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Rural Sudan: IWRM Applied (Case Studies)

Tags: Infrastructure, Programme Design, Case Study



Integrated Water Resources Management (IWRM) is a means of addressing water problems driven by competing water demands for scarce and variable water resources. The approach has been used successfully in fragile contexts to manage risk and promote development. During 2018 ICED undertook a review of successful IWRM approaches in Sudan, extracting lessons learnt on how IWRM can be used to manage conflict and climate risk, and support the transition from humanitarian response to developmental intervention. The study produced a series of guidelines, 5 case studies, and a summary guide on the importance of IWRM all of which can be accessed via the ICED website.

Case Study 1: Khor Arab – Strong local ownership of the catchment committee

Project description:

Khor Arab is a large catchment that rises in the red sea hills and flows inland into the wide open Batina plains. The upstream sub-catchments comprise rocky grazing areas with a little cultivation along the wadis and khors. The middle reach uses traditional water spreading systems for flood-based farming. The diversion structures are designed direct enough water from the main channel to fields for cultivation but to be washed out in the event of a big flood to prevent excessive flooding of the fields and damage to infrastructure. The downstream part of the catchment is an important grazing area that flourishes when the land is flooded at the tail end of the wadi. It is the best grazing for camels, goats and sheep in this part of the state. Overall the catchment is characterised by water scarcity with occasional flash floods – as is common in dryland catchments.

The implementing NGO have worked in the area for many years which has contributed to their ability to convene a collaborative effort on water resources and livelihoods in the catchment. The catchment is managed with four contributing sub-catchments. The project team visited all areas and discussed the concept of the project inviting nominations for the catchment committee. In this area the role of customary leaders is important and they are well represented on the committee. There is a representative of pastoralist groups on the committee who speaks for their interests in this project and more broadly as they interact with government in Red Sea state.

Hearing from female water users:

There was extensive discussion over the gender balance of the committee because in this part of Sudan quite separate traditional gender segregation prevails. Many other local committees such as health committees are gender segregated. At the start of the project women only worked on the all-female sanitation and hygiene committee. In this case however it was agreed that women should be part of the main, mixed committee. This is a significant and welcome step in gender relations in rural eastern Sudan. There are four women out of 22 members of the committee, three representing their villages and one women from the locality hygiene and sanitation office. There are a number of women's economic and livelihood initiatives that have emerged from this project.

Success factors:

A notable feature of this committee is how it has so clearly become the first point of contact on water problems in the catchment. It has been well supported by the locality who have provided an office for the committee. Both the locality and the project team refer people to the committee so that they have the key coordinating role prioritising work on water issues across the catchment.

A joint tour by the committee to all areas of the catchment was a turning point in the development of the project because with this process participants shifted their perspective from their own competing water problems to a collective effort to address the collective water challenges across the whole of the catchment.

Case Study 2: Odoud Haya – pledges support a shared initiative

Project description:

Odoud is one of the upper sub-catchments of the Khor Arab. There is a single water yard and a single handpump which provide the only fixed water source for 15km. It serves a settled community and an important livestock migration corridor so managing the interaction of the two types of use is a key challenge.

In this case the water committee predates the current project having been established in the 1990s. A mining company drilled the borehole, the locality provided the pump and the committee bought the solar panels. The committee is highly competent and well organised taking care of maintenance, procurement and storage of spares, on a pre-emptive basis. They have tools and mechanics. Allocation of water is on a time-share basis with all herds having particular time slots during the week. There are slots available for migrating herds which are allocated to the visitors by the committee.

Under the current project the catchment committee has developed a catchment plan according to the overall stepwise approach described in this document. Three sand dams are scheduled for construction in order to increase recharge and provide more water for livestock.

Success factors:

The Oudoud Haya catchment management project is interesting because of the strength and the self-reliance of the community that runs the project. The work followed the outline of activities described in this report closely and created a strong catchment committee with representatives from different parts of the catchment and the customary leadership. There is a strong link with government offices on the committee who are there in a technical role rather than a decision-making capacity.

