murray Biedler: Okay, thank you very much for that on the question and comment. Any other support or any information on projects or ideas or concepts on Coastal sea levels rise and Coastal River and flooding?

I do know that some work has been done with ONBS and setting [2:50:57 sound error] on the river basin since a few years they've been having problems with that from prof. Gamal, you know, that the project is closing, pilot implementation for [02:51:08 sound error] is less than 40% so chance for completing pilot trainings by the Centers of Excellence. In terms of the ACEWATER-2 project, the actions will come to a close. But in terms of implementing pilot projects, it's a matter of resources, which the current partners won't have access to after the close of ACEWATER project, but rollout of the human capacity development and the pilot courses is part of the objectives of future collaborations, which is mentioned yesterday by Dr. Abdullah Mani, the director of hydrology and UNESCO and has been also repeatedly mentioned as an objective and a key important task to address in the next phase of activities whatever it's called, whatever the project might be the pilots need to be pursued. Okay, I think that's all we have to comment. Yes, Ezio.

Ezio Crestaz: Murray, may I add brief comment related to the comment of Arnaud?

Yeah, there is also some researcher from JRC on issues related to coastal aquifers that are somehow linked to the problems of sea rise, as it would somehow affect the ground water levels as well. And according to SADC, there is a growing population along most of the African coast. Of course, there is also a growing pressure in parallel on groundwater in terms of groundwater withdrawal and this somehow links in a complex way with sea rising, because all these components and may affect the increasing salt water intrusion on one end and on the other end depending upon the specific geology. You may have problems related to subsidence, that particularly in the areas, which are relatively flat can be absolutely critical. So, it's a really complex interlinks of factors that they must all be taken into account. That's all from my side.

Murray Biedler: Okay. Thank you very much for that, Ezio. I think we need to bring this to a close now.

Fabio Farinosi: Murray, there is the last comment from Joanna.

Murray Biedler: Okay. Joanna, please carry on, over.

Joanna Fatch: Yes, quickly yes, I think it's related to Ezio's point regarding for example, some of the work that's required, especially in the SADC region with a like especially on what security on what security in Island States. There some work that has been done in Mauritius for example that prof. Manta, I'm hoping prof. Manta will come here, but there some drought work on drought monitoring and awareness and those kind of things in Mauritius that one of her students is working on for his Ph.D. For example, and they have been calls at think a lot of calls in terms of looking at Water security issues and threats and those kinds of vulnerabilities, especially in Island States and that would be an important component a so, I'm really hoping prof. Manta method will help me here.

Murray Biedler: Okay. Thank you very much for that, Joanna. Right. We need to bring this to a close. I would like to thank everybody for their contribution in their participation. I do apologize for the technical difficulties coming all from my side. It's unfortunate. But thank you Fabio for assisting me in finding a workaround on that.

Fabio Farinosi: You owe me a chocolate, Murray.

Murray Biedler: Okay, I can do that, I owe you a chocolate, I will send Cesar, something in the bottle, fair enough I can do that. Right. Let's close out the session. Thank you everybody for your participation and we can move on to the wrap-up. And over to Cesar, thank you, over.

Kawawa Banda: Sorry. Murray, before you close the session. I just wanted to make a small comment for the question of Cesar, is that, okay?

Murray Biedler: Yes, please. Go ahead.

Kawawa Banda: Okay. I was this also thinking about regarding the future of project activities. One of the issues that we highlight to the fact that COVID has impacted on some of the delivering around the piloting of some activities, still have some stakeholders that you that they should be some level of interaction with them regarding some delivery and bringing back to the point that Ash raised looking at engagements with stakeholders and ensuring some of this material that has been developed really gets down to the people who really want to know about it they can use it. Maybe this is something to think about also in terms of how we take activities going forward.

Murray Biedler: Okay. Thank you very much for that observation very valid, I would say coming back briefly on COVID. Yes, go ahead.

Fabio Farinosi: Sorry, Murray. There is Professor Manta wants also to add something.

Murray Biedler: Okay. Continue, please over. You'll have to use, you are muted, I think, Manta.

No, we're not hearing you. There's an audio problem with you, Manta, perhaps if it's difficult. You could put it in the chat box.

Okay, at University in Mauritius, they are undertaking research on sea water intrusion. Yes, indeed and that's not a surprising for a lot of small Island States, rising sea levels are definitely a problem on that and just quick follow-up on that. It's the groundwater abstraction even before sea level rise, became a problem is also in a sea water intrusion and there is quite some research be going on a number of years along the coast of Mozambique and this small islands of the coast of Mozambique.

Okay, Mauritius. We can't add on catchment hydrology or morphometric analysis and flood-prone sites. Okay, right. We need to wrap up now. So, we'll collect all of the comments there and Manta, if you have information, please absolutely do share that with us. It's most welcome Fabio. We can close the session now and we can hand over to Cesar for the wrap. Thank you very much everybody, over.

