# I Stakeholder Meeting: Building partnerships and identification of main Water-Energy-Land Nexus challenges

The overall purpose of this first meeting was to strengthen and build partnerships with regional and riparian organizations in order to: 1) identify priority issues related to cross-sectoral and transboundary cooperation in the areas of water, energy, and land; 2) engage with a number of organizations and experts that could support and contribute to the ISWEL project and benefit from its outcomes.

As a result of the discussions with ZAMCOM, the ISWEL team was invited to participate in the second Zambezi Basin Stakeholder Forum, held in Lusaka on 24-25 September 2017. The specific objectives of the project participation in in this Forum were:

1. Build partnership with ZAMCOM and the National Stakeholder Committees (NASC)
2. Introduce the project to the Forum participants to seek for opportunities for collaboration;
3. Hold a number of bilateral meetings with key actors to gain a understanding of the sectoral challenges related to water, energy, and land;
4. Conduct a number of field visits including two hydropower plants (Kafue Gorge, Kariba Dam North)

## Forum background

The Second Zambezi Basin Stakeholder Forum "Benefits of Co-operation and Basin-wide Planning in the Management and Development of Shared Water Resources" took place between 25-26 September 2017 at the Intercontinental Hotel Lusaka. It was organized by ZAMCOM and attended by 120 participants, representing more than 40 regional and riparian organizations.

This Forum is a platform developed by ZAMCOM to support a wider involvement and engagement of riparian countries and organizations in the Zambezi basin-wide planning. The two other participatory instruments in place, include the National Stakeholder Coordination Committees (NASC) and the Basin-wide Stakeholder Coordination Committee (BASC).

Day one of the meeting was mostly devoted to introducing the progress of ZAMCOM activities upon two main fronts: 1) the development of the Basin Strategic Development Plan (2017-2019); and 2) the development of the Decision Support System (DSS) for the Planning, Management, and Development of Water Resources. The last session of the day was dedicated to discussing in working groups three priority topics:

1) What are the priority issues requiring transboundary water cooperation in the Zambezi?
2) What are the benefits of transboundary water cooperation?
3) What role should ZAMCOM play in the realization of benefits for cooperation?

Day two started again with parallel discussions on four main topics:

1) Building resilience through infrastructure development in the Zambezi
2) Institutional strengthening and capacity development for basin wide-cooperation
3) Improving data and information management in the Zambezi
4) Strengthening gender equity and social inclusion in basin-wide planning

The last session before the wrap-up was allocated for presenting the ISWEL project. Next section provides full details of the structure and outputs of the ISWEL session.

In the afternoon of day two, and as a part of the activities planned within the Forum, we had a guided technical visit to Kafue Gorge Dam.

## ISWEL session "Applying a Nexus Approach to generate new-synergies and resolve trade-offs for basin-wide planning"

The session was structured into three main parts:

1) A short **introductory presentation** of the project to provide the overall framework and assumptions of the IIASA nexus approach. Given that the main theme of the conference was related to the discussion of benefits for cooperation, with a special focus on transboundary water cooperation, the emphasis was placed on the added benefits from cross-sectoral cooperation. This presentation was delivered by Piotr Magnuszewski and preceded by a short introduction by Simon Langan.


The presentation was followed by an **interactive group discussion** aimed at promoting the dialogue among the participants around the following two questions:

*What are the main constraints for promoting cross-sectorial and transboundary coopetition in the Zambezi?*
*What are the main opportunities to overcome such constraint?*

For this session, no pre-arrangements of the room were needed, as the existing setting was favourable. All participants sat in 10 roundtables, and each table had between 7-9 persons. Each table/group was provided with markers, flipchart paper and post-its of two different colours (orange and green) before the facilitators started describing the process. Flipchart sheets at each table were pre-divided into two main columns with two labels: constrains and opportunities.

