

Aqua4Sudan Partnership



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Lessons Learned Aqua4Sudan

Technical Paper

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INTRODUCTION

Rural Water for Sudan is a development programme that ran in Sudan from 2015 to 2020. The programme aimed at enhancing the well-being and health of people living in rural areas by improving their access to water, sanitation, livelihoods, and food security. By doing so it aimed to reduce conflicts surrounding water as well. This programme was funded by UKaid and the European Union and implemented by the Aqua4Sudan partnership. This partnership consisted of International Aid Services, Islamic Relief Worldwide, Practical Action, Plan Sudan, SOS Sahel, World Relief and ZOA. The targeted locations of the programme were the Red Sea, Kassala, Gedaref, North Darfur, South Darfur and West Darfur states.

The programme addressed the root causes of crisis in these states by tackling one of the main drivers of local conflict and poverty – accessibility to water. Competition over water use often leads to conflict and stress on water-dependent livelihoods, forcing people to migrate to find alternatives. Even though water resources are considerable, Sudan is still considered a water scarce country and climate change will only contribute to this scarcity in the future. Therefore, the programme's aim was to pilot a sustainable approach to increase access to water. An Integrated Water Resource Management (IWRM) approach was decided upon. IWRM balances the different water requirements (for drinking and domestic use, farming, cattle herding, etc.) with the total availability of water within a hydrological unit (a catchment area). The programme supported the relevant stakeholders in jointly developing an IWRM plan for their catchment area. These catchment areas varied in size from 160 km² in Darrasta, Kassala to 12,500 km² in Khor Arab, Red Sea; and from 5 villages in Audurt, Kassala to 50+ villages in Wadi Muhbas, West Darfur. This approach increased the availability of water for 420,000 people, their land and their livestock and

supported communities to sustainably manage their water resources for the benefit of all users. Also, since more water became available, improved sanitation and hygiene practices became feasible, which positively impacted the health and well-being of communities. Thus, *Rural Water for Sudan* increased the beneficiaries' resilience to the impacts of drought, contributed to more sustainable livelihoods, diminished the risk of conflict, improved stability in the targeted states overall and reduced conflict-driven migration.

This paper documents the lessons learned during the implementation of the Rural Water for Sudan programme. These lessons learned can provide useful insights for organisations seeking to set up a water and natural resource management project in Sudan, but also in other areas of the world where conflict and limited water availability make accessibility and sustainability of water systems vulnerable. An IWRM project will not achieve "quick wins." Therefore, some stakeholders might prefer faster, less complicated and less expensive interventions. This paper argues, however, that the time and money invested in IWRM is well spent in the long run. It shows that water systems and committees set up through the IWRM approach not only significantly contribute to the sustainability of water management in the context of climate change, but also diminish the risk of conflict and advance peacebuilding.¹ In light of increasingly unpredictable rainfall and climate patterns, NGOs should design and implement projects geared toward improving resilience.

As to the structure of the paper, it uses the four guiding principles for IWRM that were agreed upon in the Dublin Statement on Water and Sustainable Development issued at the International Conference on Water and the Environment in 1992 as a

¹ For a more detailed explanation on how IWRM contributes to peacebuilding, see: Corbijn, C. and Hassan Mohamed Elamen, M. "IWRM and Peace: The Contribution of the Integrated Water Resource Management Approach to Conflict Reduction and Peace – The Case of the Rural Water for Sudan Project," Technical Paper, 2021.

² Dublin Statement on Water and Sustainable Development, Rio de Janeiro, June 1992. <https://www.gdrc.org/uem/water/dublin-statement.html> (accessed 23 August 2021).

framework for documenting the lessons learned of the programme. These principles are: 1) Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. 2) Water development and management should be based on a participatory approach, involving users, planners, and policymakers at all levels. 3) Women play a central part in the provision, management and safeguarding of water. 4) Water is a public good and has a social and economic value in all its competing uses.² These principles highlight the importance of the IWRM approach and also expose the main challenges that the *Rural Water for Sudan* programme faced and learned from.



PRINCIPLE 1

Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment

Despite having the river Nile as its main water resource, representing 73 percent of its annual available freshwater, Sudan is a water scarce country.³ Sudan's per capita share of water is less than 700m³ per annum.⁴ The communities located at a remote distance from the Nile are much worse off. Most of the communities in Sudan's eastern and western states, where Aqua4Sudan operates, depend on groundwater in aquifers and seasonal streams (*wadis and khors*). The problem with these is that the former are depleting and the latter are shared with other countries with which Sudan does not have clear and binding agreements on water use and sharing.⁵ Climate change and the intensifying climate variability are putting extra pressure on the scarce water resources in rural areas. Moreover, water uses are interlinked, interdependent and sometimes competing, posing further challenges to water management. Sudanese collective memory is marked by a plethora of droughts and deadly conflicts that were influenced by them. Because water management in Sudan is essential and problematic at the same time, careful thought should



In Dumta, Wadi Sirba Catchment, West-Darfur a camel herder fetches water from shallow ground water through scoops (*masheesh*).

