



### Water and sediment sampling in Mozambique

November 2017

The Limpopo lab has started with the analysis of the sediments and water quality to better understand the characteristics of the Limpopo river. From the 2<sup>nd</sup> of November Attouame Abi (IHE Delft) and Paulo Savea (IPSG) carried out vertical sounding and sediment sampling in Guija followed by the same activity in Shokwe. Those soundings were drilled by auger hole equipment and sediments samples are sent to the ISPG laboratory of soil mechanics for further analysis. The sounding showed that the sediment deposition in Shokwe is quite uniform compared to Guija in which a clay layer can be found between the sand deposits. The second main activity that was performed is the water analysis of the river both in Shokwe and Guija. Water both in the river bed and along the river has been sampled. The analysed parameters onsite are the EC, pH, alkalinity and temperature. The values of alkalinity vary between 107 and 136 mg/l; the EC varies between 412 and 600  $\mu$ S; the pH vary between 8.45 and 8.70 and the temperature vary according to the daytime between 26 and 35 C. In addition, 2 piezometers have been drilled near Guija, and vertical hydraulic conductivity from the river and sand has been determined near Shokwe.



#### Short announcements

- Ms. Tanyaradza Mawoyo, a Water Management student from IHE Delft, has started fieldwork for her MSc research in Mzingwane. Her objective is to co-develop irrigation designs with individual farmers for optimising productive use of alluvial aquifers. Read more in the next edition!

### Fieldwork on evolving irrigation systems by Annelieke Duker



August 2017

Annelieke Duker from IHE Delft, started her field work for her PhD research in the Mzingwane catchment. She aims to analyse how different types of farming systems using alluvial water have evolved over time and how they are able to deal with shocks such as floods, drought, interventions by external organisations and volatile markets. She has visited several communal irrigation systems and independent smallholder and commercial farmers along the Thuli and the Shashe rivers. One of the remarkable findings was that none of the farmers had ever had experienced problems with water availability in the

rivers, not even in the dry El Nino season of 2015-16. Accessibility, i.e. energy, on the other hand is a major concern: maintenance of diesel pumps, access to fuel, and a dependency on external actors and infrastructure were challenges experienced by the different farmers. The insights confirm the relevance of A4Labs to engage in action research to co-develop sustainable methods for optimising the use of alluvial water. The next steps in her research are to make an in-depth analysis of the processes of selected events that led to major changes in system functioning.

### Stories of Change

August 2017

Oxfam Novib, as primary partner in A4Labs, is the lead in recording so-called Stories of Change, in which we aim to support learning and evaluate changes triggered by the project. By listening to the experiences of stakeholders in the Labs, we increase our understanding of what works and why, and what doesn't work. Ms. Anne Oudes leads the process and has given an initial training to the leads in each lab: Louise Nkomo, Kebede Manjur, and Helder Paulo. They have in turn trained staff to conduct interviews with farmers, local leaders and other stakeholders to assess the impact of the work of A4Labs at different stages. This approach is expected to give valuable qualitative insights for this action-oriented research.



# A4News - Arid African Alluvial Aquifers

## Dynamic Adaptive Development Pathways by Evelien Rietdijk, TU Delft

August-September 2017

After some years at university you know on the one hand quite a lot, but when you come in a totally new area you know on the other hand absolutely nothing. The knowledge about this environment and the way to develop it lays with the people living there. That is why I, for my final master thesis IWRM, wanted to create a planning for the use of alluvial aquifers in a participatory manner. To plan the upscaling of irrigation practices from the alluvial aquifer of the Shashane catchment a visualisation method was used. Farmers from already established gardens and other community members explained their current situation and their ideas for the future with the use of drawings.

Opportunities on farm scale and for the larger landscape were discussed together with the limitations of the present. All these development actions will in the upcoming period be tested against an hydrological model of the area, to define the pathways for development. This will result in a pathway map that should support local water managers with planning for an uncertain future. This new methodology of Dynamic Adaptive Development Pathways will then be evaluated for the use in other development areas.



## Progress in research and monitoring in Tekeze

November 2017

At the study site in Ethiopia nice research is going on in the catchment of the May Gobo and Koraro sand rivers/dams, including a comparative study with the Adiha sand river, located relatively nearby. Research on the farming practices in the area of May Gobo, and how they are being influenced by the presence of the sand dam, is being done by Geoffrey Opiyo, a Kenyan MSc student of IHE Delft, together with IHE staff Annelieke Duker and Poolad Karimi, as well as with Eyasu Yazew, the local A4Labs coordinator from Mekelle University. The work is challenging given the language barrier, but the farmers are generally very

willing to cooperate and with the help of a translator results about the evolution of abstraction and irrigation technologies are being obtained. Hydrological and hydrogeological research is carried out by Angel Gonzalez-Carballo, also an MSc student of IHE, in collaboration with staff from Mekelle University (Kifle Woldearegay), IHE Delft (Tibor Stigter and Gretchen Gettel, who visited the area in the second half of November), and Acacia Water (Mieke Hulshof). The objectives of the research are to study to what extent natural recharge on a regional scale is enhanced by the sand river and sand dam, and to assess the connectivity between the regional aquifer and the sand river system. Monitoring equipment has been installed on the banks of the sand river, hydrogeological observations have been made, geophysical surveys have been carried out, and soil, infiltration and well (pumping) tests are being performed to estimate the hydraulic parameters of the sand river aquifer, as well as the geological material composing the regional aquifer system. Moreover, hydrochemical testing of groundwater in the many wells and in the sand river water is ongoing, to further help understand the connectivity and functioning of the system.



## Special session during WaterNet conference, Swakopmund, Namibia

October 2017

Our special session on alluvial aquifers during the 2017 WaterNet conference in Namibia was well attended! The session contributed to resilient livelihoods in arid Africa through nature-based water storage in seasonal rivers through an exchange of experiences and best practices of the sustainable utilisation of water from seasonal rivers for resilient livelihoods in Sub-Saharan Africa, focusing on creating opportunities for learning on (i) Understanding the sand river, (ii) How best to abstract alluvial water, and (iii) how best to use it. A "community of practice" on this theme was created with members from Botswana, Ethiopia, Kenya, Mozambique, Namibia, South Africa, Zimbabwe and The Netherlands. The group will produce a synthesis paper on "Best practices and prospects".



### Upcoming events

We are developing a solar pump competition for students, young professionals and any other who is passionate about alluvial aquifers and smallholder agriculture in arid Africa! The aim is to come up with a next generation solar pump to be tested in one or more of the Labs. If you have any suggestions or ideas, let us know!

### More information

Visit: [a4labs.un-ihe.org](http://a4labs.un-ihe.org)

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Any news to share? Send it to Annelieke Duker