This part of the session was facilitated by Amanda Palazzo and Barbara Willaarts. Both facilitators explained the process and requested the groups to discuss among themselves the two questions outlined above and write on the orange post-its the main constrains identified, and on yellow the opportunities to overcome the former ones. The facilitators decided not to pre-establish any group of categories of constraints and opportunities, in order to prevent possible framing of the issues, so that the ISWEL team could get a broad range of answers. Participants were asked to pair constraints and opportunities placing them in parallel next to each other i.e. one opportunity to one constraint.


Each group was asked to discuss and write their post-its. Facilitators walked through the room answering questions and clarifying doubts. Once finished, facilitators collected the 10 flipchart sheets with the post-its.

Given the short time allocated for the session, facilitators could not debrief on the outputs of the individual groups. Participants were informed that individual group outputs were going to be processed, clustered together and interpreted *a posteriori,* and results would be sent to ZAMCOM for its inclusion in the Stakeholder Forum Report.

2) The last part of the session included an open discussion with other organizations currently involved in nexus projects and initiatives in the basin and SADC region to explore potential avenues for collaboration. Specifically, with ongoing projects like AU/NEPAD Water CoEx and the SADC NEXUS Dialogue Project "Fostering Water, Energy and Food Security Nexus Dialogue and Multi-Sector Investment in the SADC Region".

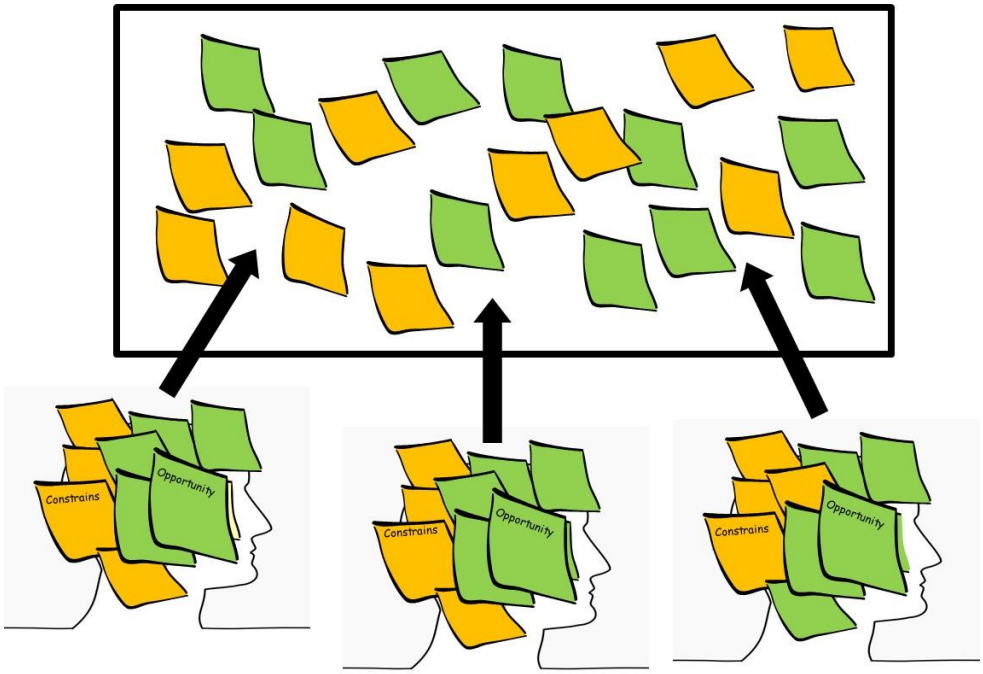
In terms of outputs, the information collected in the flipchart sheets was processed ex-post through a clustering analysis. With more time available, this exercise would have been done during the session with the participants, but due to the time constraints it was agreed to be processed after the meeting.

The clustering analysis is a technique frequently used in stakeholder analysis, and it is intended for grouping opinions, participants and views emerging from a participatory process as a mean to synthesize outputs. It can be done by the stakeholders based on their perceptions, opinions, and views of the topics under discussion, or it can be applied to the outputs of the process by researchers.

For the purpose of this exercise, post-its collected from the flipchart sheets were clustered, distinguishing between those referring to constraints (orange) and to opportunities (green). The criteria/categories for clustering were not pre-defined (bottom-up analysis) and post-its were grouped based on the similarities of its contents.