Ed-Elnabbag is situated upstream of Wadi Bargo in North Darfur. Both farmers and pastoralists lived in this area and utilized the same water sources. When farms expanded and livestock water needs increased, the excessive water use led to the depletion of ground water and the drying-up of the wells. Eventually the water scarcity in addition to other factors contributed to the outbreak of armed conflict and displacement. The Aqua4Sudan partners constructed five Managed Aquifer Recharge (MAR) infrastructures in order to revive the ground water. If limited resources would be managed well then conflict could be avoided in the future and livelihoods could be maintained.

be given to the method and location of planned water interventions, as well as community involvement in it.

Water Resource Assessments

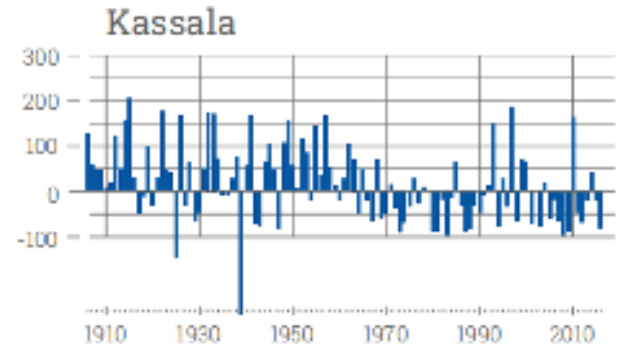
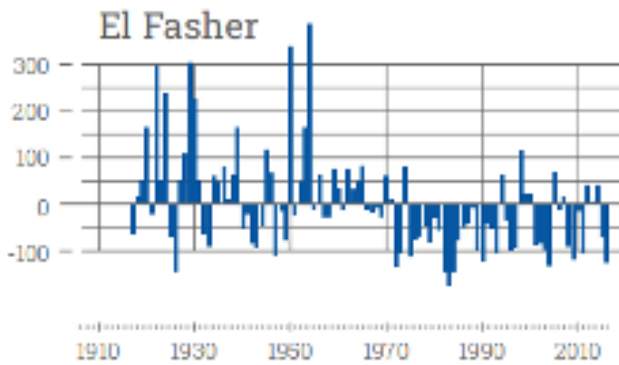
Water interventions informed by short-term and village-based planning – such as in response to emergencies – could lead to long-term damage. Instead, WASH activities should be informed by detailed water resource assessments (WRAs) at the catchment level.⁶ WRAs include a survey of all waterpoints in a catchment area (their status, their users, WASH committees in the area). WRAs will determine water resource availability throughout the year, assess current and future water demands at the catchment level, identify important institutional stakeholders as well as suggest opportunities for enhancing water management efficiency and equity. WRAs are usually conducted every five to ten years during the dry period in May, in order to measure the status of the water points at its lowest capacity and also during the wet season in September to

³ United Nations Environment Programme, Sudan First State of Environment and Outlook Report 2020: Environment for Peace and Sustainable Development, October 2020, <https://www.unep.org/resources/report/sudan-first-state-environment-outlook-report-2020> (accessed 17 August 2021), p. 19.

⁴ Ibid.

⁵ For more information on the issues concerning transboundary groundwaters, see: United Nations Economic Commission for Europe, Management of Transboundary Groundwaters [website] <https://unece.org/environment-policy/water/areas-work-convention/management-transboundary-groundwaters> (accessed 19 August 2021).

⁶ For more information on WRA, see: Lins, H.F. "The Imperative of Water Resources Assessment," World Meteorological Association Bulletin 57(3), 2008.



The graphs, representing annual rainfall anomalies, show a decline in rainfall trends in El Fasher (west Sudan) and in Kassala (east Sudan). UNEP, 2020.

verify earlier findings. In many catchments that the Aqua4Sudan partners were working in, the existing WRAs were very outdated and needed to be reconducted. WRAs can prevent long-term damage, as can be seen in the Darrasta catchment case.

In the Darrasta catchment in Kassala, the Water Resource Management Committee (WRMC) initially suggested the construction of a new hafeer in the catchment centre. It was a structure the members of the committee were familiar with. However, the WRA showed that such an intervention could reduce the water flow to the grazing areas downstream by 40 percent in dry years and cause significant harm to pastoralist communities. Consequentially, the WRMC cancelled the plan for a new hafeer. The WRMC decided instead upon constructing seven managed aquifer recharge structures, as the WRA suggested. As a result, the water supply in the Darrasta catchment increased by almost 51 percent.⁷ This example shows that water management bodies need to properly understand the existing water resource availability and the utilization of water across the catchment area. Their decisions should be informed by WRA and not by a preference for one structure over the other.

Capacity Building and Advocacy

Since it is crucial to conduct WRAs before implementing an IWRM project, Aqua4Sudan learned that it is necessary to include capacity building and advocacy. Topics for capacity building and advocacy can include sustainable natural resource management, service governance, community participation, conflict sensitivity, operation and

maintenance (O&M), infrastructure design and surface and groundwater hydrology.