The people in this area hold strongly to the idea that water is for all and no cash payments should be made for it. There is also a strong culture of providing water for visitors without demanding payment. The fund raising from the community is undertaken with a pledge-based system. The committee records how much each family is willing to contribute to support the project. Pledges are made in non-financial capital such as livestock and labour. The pledges may not be collected immediately, but a record is kept and pledges are called in when the need for funds arise – such as when a water-yard requires repair. The system works because of the trust the community has of the committee and the careful oversight of the customary leaders. Nomads and poorer households are not required to contribute. Any visiting nomad meets traditional leaders and gives assurances of the size and health of herd, and they are then allocated a slot in the rotation of livestock watering.

Case Study 3: Mahala – A large inclusive committee addressing water resource and sanitation challenges

Project description and water problems:

Mahala is a catchment in Gedaref with both settled communities and migratory pastoralists. The area experienced a significant population growth as a result of in-migration, in some cases by communities fleeing the severe droughts in Darfur during the 1980s. One of the villages has a name that reflects the comparative abundance of water that these drought refugees found: Um Sinibra translates as “the mother of taps”. However, over time, the area has begun to experience increasing problems of wells running dry which is believed to be associated both the increased demand for water and a reduction in recharge associated with the deforestation of the area. Flash floods are a problem with the main market in Mahala town being washed away in 2016. Another significant water related challenge is a recurring high level of Acute Watery Diarrhoea (AWD).

Setting up the committee:

Project sensitisation and catchment committee development closely reflects the standard steps described later in this document. In this case a decision was made to form a large committee so that the more marginal voices were clearly reflected. Leaders, women, youth, farmers, and pastoralists are all represented on the committee. In this traditional patriarchal context a specific effort was deemed appropriate to reinforce the voice of women and youth to

enable an inclusive dialogue. There are 6 women on the catchment of committee of 30 members who represent a diverse range of water users and ethnic groups. Since the pastoralists in the area are semi-settled, they are represented according to the villages where they are based.

Original and ongoing problem analysis:

The catchment committee undertook a collective problem analysis that highlighted two issues. The prevalence of AWD was prioritised and a major effort on sanitation and hygiene promotion was made. The committee subsequently made an important contribution in the response to the outbreak of AWD in 2017-18.

The committee also identified the lack of groundwater recharge as an important problem. Three gabion check dams have been made and are showing initially promising results. Over time the focus of the work has moved towards a broader landscape-based approach. Restoration of vegetation is now a priority because of the following benefits:

- Increased groundwater recharge
- Improved fodder supply for livestock
- Firewood for domestic energy
- Reduced flood risks downstream

The collective learning and evolution of activities illustrates the point that we saw in the theoretical discussion above: IWRM is an evolving process rather than a destination. Making the plan is part of the process but it is a living document that develops as the collective understanding grows and situation in the catchment changes.

Case Study 4: Wadi Endur, Nyala catchment, South Darfur – four challenges in a mixed catchment.

Project description and water problems:

Wadi Endur is a small catchment to the flowing from the North to the West of Nyala. The wadi flows through an area with diverse communities that have experienced tension. There are several water problems in the catchment, which have been addressed in the following ways.