The clustering exercise consisted of two steps. To start, post-its pairs (challenge-opportunity) from all 10 flipchart sheets were first numbered (e.g. constrain 1 to opportunity 1, constraint 2 to opportunity 2, etc.). Once numbered, post-its were removed from the sheets and placed into a whiteboard and started to be moved individually by participants. This process took approximately 1 hour and involved several discussions among the participants in order to best classify these different post-its. Once grouped, clusters were reviewed jointly by the team and cluster names were proposed i.e. the categories under which constraints and opportunities were classified. Figure 1 summarizes the process.

A. Individual exercise of placing post-its on a white board.




B. Grouping and collective agreement on the emerged clusters and their names

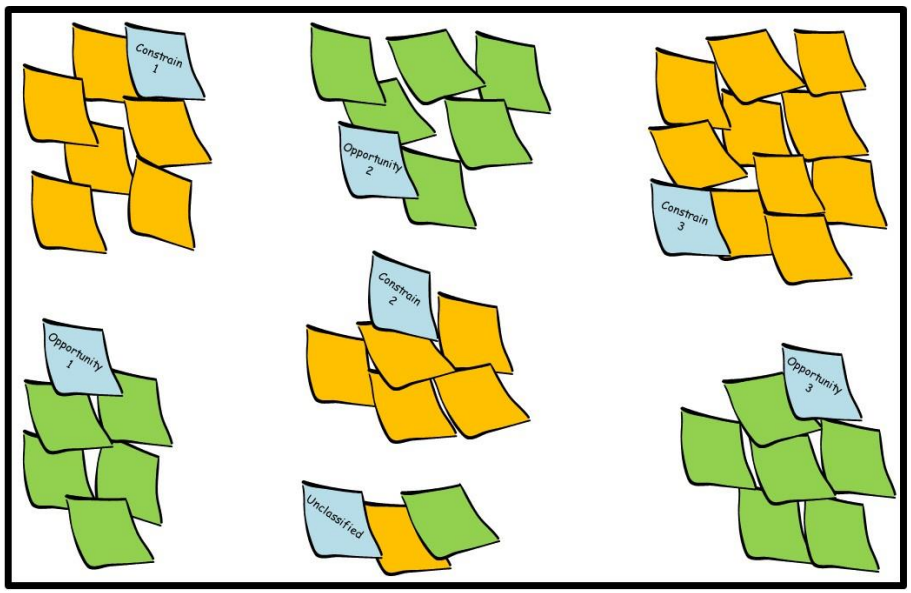



Figure 1 Summary of the clustering exercise developed to unfold the main constrains and opportunities to implement a nexus approach in the Zambezi basin.

The outputs of the clustering exercise are summarized in Table 1.

Table 1 Main constraints and opportunities for fostering a cross-sectoral cooperation and nexus approach in the Zambezi Basin

| What are the main constraints to implement a nexus approach? | What are the opportunities to overcome such constraints? |
|---|---|
| **Resources** | |
| **Financial** | |
| - Budget allocation and mandate | |
| - Lack of financial resources | - Sustainable Financing |
| - Limited financial capacity | - Willingness by development partners to support |
| - Inadequate resources | - Donor/CP willingness |
| **Capacities** | |
| - Inadequate knowledge on the linkages<br>- Theoretical/ Don't appear practical<br>- Lack of capacity<br>- Institutional capacity lack | - Government promoting the linkages<br>- Research may bring clearance on the issues<br>- Capacity building programs<br>- Capacity building under the umbrella of ZAMCOM |
| **Technical** | |
| - Lack of harmonized data and information<br>- Lack of capacity | - Use of remote sensing<br>- Training opportunities on the increase |
| **Physical** | |
| - Lack of equity in resource distribution | |
| - Spatial and temporal variability of natural resources | - Adequate natural resources |
| **Technical/Financial** | |
| - Differences in technical and financial capacities | |
| **Cultural** | |
| - Cultural aspects | - Integrate Cooperation |
| - Cultural differences | |
| - Language | |
| **Gender** | |
| - Lack of inclusive approach (including gender sensitive) | |
| **Cross-sectoral cooperation** | |
| **Institutional setting and policies** | |
| - Water, energy and food issues mandated to different institutions | |
| - Focal points for integration not existing | |
| - Lack of institutional coordination | - Integrated management |
| - Lack of coordination among the sectors | - Integrated approach for coordination |
| - Sector reforms at different stages | - Harmonize sector reforms |
| - Practical difficulties in breaking the silos | - Improves efficiency and sustainability<br>- Job creation<br>- Wealth creation |
| - Poor land management affects water flows, which also affects energy generation | - Investment in water resources management |
| - Institutional government silo mentality | - Available revised SADC Protocol on Gender, Development partnerships (articles 18-19 and 31)<br>- |