Aqua4Sudan has heavily invested in training WRMCs, implementing partners as well as government counterparts on these topics. For example, technical staff received training in water harvesting in Kenya and managed aquifer recharge in Spain, which have resulted in a significant increase in the quantity and quality of implemented structures throughout the programme. It is not enough to blindly rely on “outside” experts; the stakeholders themselves should be convinced about and capacitated on the relevant interventions. It was part of the tasks of the WRMCs to inform their communities about the IWRM projects and their status of implementation. If WRMC members did not inform their respective communities about the need for certain water structures or the need for inclusion of certain community groups, minorities and women and to involve them in the implementation of the project, it would come to a stop. Community members have an interest in the continuation of the project and therefore WRMC members have an interest in spreading the information and building consensus.

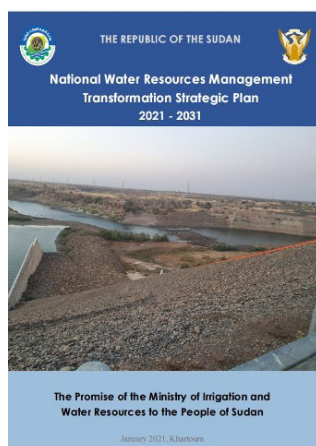
The project involved extensive advocacy activities that contributed to building trust in new approaches. In Hamash Koreib, Kassala, for example, communities resisted building in-stream infrastructures like ground water recharge dams. The programme team took the Hamash Koreib WRMC to a neighbouring catchment, which has similar social settings and composition. There the Hamash Koreib WRMC met with the WRMC of that catchment and together they visited the ground water recharge infrastructures. The visit helped change the Hamash Koreib WRMC’s perception of the new approach and its members were convinced that similar infrastructures would benefit their community as well.

⁷ The figure is this high because the Darrasta catchment is very small and the MAR structures will not reduce the water downstream as it harvests base-flows, while the hafeer uses surface flows and would have reduced the water downstream.

Policy Framework

It was difficult for government technical staff at the local level to accept that plans were based on catchment boundaries instead of administrative boundaries. It is important that policy making should be informed by WRA and its way of thinking. One of WRA's basic principles is that analysis should be conducted based on catchment boundaries and not on administrative boundaries. The communities the programme worked with recognised the need to consider the catchment as the appropriate management unit for water resource management. Community members were well-aware of the physical nature of wadis and khors and how they connect upstream and downstream villages, yet government technical staff still needs to be convinced at times.

Wadi Muhbas catchment is located in both the West Darfur and North Darfur states. During the implementation of the IWRM project, however, the Aqua4Sudan partners realised that in Wadi Muhbas the project was only implemented in West Darfur. In spite of being in contact with the relevant government officials and advocating for IWRM, it was still difficult to obtain the permits to implement the project in North Darfur. Administrative boundaries were given more weight than catchment boundaries.



Box 4: Promising cases: States leading the path towards Water Resources Management Councils

Motivated by the recurrent overlap of development projects, competition over access to water across sectors like mining, drinking water, and irrigation, and reductions in availability and/or changing frequency, many states have embarked on creating institutions to coordinate water resources planning and development across stakeholders.

Kassala State has established an integrated water resources management council to work as a consultation, coordination, and regulatory platform with the membership of related state-level ministries, corporations, institutions, and others. Algedaref state has established a committee to review its legislation framework in order to make recommendations about the proper mandate of a potential Water Resources Management council. Similar steps are being taken in Red Sea, West Darfur, and North Darfur.

On the community side, many community water management committees have been established with support from development projects. These committees are trying to bridge the governance gap at the sub-catchment level by organising the community to coordinate with relevant government bodies, i.e., locality, SWC, GWWD, and the pasture department. In Kassala, for instance, 7 community water management committees representing 7 sub-catchments in Hamashkoreib, Telkok, and North Delta localities are now linked with the newly established

The Wadi Muhbas case study shows that there is a need for an updated legal policy, which will identify the catchment boundary as the appropriate framework for managing water resources. The Aqua4Sudan partners were able to provide input for the Water Resources Management Transformation Strategic Plan of the Sudanese government. However, as of this writing, this transformation is still referred to as an “ambition” and the partners are waiting for more results on the ground.

Sectors

Besides identifying the proper framework for managing water resources, there is a need to identify which sectors to target as well. The competitiveness and interdependency of water usages and users, requires cross-sectoral planning. The Gedaref case study shows that increasing agricultural production could harm certain livelihoods and that different kinds of livelihood sectors should be taken into account when it comes to the planning of water interventions.

In Aqua4Sudan's catchment areas in Gedaref state, the expansion of mechanised farming schemes in recent years has caused an obstruction of traditional nomadic 'corridors.' Pastoralist communities use these corridors for their seasonal movement and access to water sources. The expansion of rain-fed agricultural land in Gedaref also leads to high levels of seasonal labour from outside the state. During the harvest period, when the water levels in farmers' hafeers are dropping, water consumption is much higher because of the additional usage by seasonal labourers.