Cesar Carmona: Okay. Thank you very much. On my part, I would like to thank you for being here. It was a very interesting today session; everyone is in agreement with to this that we have worked a lot. We have been covering a lot of tutorial last four years and a half. So, there is quite a lot of result we made breakthrough for. There are still things to be done of course. All these will be session board when we sit down to last a synthesis of technical aspects of all those things accomplished documents to be addressed to all of our partners, so there are many things to explain, where will be recommendations and very succinct recommendations and ideas, we will be addressing our political partners. On that basis, we hope we will be able to long ourselves to a very good work exchanges with all our partners. I will be insisting on those themes that have been covering throughout this four-years operation and also highlight these two days reinforcing the capacity is a very important term. As I explained this is a top secondly link to the

needs for updated technical incentive knowledge, we have to name which lead us to fill the gaps in terms of information data. This is an issue all of you decided with critical points that we have to take account. Underground waters, is an aspect that has not been fully elaborated during this for the true at this stage. Although, all agree on each relevant for the call upstream region, this is something we should definitely deal for further. The acting event and circumstances which was again properly highlighted not just very much once for all, other circumstances as for instances, so you said illnesses portrayed with water quality, the water borne conditions, we should have to be able work on that as well. Hence, the need for enhancement of the water and science at political level. Linkage we have to implicate all the private sector that we hope no effort develop this could be made these. In parallel aqua, in other element we basically touched upon as of this last project it is creating awareness towards establishing water diplomacy, about the science and technicians should bring on table for further exchanges. There is need for concept for critical importance imply. Political exchanges among states that are also need for discussion among sectors. Where again by worry of projects as for example the European Commission is mainly carrying out on the Nexus cooperation with the German Delegation. There is very critical focus whether they want though taking place which amongst others, allowed and understand how water science may contribute to the develop recent intersectoral dialogue. So, this is not good bye, see you soon, more ahead we should do effort towards developing those work where we belong. So that, we will be able to complement them and present them appropriately in front of difficult, the financial realities, our colleagues and brothers, who are in charge of recommendation and definition presentation and cooperation with confidence and excellent to the work. And thank you and congratulate you all. I know it has not been easy given the circumstances with last few months while with COVID pandemic. I know this slowed down a bit the place in all exchanges towards the end of the project [02:58:19 sound error] knowledge... very important to develop, mainly... accident basis for further work, it will be further utilized for the year to come. Thank you very much.

Murray Biedler: Okay. Thanks very much for that, Cesar.

The, I think of, for also the last closing off, Ezio, maybe a couple of points on what we have for remediate country next steps and we'll be ready to sign off. Ezio, would you like to say couple of points? Over.

Ezio Crestaz: Yeah, well I, first of all I would like to thank you all, interesting and challenging that we are all had. Actually, we were just a bit worried with a such a huge online video conference, but it would like that everything run smooth and I'm very pleased about that. Of course, in the coming months, two months maximum that we will be finalizing most of the activities that we already have all the scientific deliverables that are not limited to report and [03:06:45 sound error] they include models, they include databases, they include analysis tools and then somehow we will recap all this huge body of knowledge that has been produced in this for last years by preparing scientific JRC scientific report and collect contributions from all the stakeholders, from all the Centers of Excellence and of, from all the other contributors and it would be basically a gateway to assess the much richer and complex documentation that have been produced. Of course, data collections and deliverables will be another major focus and all the documents would be made available, also for the app and a knowledge management system. Of course, with all the limitations that we may be aware about that concerning confidentiality issues about, basically most of the documentation will be, if not, all of the documentation would be made available. And of course, it has already been mentioned by Cesar, scientific papers in peer-reviewed journals that are underway and policy briefs would be shared. So, I would say that's all on my side and again I would really like to thank you all for the challenges, sessions, very interesting contributions.

Murray Biedler: Okay, thank you very much for that, Ezio. Like from my side it's quite similar. We're still wrapping up on the HCD final reporting activities. So that, that's coming up on the table almost on a daily basis right now up until the end of project and there are also compilation notes, which need to be to be written on evaluation study which is still ongoing, which is being implemented across the regions and

should be getting a report on that within a week time and a synthesis of the risk mapping in E-Readiness survey activity that was undertaken between April and August and on that point, I'd like to say a big thank you to University of Stellenbosch, and to the services that you organized for us, Nico, specific with Mr. Karina de Kok, who helped us design, implement and follow it up and do as much of the detailed analysis so Nico, Karina and also Joanna, thank you very, very much for that. And then also results from the impact studies that a number of you have taken part in and in collaborating with us and especially with Nico on that. All of those will be full together with the actual HCD reports and they will be summarized into a, UNESCO publication at the beginning of next year. Project documentation, absolutely, the reports are, begin. And as for the with the JRC all deliverables will be incentivized and uploaded. We will share with the aqua Knowledge Management System, and we will also be setting up a space on UNESCO platform the winds of water information system on that. So, that's we are for today and I think that's all it for closing. Nico, maybe I can ask you just for a final word for all of us as you so kindly opened up the early session.

Cesar Carmona:): I would like to thank you all. Once again. Nico, Joanna, people from South Africa. Gamal, for the coordination, he has liaised with all Centers of Excellence in East of Africa. And professor Kawawa for the excellent piece of work carried out in West Africa. I would also like to thank all of the institutions and agencies working with plenty of them in Africa, plus, the economic region for their interest, participation, for active participation throughout the years, also AMCOW, our colleagues from DEVCO, for the cooperation, the European Commission, for their support and for having understood this is an excellent opportunity to all of us work diligently as a team. As well as our HCD colleagues, regarding SADC and various water sheds with other authorities of the river Zambezi, the Nile, Nigeria and Senegal. Thank you very much. That has been a unique experience. Once again, and having said that hopefully we will be able to renew this meeting in the prompt future. Thank you very much. I believe we can declare this to be closed. Thank you very much.

David: Thank you, everybody will see each other around and keep well, keep safe, bye-bye.

Murray Biedler: Thank you very much. Goodbye, everybody. Chao.

All are saying: bye-bye