| What are the main constraints to implement a nexus approach? | What are the opportunities to overcome such constraints? |
|---|---|
| - Different platforms dealing with nexus issues from different perspectives | - SADC Agricultural Regional Policy |
| - Lack of integration of where, when, and what is available to enable the nexus | - Industrialization strategy |
| - Public sector silos | |
| - Budgeting per ministries and departments | |
| - Conflicting and competing uses | |
| - Sectorial focus. E.g. ZAMCOM: water | - Sectorial programmes quite advanced and possible to integrate |
| - Inadequate collaboration between different water sector players across the region | - Regional peace in region (SADC) |
| - Inter-agency poor collaboration | - Inter-agency coordination mechanism |
| - Silo mentality | - Integrated approach |
| - Different priorities in national development plans | - Already existing synergies between energy, land and water. E.g. most countries water and energy are in the same ministry |
| - Barriers to land ownership | - Open transboundary land ownership |
| - Inadequate of institutional approaches to buttress the nexus approach | - Existence of regional institutional framework for cooperation |
| **Transboundary cooperation** | |
| **National prioritization** | |
| - Individual countries have different priorities | |
| - Different priorities for the Member States | - Harmonize priorities |
| - Different national contexts and priorities | - Regional Economic integration in motion |
| - Sovereignty | - Political will |
| - Hidden agenda, political issues, and sovereignty | - ZAMCOM integrated strategy |
| **Institutional setting and policies** | |
| - Barriers to trade | - Customs union |
| - Lack of coordination and implementing partners | - Harmonization of protocols among member states |
| - Different policies by sector and country | - Existence of institutions (e.g. SADC, ZAMCOM) |
| **Benefit sharing** | |
| - Weak ZAMCOM agreement, no explicit benefit sharing | - Amend ZAMCOM agreement to include benefit sharing, limit no harm rule |
| - Benefits of cooperation, there are no evidence | - Presence of research institutions in the riparian states |

Based on the clustering exercise, the different barriers and opportunities to implement a nexus approach can be broadly grouped into five main categories: resources availability, cultural factors, gender factors, cross-sectoral and transboundary governance issues.

In terms of resources, there are several barriers or constraints, with financial resources appearing to be most acute. Budget allocation and especially limited resources for promoting this cross-sectoral cooperation are mentioned several times. Greater endorsement by donors and development partners is seen as an opportunity to overcome these barriers.

In terms of capacities, the existing inadequate knowledge about what the nexus means, and the yet little evidence of its practical application, were cited as the main barriers. Fostering capacity development programs, and in particular bringing in research and academia to shade light on the practical usefulness of this nexus approach, were given as opportunities.

From a technical perspective, there are data challenges and lack of technical skills. The use of new technologies like remote sensing can help to overcome part of the data gaps and support the harmonization of existing information data sources. The growing opportunities in training might contribute to addressing some of the technical challenges.

Lastly, unevenness in resource distribution and capacities (technical and financial) among riparian countries is also given as a key barrier. Opportunities on this front are still unclear.

Cultural factors, including language barriers, were identified as an important constraint to promote cross-sectoral cooperation across countries. The lack of an inclusive approach is regarded as a barrier to take the nexus approach into action.