PRINCIPLE 2

Water development and management should be based on a participatory approach, involving users, planners, and policymakers at all levels

Community-level governance is key to the sustainability of rural water infrastructure. It creates a sense of local ownership, so that after the NGO leaves, the local population and authorities will carry the responsibility and have the skills for the operation and maintenance (O&M) of the water system. For this reason, the Aqua4Sudan programme chose to set up WASH committees to represent targeted villages, and Water Resource Management Committees (WRMCs) to represent a targeted catchment area in its entirety. These bodies represent the users. The WRMC is also a planning body and a voluntary non-governmental decision-making body. Local and international technical experts play advisory roles and should be consulted during the planning stage. Policy makers such as the different (local) government departments should be involved in all stages of the implementation.

Users

Selection of Committee Members

WRMC members should be carefully selected.⁸ At the beginning of each project, the Aqua4Sudan partners conducted an analysis to identify primary and secondary stakeholders. All primary stakeholders (water users) should be represented on the WRMC to have a voice in the decision-making process and this should be done in a locally acceptable manner. Secondary stakeholders (State Water Cooperation, locality, etc.) were given advisory roles. A WRMC structure should be flexible and decided upon based on the local context. In Rural Water for Sudan the decision was made to establish committees from scratch in order to avoid being associated with previous non-inclusive committees. However, in other contexts it might be advisable to work with previously existing committees. Also, if the catchment area is large, or if there are many stakeholders who need to be represented, it is possible to work with subcommittees for sub-catchments. The chair of the committee should be someone who is not likely to

move away from the area in the foreseeable future. He or she should be chosen depending on the local context. It is important to draw on the experiences of organisations working in similar fields in the area. If there are committees for different projects in an area, it may be useful to put them in touch so that they will learn from each other. In all cases, members should be selected based on conflict-sensitivity, inclusion, capacity, ownership, reputation, active involvement, history of public participation, voluntary commitment and possibly literacy. However, strict application of these criteria may exclude women. Therefore the criteria should be applied in a pragmatic manner, depending on the local context.

Traditional Leaders

A decision about the involvement of traditional leaders in the WRMC is dependent on the local context. It is recommended to include male and female traditional leaders in areas where traditional leadership structures are well-established and respected. If traditional leadership is contested or if the leaders are not residents of the area, the project might be better served by not including these leaders. The Wadi Bargo catchment area in Kabkabya, North Darfur state provides a useful illustration.

The Wadi Bargo catchment had a history of violence between agricultural and pastoralist tribes in the area. Because of this and because of the high mobility of pastoralists, the Aqua4Sudan partners made sure that tribal leaders were not selected as members of the WRMC. Tribal leaders, however, were addressed in a dignified manner and an effort was made to convince them that their interests were better served by not being a member of a WRMC. This helped the WRMC avoid entanglement in the local conflict.

⁸ For a comprehensive overview of how to set up a WRMC and a Water Resource Management Plan (WRMP), see: Bromwich, B. and Gaasbeek, T. "Putting Catchment-Level IWRM into Practice," Technical Paper, no.1, August 2018.

Pastoralists

The inclusion of pastoralists, and especially female pastoralists, in the WRMC, proved to be difficult in the Rural Water for Sudan programme. Because they are constantly on the move, they were less included in decision-making. In some ways, the small sizes of the catchments also played a role in the under-representation of pastoralists, given that their migratory routes exceeded the bounds of the targeted smaller catchments. Because of these limitations, livestock needs were not considered as much as they should have been. Future programming in water and natural resource management should seek to cover adjacent catchments that share animal corridors and to ensure that community water management structures are flexible to adapt to the seasonal presence of pastoralist representatives. Also, a more comprehensive assessment should be made during the baseline study as to the available water sources and the water users throughout the year. Then creative solutions should be decided upon for including pastoralists on the WRMC. One idea would be to have a “moving chair,” meaning that pastoralists passing through the area would take turns being on the WRMC, making sure they are represented throughout the year and across catchments. Another idea is to work on advocacy to have pastoralists well



A girl in Kabkabya, Wadi Bargo, North Darfur, fetches water through a hand pump constructed by the Rural Water for Sudan programme.

represented in future state level IWRM councils, since this would ensure that their specific needs are taken into account. Other modifications can be implemented as required by the local context.

Capacity Building

Capacity building in general and for WRMCs specifically should be a priority for an IWRM project. Currently, members of the WRMCs frequently lack the basic technical knowledge and soft skills for sound planning of water-related interventions. To overcome this challenge, links should be established between the WRMCs and experts involved from the start of the project. There should be information sharing between the WRMCs and these experts. Also, there is a need for the establishment of a communication system that connects WRMC and local government staff with federal experts. Additionally, some of the WRMCs themselves indicated that logistical challenges, such as transportation difficulties in large catchments, hinder their independent operation. It would have been preferable to work with smaller sub-catchments in some areas to reduce the transportation challenges. The challenges of communication, transportation and technical expertise should be considered so as to equip WRMCs for the future.

Clear Roles and Objectives

To ensure the sustainability of the WRMCs and the WASH committees their roles and objectives should be clear from the start,⁹ so the Aqua4Sudan Capacity Needs Evaluations indicated.¹⁰ The distinction between the local partner organisation and the WRMC is also unclear at times, which results in allocation of limited responsibility to the WRMC. Therefore, it is important to define and internalise the scope, tasks and visions of the WRMCs. The WASH committees and the WRMCs should be enabled to strengthen each other, which also requires having the relationship between them clearly defined and agreed upon by all parties. Moreover, there should be an election process established for the WRMCs to make sure they truly represent the people of the catchment area.