Governance-related challenges, within and across countries, were the most numerous barriers to implement a nexus approach as recorded from the number of post-its collected. Nevertheless, a large number of opportunities were also proposed by the participants.

At the national level, the existing institutional setting, with ministries developing their separate, non-coordinated agendas is the most frequently identified constraint. The current budget allocation system and the conflicts between some ministries, incentivize the silo mentality and prevents the operationalization of the nexus management approach. Promoting greater integration is seen as a key opportunity, and possible pathways to this end include a more active role of SADC in the development of integrated policies, and at national level the development of mechanisms to support harmonization of the sector reforms that are currently taking place. In some countries, the interlinkage between sectors (e.g. water and energy) is tight, and this has led to the development of joint ministries on Energy and Water.

The (limited) transboundary cooperation is also cited as an important constraint to the implementation of the nexus management strategy. Riparian countries have different national development priorities and a strong sense of nation's sovereignty. Lack of trust among riparian countries is also pointed out. These barriers result often in conflicting agendas with an accompanying absence of political will. The current institutional settings are perceived as inappropriate to buttress the nexus approach, although existing institutions like SADC and ZAMCOM have a potential to foster the co-operation across countries and sectors. Lastly, the need to provide solid evidence on the benefit sharing across countries will also contribute to foster co-operation and research can play an important role here.

## Summary of sectoral challenges and prioritization of nexus challenges

The Lusaka meeting also provided some insights on the specifically sectoral challenges. These where further investigated to map a number of priority challenges across the water, energy, and land sectors. The second stakeholder workshop (Harare, July 2018) also helped to confirm the issues described below.

### Energy challenges

1. Access to energy. Only a small percentage of the population has access to electricity, and those having access are mostly urban/industrial centers. Access to electricity in urban areas differ from country to

country but still remains under 80%. In rural areas the situation is worsen, with minimum access (5%) in countries like Malawi, Angola and Zambia.

2. Sources of Energy: Rural areas mostly rely in the use of charcoal and fuel wood, which is responsible for much of the ongoing deforestation and erosion problems, as well as health issues. Sedimentation of dams is partly related to this problem, which ultimate affects hydropower performance. Overall between 50-70% of the energy required for cooking across all countries comes from biomass fuels. Electricity in urban areas is mostly supplied by hydropower.
3. Energy production: the majority of the countries, except for Angola and Mozambique are net energy importers (much of which comes from South Africa in the form of fossil fuel generated thermal). Larger percentages of the national production relies in renewable energies (hydropower and particularly biomass). This energy mix is not efficient from an emissions perspective due to the high reliance on biomass.
4. Energy development plans:
    - Most of the efforts and investments plans are oriented to further develop the hydropower sector. This will contribute to increase energy security within the basin countries and export clean energy to neighboring countries like South Africa contributing to meet emission reductions. The challenge here is that impacts of Climate Change are not well accounted due to high uncertainty and it might have counteractive impacts in the long run for the energy sector, but also for environment and other water users.
    - Development of other renewable energies (solar, wind, small hydro-, mini-grids) is also in the agenda. Rural areas will largely benefit from these development plans, although it encounters some problems, including the financing of the rural electrification, the lack of feasibility studies which prevent from having a clear picture of the energy potential, and the complexity of the implementation and management of such sparse infrastructures as oppose to large scale projects (big dams).

### Water challenges

1. WASH (Water, Sanitation and Health): Access to water and sanitation is low within the basin countries. Basic access to water remains below 60%, and in rural areas it reaches up to 70%. Access to sanitation facilities remains also below 40%. Overall, investments in water infrastructure are low.
2. Water users: agriculture and hydropower (evaporation) are by far the largest water consumers in the basin. Available estimates indicate that agriculture consumes annually 1,500 $Mm^3$ and water evaporation from hydropower up to 1,700 $Mm^3$. Consumptive water use of urban (200 $Mm^3$), industry (25$Mm^3$) are in comparison rather small. Aluminum smelters are the largest industrial water consumer and also the main source of (surface) water pollution. There is a widespread mind-set that water which is not utilized for human and economic uses is wasted. There is a lack of understanding of the role that environmental flows can play in supporting development goals. This is partly caused by the lack of sound knowledge about ecosystem services.
3. Water sources: irrigation, urban water supply and industrial activities mostly rely on surface water, whereas rural areas and small scale agriculture largely rely more on groundwater use. There is however an untapped potential for groundwater use and recharge.
4. Limited storage capacity combined with the prevailing climate variability and change deeply affects the water availability and becomes a key driver of water insecurity.
5. Water governance: despite the fact that many countries are developing water resources management plans, in many cases those are not implemented. There is also a need to strengthen national capacities for effective river basin management and to integrate these further with and through ZAMCOM