There is no blueprint as to the role of the government in IWRM. In Rural Water for Sudan government involvement varied across catchments from being informed to being heavily involved. In many cases after implementation the government contributed to arranging for the O&M in coordination with the WASH committees and the WRMCs. In the planning process, however, the government should not have a final say

⁹ For a list of advised key roles for the WRMC, see: Rowen Jani, “Sustainability Strategy for Rural Water Infrastructure Developed in the Rural Water for Sudan Project,” Aqua4Sudan Partnership, November 2019, p.23.

¹⁰ Mirjam Pruijssen, “Capacity Needs Assessment for the CCs,” 24 October 2019.

on the decision of the WRMC, but should rather take on an advisory role.

Legal Registration

As the WRMCs have decision-making power, they should be legally registered. A constitution should be developed to inform how the WRMC should be managed. This was one of the programme's most important lessons learned. Currently not all WRMCs are legally registered. This is problematic for several reasons. First, the WRMC runs the risk of being seen as a parallel governance body. Therefore, the WRMC should be integrated into the current water governance bodies. Second, and related to the first, without legal registration, WRMCs and WASH committees are not mandated to carry out the tariff collection for the O&M of the water structure. Officially this is the responsibility of the State Water Cooperation. Also here the committees can appear to be unofficially taking over government responsibilities. Third, the WRMC cannot be financially independent if it is not legally registered. This entails that it will remain dependent on the funding of future NGO projects. The Aqua4Sudan partners take this issue seriously. There were cases where legal agreements with the local government were successfully made, and the partners are striving for the legal inclusion of all established WRMCs. Fourth, a constitution would lay down the rules of engagement of the different members and promote inclusion and equal representation of the different groups in society.

A successful case in which a legal agreement was established between the WRMC and the local government took place in the North Delta area in Kassala state. In this area the WRMC signed an agreement with the locality office that allowed it to make decisions on water resource management based on their knowledge of the area and its water users. Because of this agreement, the WRMC was assured of its supervisory role of the water source operation, and it was officially able to make decisions on setting the water tariff. Agreements like this should be made in the other targeted areas as well. Existing laws are still not fully enabling WRMCs to deliver their intended activities, even when WRMCs are legally registered.

Planners

Joint Planning

In many instances the planning of IWRM is the responsibility of the NGO's government counterparts (State Water Corporation, Groundwater Department, etc.). In the case of the Rural Water for Sudan programme, the planning was carried out in a joint manner. The WRMC is the planning body, consisting of representatives of the water users. This body strove to include a representative from the (local) government as well. The locality in which the Aqua4Sudan partners operated endorsed the Water Resource Management Plans (WRMPs) before implementation.¹¹ Rural Water for Sudan had no cases in which the government refused to endorse a plan. However, there were some cases in which a government official had a conflict of interest and attempted to favor intervention in certain areas or villages over others. This was resolved by the WRMC, which established a consensus regarding the area in which the IWRM plans would be carried out. The Aqua4Sudan partners learned from these instances that NGOs must ensure that conflicts of interest do not influence IWRM plans. NGOs could do this by making sure that differences of opinion about IWRM plans are addressed through WRMC channels. However, WRMCs are still vulnerable to conflicts of interest with the government because of their lack of legal status.

Role of Technical Experts

Technical experts (often from state level departments of water, agriculture, livestock, etc.) have an important role to play in giving technical advice. They are not water users, but they might have vested interests in water resources. There is a fine line between advising from a technical point of view and from personal interest. There is a danger of the technical staff being biased. A way to mitigate bias is to have a diversified body of technical experts from around the country. Also, and this is a great undertaking, it would be advisable to have a country-wide water resource assessment that sets out the status of the resources and the possible interventions that do no harm to the environment.

Policy Makers

Engaging Higher Levels of Government

A main lesson learned regarding policy makers is that a strategy should be developed to systematically engage higher levels of government (particularly at the state-level) and to build this state-level enabling

¹¹ For a more detailed description of how to set up a WRMC and a Water Resource Management Plan (WRMP), see: Bromwich, B. and Gaasbeek, T. "Putting Catchment-Level IWRM into Practice," Technical Paper, no.1, August 2018.

environment for sustainability and replication. The Rural Water for Sudan programme did not pay enough attention to this aspect as it was meant to have a 'bottom-up' approach for establishing IWRM structures. The decisions about which water systems to establish/rehabilitate and how to manage them were in local hands. For this reason, UKaid also funded another programme that would work simultaneously on putting IWRM on the political agenda and on engaging government stakeholders in the Rural Water for Sudan programme.¹² The Aqua4Sudan partners learned that a strategy regarding policy-maker involvement should be developed early in the programme, and that programme targets and budgets should reflect this. Government ministries and relevant departments should be viewed as partners in implementing IWRM. It is important for NGOs to promote the development and actualisation of policy and legal frameworks to ensure proper implementation of IWRM.

Engage Policy Makers

Rural Water for Sudan did engage policy makers at the state level in an innovative way, which proved successful. It organised quarterly state-level forums for discussion. These forums included stakeholders from different sectors (i.e., agriculture, animal resources, mining, etc.) and were a platform for discussing water management challenges and advocating for coordinated management. As a result, a state-level water resource management council has been established in the Kassala, Red Sea and Gedaref states, which includes representatives from the relevant government ministries.

The Aqua4Sudan partners also worked together with the Japan International Cooperation Agency (JICA) through a platform called the IWRM Coordination

Group. JICA's approach was "practical IWRM:" starting with capacity building of local government staff and drawing up IWRM plans with them. Then JICA planned to include the local community. At this stage JICA was in contact with the Aqua4Sudan partners to learn from the Rural Water for Sudan implementation. For the Aqua4Sudan partners programs like JICA's and ADAPT! were useful because they were informing government policy. These top-to-bottom approaches also allow for sharing information across the states.



Training workshop on IWRM in Gedaref (east Sudan), involving state-level actors. The outcomes of this workshop informed the Aqua4Sudan sustainability strategy.

¹² For more information on the ADAPT! programme, see: UK Foreign, Commonwealth and Development Office, Adapt Environmental and Climate Resilience in Sudan. <https://devtracker.fcdo.gov.uk/projects/GB-1-205115> (accessed 19 August 2021).



PRINCIPLE 3

Women play a central part in the provision, management and safeguarding of water



Cartoon based on an idea contributed by B. Mommen, UNICEF¹⁴

It is a known fact that although women are pivotal stakeholders in water management, they often have less than equal influence when it comes to decision making on water management issues. Also, water interventions have a different effect on men than on women. Therefore, the Rural Water for Sudan programme made a gender needs assessment and aimed to have a fair representation of women in all stages and parts of the programme. It aimed to equally employ female NGO staff, to offer maternity and paternity leave for all staff, to have women represented in the various committees established during the programme, and to recruit women in all capacity trainings. The partners conducted sensitisation meetings with community leaders before the start of the programme to ensure women's inclusion. Also, a gender audit workshop was carried out in Kassala. However, in certain areas the Aqua4Sudan partners worked with cultures that were very conservative in terms of gender roles and behaviour. The progress regarding women's inclusion may therefore seem small. However, the progress made was significant to the lives of local women.

Exchange Visits

Exchange visits proved to be instrumental to increase women's participation. Committee members from

different villages with similar traditions/from the same tribal umbrella visited each other's homes. These exchange visits helped the less urban, more gender-conservative communities to see how communities from the same cultural background include women in the community to a greater extent. The exchange visits helped WRMC members to see how important women are to the functioning of their community. It allowed for more openness to women's input. Also, the visits provided an entry point through which to talk about menstrual hygiene issues, and social norms that inhibit women's roles in society.

In-depth Gender Approach

Gender training was given in certain project areas but not in all. The Aqua4Sudan partners concluded that the gendered approach had not been sufficiently mainstreamed. A more in-depth approach towards gender would be desirable. This approach would include gender training in all project areas in which the trainer encourages open dialogue and critical thinking about gender related issues among the participants. Thus, ideas about gender would not be forced upon communities; rather people would be provided with an opportunity to analyse this topic and offer ideas for change.

Difference in Context

At the same time, the expectations regarding the extent of women's inclusion had to be adapted to match the different contexts in which the programme operated. The Aqua4Sudan partners noticed a marked difference in women's inclusion in the various targeted areas. In the Darfur region it was easier for women to participate in programme activities and especially easier to become a member of a WRMC. For example, 50% of the Wadi Andur WRMC members are female, and the deputy head of the WRMC is female as well. In certain more conservative areas in the Kassala and Red Sea states, it proved difficult to meaningfully include women in the WRMCs and

¹⁴Water and Sanitation Program, "2012 Cartoon Calendar." <https://www.wsp.org/content/2012-cartoon-calendar> (accessed 7 January 2022).

alternative methods for improving women's inclusion had to be explored. In the Telkok catchment a separate women's WRMC was established. Another solution is to establish separate water points for men and women in conservative areas, since the local culture sometimes restricts the use of mixed water points. This way, women were at least able to collect clean drinking water at a reasonable distance from their homes. There was also an initiative for a separate women's farm. These initiatives show that it is important to set a realistic timeframe regarding women's inclusion when working in areas with similar conservative traditions and customs.

Darrasta, Kassala is an example of a village that considered it inappropriate for men and women to meet. Therefore, the Aqua4Sudan partners sought different ways to include women in the decision-making process about water management. They learned that a separate women's WASH committee can be established, working alongside the men's WASH committee. The women's WASH committee included women from already established community groups and women who were influential in the community. Some of the women in the separate WASH committee had relatives in the men's committee. The culture permitted the relatives to be in contact with one another, which provided an entry point for voicing women's ideas about water management to the men's committee. These initiatives represent the first steps in the right direction.