6. Water development plans:
    - Large scale investments in water infrastructures to support the expansion of hydropower and irrigation schemes. The intention is that such infrastructure developments will be subjected to proper environmental impact assessments (EIAs). The existing and future projects are being integrated into the Zambezi Strategic Development Plan.
    - Develop appropriate simulation models to simulate influence of dam operations to downstream users. ZAMCOM is currently implementing the Zambezi Water Use System (ZAMWIS), which aims to address part of the gaps existing related to tools and data sharing.
    - ZAMCOM through the Zambezi Strategic Development Plan is also seeking to identify the nexus challenges in order to align the investment priorities.
    - Optimize multi-purpose management of existing reservoirs

### Agricultural challenges

1. Agriculture represents a key socio-economic sector for the basin. In some countries like Malawi, Mozambique, Zimbabwe, and Tanzania, this sector accounts for more than 20% of the national GDP.[1] The majority of the economic revenues from agriculture in these countries relate to the production and exports of cash crops (cotton, tea, tobacco). This sector is providing employment to a large part of the population in the basin, especially in countries like Angola, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe, although the majority if the farmers are small holders engaged in primarily <1ton/ha production.
2. Irrigated agriculture is still symbolic in the context of the basin (less than 6% of the total cultivated land). There is however, the ambition to further expand irrigation to enhance the productivity of agriculture. These irrigation schemes will most probably benefit market-oriented agriculture. Off-farm Infrastructure (communication infrastructures, storage, etc.) also needs to improve are there significant food loses.

Improving agricultural productivity should contribute to the development of farming economy and livelihoods but also improve food and nutritional security. The questions of what crop patterns and subsidies are required to achieve this double goal remains an important challenge.

Table 2 summarizes the main nexus challenges identified after the stakeholder consultations

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[1] The share of agriculture to the national GDP differs widely among riparian countries. < 10%: Angola and Botswana; 10-20%: Zambia and Namibia; 20-30%: Mozambique and Zimbabwe; 30-40%; Malawi and Tanzania.

Table 2. Summary of key nexus challenges identified in the Zambezi and the Indus Basins.

| | Water-Energy | Water-Land | Energy-Land |
|---|---|---|---|
| Zambezi | The basin is still facing an important energy deficit. Energy development plans are focused on further expansion of hydropower, particularly to improve access to clean energy (electricity) to urban areas and industry. Issues at stake: There is no clear consideration of the Climate Change impacts linked to these plans, and the prioritization of water infrastructure for single purpose use is and will continue causing problems (e.g. with other users like irrigators, downstream countries, non-compliance of environmental flows). | Agricultural productivity is very low and development plans include the expansion of irrigation. Issues at stake: increasing irrigation water demands might create conflicts over water in some parts of the basin. Also, expanding irrigation might contribute to increase productivity of farmers with access to markets, but it is unclear how this measure can help lifting subsistence farmers out of poverty and give them access to markets. | Access to clean energy (electricity) is low but particularly in rural areas (below 5%). Issues at stake: Charcoal is used as the main source of energy in rural areas, and responsible for much of the ongoing deforestation and land degradation. Erosion linked to ongoing deforestation is also caused sedimentation in dams, undermining the hydropower potential, and thus the electricity supply for urban areas. Rural electrification with renewable energies (e.g. solar) is regarded as more complex to manage (and finance) than large scale projects (big dams). |