Skill Trainings

Inclusion of women can also be increased by providing training in particular skills. Several NGOs within the consortium found that training women in certain skills is tremendously beneficial to the community and at times more effective than training men. One of the partners found through their projects in Haiya and Kabkabya, North Darfur, that training women in the O&M of water points has several positive effects. First, it provides women with additional income for their families. Second, it solves the problem of the constant changing of the guard when it comes to the O&M of the water points. Whereas men often migrate to find work in O&M elsewhere after the O&M training, women are more likely to stay in their original community. Therefore, training women in O&M is a long-term investment.



A man in Kabkabya, Wadi Bargo, North Darfur receives a training on agricultural inputs and tools.

Similarly, the partner working in Talkuk, Kassala, found that activities in food security and livelihoods (FSL) related to the programme created opportunities for gender inclusion. Since small steps must be taken to make a steady change, it is recommended to first focus on small income generating activities for women. Starting with activities close to the home, women can become more independent by earning an income. This will lead to the empowerment of these women and in turn will encourage other women to join these activities as well.

Actors of Change

Despite these great efforts to include women in the programme, not everything can be done by the NGO partners. They are merely the enabler of platforms and training that can be used as springboards for individual actors of change. Sometimes, all that is needed is one person willing to call for change. Sita Kogor Ahamed Wali is an example of such an agent. She was chosen to represent the women in the WRMC of Khor Dordeib. Since then, she has been at the forefront of addressing issues related to women

inside and outside of Khor Dordeib. She received training in veterinary medicine, peacebuilding and sanitation. She now teaches other women on these topics, is involved in exchange visits of women from different villages and encourages women to work for the community. A woman like Sita can bring change to an entire community.

Even though individual local actors often have more influence on a community, and an NGO's capacity for fostering change is a slow process, it is nevertheless important to keep stressing the issue of women's participation. IWRM planning already provides an entry for discussing equal gender participation with the water users of the community. In IWRM projects there should be a stronger focus on women's empowerment training to make it more inclusive and sustainable. Also, such projects should incorporate lobbying for women's inclusion at the local and state government level as part of their activities. Even in communities where the idea is not generally accepted, with time and effort, small steps can make a significant change.





PRINCIPLE 4

Water is a public good and has a social and economic value in all its competing uses

Water is a public good and therefore it is usually the government's responsibility to provide access to water. Since the government of Sudan has been unable to do so, the project piloted an approach that is based on community-led water management in the form of WRMCs and WASH committees. However, it is important to have the government as closely involved in taking responsibility for access to water as possible. Also, the water users have a responsibility. Since water has economic value, charging for water is a way to ensure the sustainability of IWRM. Therefore, the WRMCs of the Rural Water for Sudan programme set a tariff for the local water users which would ensure enough budget to pay for the O&M of all water services (drinking, cattle and agriculture). The costs of capital expenses, like construction, was covered by the project.

Aqua4Sudan put an emphasis on the use of groundwater recharge infrastructures, also known as Managed Aquifer Recharge (MAR) systems as a new technology in rural Sudan. 30-40% of boreholes in Sudan dry up during the dry season. MAR infrastructures enhance the availability of shallow ground water during the dry season. Also these infrastructures have some advantages over surface water storage structures, like hafeers. MAR infrastructures are cheaper to construct, maintain and operate. They also reduce evaporation losses. Over the course of the programme, the Aqua4Sudan partners established 123 MAR infrastructures, including check dams, sand dams, subsurface dams, recharge basins/bunds, buffer/wing dams.

Models for Partnership of Responsibility

In the Aqua4Sudan experience three models of O&M responsibility partnerships were established. In the typical model the WASH committees are solely responsible for collecting tariff, regular O&M and major

repairs. The problem of this model is that there is less accountability since there is only one party involved. In this model, there is often an inability to manage larger funds. In the second model the WRMC and the WASH committees share the responsibility with the locality through the latter's water office. In this model the WASH committee is responsible for 75% of the O&M budget and the locality for 25%. Such a model can be found in the North Delta catchment of Kassala state. In the third model the WRMC, the private sector and the locality made an agreement. The private sector is responsible for the collection of tariff and the amount collected is divided between it and the locality. The locality represented the government or the State Water Cooperation. In this model the WRMC had input on deciding the tariff and supervised the collection and the O&M process. An example of this model can be found in the Khor Arab catchment in the Red Sea state. In this model there is better cooperation between the government, the private sector and the WRMC, and there is better oversight of the process and a smaller likelihood of corruption than in the other two models. From the three models, the Aqua4Sudan partners considered the third model the best. It is considered a step towards achieving sustainable O&M and addressing weak rural water supply governance.

Setting the Tariff

Through the Rural Water for Sudan experience, it was learned that a solid analysis of the cost of O&M should be conducted in advance with the relevant stakeholders. Since O&M costs will be paid from the tariffs received from beneficiaries, the tariffs should match household budgets, but they should also be based on a realistic estimate of what the costs of O&M of the structure will be. When setting the tariff, access for all should be ensured as well.

In Gedaref access for all was ensured in the following way. If someone would want to fill a small jerrican of water for drinking, it would be free of cost. However, if people take barrels of water (on donkey carts or trucks) or if they use water for livestock, they will be charged. This way also the poorest households can receive free drinking water.

and the country's economic outlook do play a key role in selecting the kind and quality of technology used in an IWRM programme.

Spare Parts

If there is a tariff collected by the WRMC for O&M, the committee should also be able to buy spare parts for the water services and hire local maintenance (wo) men. An NGO would do well to see if spare parts are available in the local market. Services that require spare parts to be imported from abroad or even from a city far away from the catchment area can prevent necessary repairs from taking place. Therefore, if spare parts are not available locally or regionally, the NGO should make the effort to make sure they will be. This can be done by ensuring that existing local businesses have specific spare parts in stock, or that new businesses will be created which will sell spare parts to the community in need of them. Local men and women should also be trained in the O&M of the water services, so that these services can be kept functional without outside intervention.

Affordable Systems

It is important to select designs for water structures that require minimal fees so that the beneficiaries can operate and maintain the water services at a cost which is affordable to them. It is more important to have a water system that is affordable to operate and maintain than to have a more technologically advanced system. Examples of this can be found in the Mahala and Srafa catchment areas in Gedaref state. There the Aqua4Sudan partner noticed that WASH committees preferred using cheaper lower quality diesel power generators over more expensive high-quality generators. The reason is that although cheaper generators tend to break down more often, their spare parts are affordable to the community. Even though the higher quality generator usually only breaks down every four to five years, its repair costs are beyond the financial capacity of the community, even if tariffs are saved for repairs for many years. This also has to do with the steep inflation in Sudan. The lesson learned from this is that higher quality spare parts are not always the most sustainable when it comes to O&M. Factors like community affordability

CONCLUSION

The Aqua4Sudan partners set up water systems and committees through the IWRM approach, which did not only significantly contribute to the sustainability of water management in the context of climate change and rainfall variability, but also to the avoidance of conflict and the contribution to peacebuilding.¹⁵ The partners learned that the adoption of water resource assessments can prevent long term damage to the environmental and social fabric of the targeted areas.

Regarding the WRMCs, there are a number of lessons learned. It is essential to clearly define and internalise the scope, tasks and visions of the WRMCs, to invest in the building of their capacities and to register them legally. Furthermore, there should be more effort invested in including nomads on decision-making committees. Ideas to do so include conducting a more comprehensive assessment during the baseline study as to the available water sources and the water users throughout the year and ensuring cooperation between adjacent catchments that share animal corridors.

Planners and policy makers should also be included in the IWRM process. Technical experts (often from state level departments of water, agriculture, livestock, etc.) have an important role to play in giving technical advice, although they should not have a final say in the decision on a water intervention. The latter task belongs to the WRMC. A way to mitigate bias in the technical experts' advice is to have a diversified body of technical experts from around the country. Also, a strategy should be developed to systematically engage higher levels of government in the IWRM plans. Organizing state-level forums for discussion can be part of this strategy. All in all, government ministries and relevant departments should be viewed as partners in implementing IWRM.

When it comes to women's inclusion, small, realistic steps can be taken to promote progress, such as the implementation of a more comprehensive gendered approach and the utilization of individual women leaders as examples to lead the way. Skill training for women is a natural way to increase women's inclusion and to provide women with a livelihood. In conservative areas, exchange visits allowed women to leave their homes and to travel for the first time. In areas where local culture does not permit women to share a space with men, creating a separate women's WASH committee could be a first step towards giving women a voice in decision-making on water.

Some lessons were learned about operations and management. Whenever feasible, it is preferable to have a division of responsibility in which the private sector and the locality manage the finances and repairs while the WRMC supervises. Also, operation and maintenance costs should be calculated in advance and the tariffs set to pay for it should match realistic expectations as well as household budgets. The poor should not be excluded from access to water for drinking. The programme should consider whether it is more sustainable to have higher quality spare parts at a high cost or to have lower quality spare parts that need to be bought more regularly. Oftentimes the latter is the more sustainable option.

In general, it is important for NGOs to promote the development and actualisation of policy and legal frameworks to ensure proper implementation of IWRM. With a conducive legal framework the WRMCs are able to make decisions on water management, manage the tariff system and be financially independent from NGOs. This will enable the implementation of IWRM, which is a step toward achieving the sustainable development of Sudan's rural communities and environment.

¹⁵For a more detailed explanation on how IWRM contributes to peacebuilding, see: Corbijn, C. and Hassan Mohamed Elamen, M. "IWRM and Peace: The Contribution of the Integrated Water Resource Management Approach to Conflict Reduction and Peace – The Case of the Rural Water for Sudan Project," Technical Paper, 2021.

ACRONYMS

List of acronyms

IWRM	Integrated Water Resource Management
O&M	Operation and Maintenance
WASH	Water, Sanitation and Hygiene
WRA	Water Resource Assessment
WRMC	Water Resource Management Committees
WRMP	Water Resource Management Plan

List of foreign words

Hafeer	Artificially constructed water catchment basin with a circular earthen wall
Khor	Dry watercourse or ravine
Wadi	A valley, ravine, or channel that is dry except in the rainy season

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