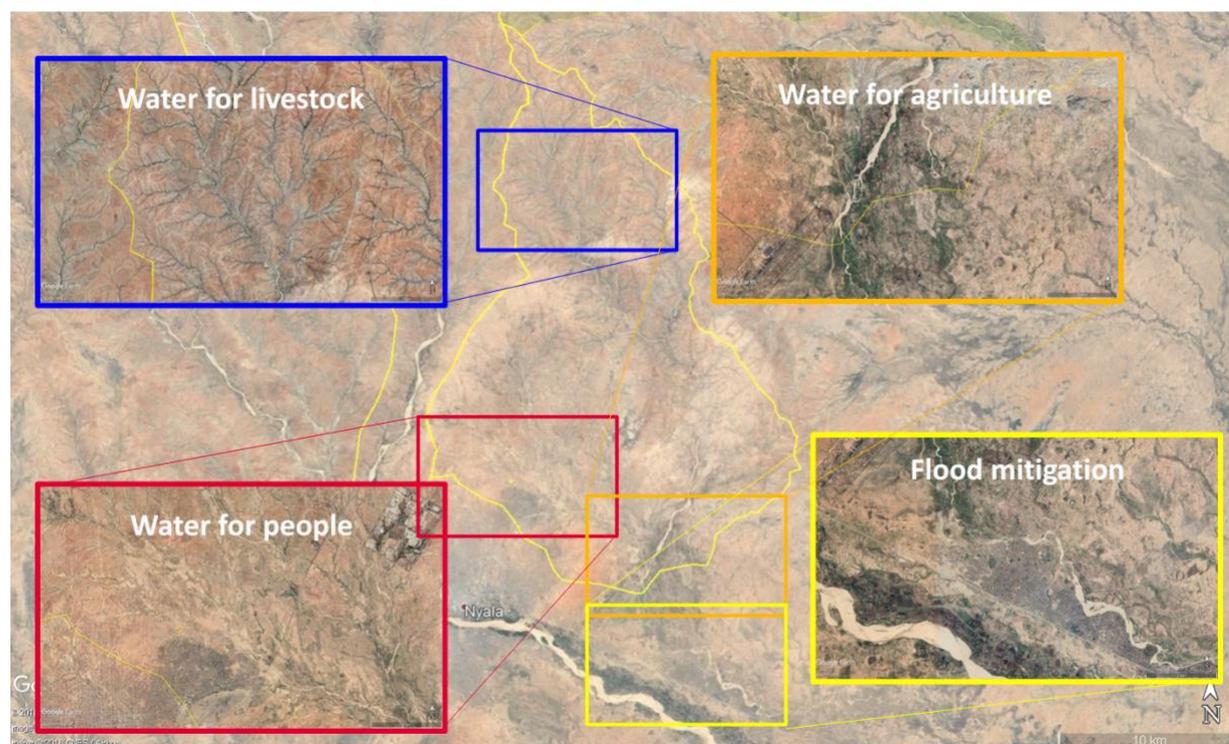


Figure 1 Categories of water problem and solution in Wadi Endur

- **Water for people:** on the north side of Nyala two IDP camps and the surrounding area have experienced severe groundwater depletion. In order to increase the recharge to the aquifers that serve this area check dams are being built to slow the wadi flow and increase the infiltration to the aquifers.
- **Water for livestock:** in the rangeland to the north of Nyala a shortage of water has meant that herders take their livestock to the wadi at the points where there is deeper alluvial deposits. The deeper alluvial deposits mean that the area is water rich and also good for cultivation with millet grown in the area. To prevent problems of cattle encroaching in the millet growing area, the catchment plan is to build a combination of check dams and sand dams in areas that are not cultivated so livestock watering can be done there.
- **Water for Agriculture:** The deforestation and disruption to agriculture in the crisis have changed the conditions for soil and water in the catchment. Floods have increased, as has erosion and sediment transport. This has led to changes in the routes of the wadi and in some cases farmland can no longer be used because water no longer flows through the area of good agricultural land. A weir has been proposed to raise the wadi bed level and redistribute flows to the agricultural area. The upstream works that slow the flows will reduce some of the erosive power of the wadi in the agricultural area.
- **Flooding** is a problem at Kalma IDP camp. The attenuation of flood flows in the check dams and sand dams upstream is intended to reduce the flood risk in Kalma.

Project activities:

The actions taken to draw up the wadi catchment plan have been as follows

- The project team visited every community to consult the communities and explain the potential of a collective effort in identifying and addressing the water problems. The team spoke with community representatives, traditional leaders and government.
- All communities were invited to nominate representatives for the catchment committee. A decision was made in this case not to include traditional leaders on the catchment committee as they have their own network for communication. Representatives of the locality government are on the committee. The committee was established.
- The committee made a tour of the catchment that enabled all the representatives to understand the problems from each other's perspectives. The committee was now working on a collective approach to the problems across the catchment rather than arguing that their own issues needed to be addressed.
- Meanwhile a technical analysis of the catchment was undertaken using remote sensing data and hydraulic analysis to determine the water balance in the catchment. This was used to identify potential interventions. The water balance was explained to communities across the catchment.
- The committee drew together the insights from the communities and the technical analysis and made a list of potential interventions in the catchment.
- The committee made another tour of the catchment in order to consult the communities about the proposed interventions.
- At this point the catchment management plan has been drawn up. It is a live document and the discussion is ongoing.

Specific challenges:

This project has taken place in a conflicted area, so particular attention has been given to the interaction of the project stakeholders. The El Fasher road runs through the catchment and acts as a boundary with pastoralists on one side and farmers on the other. For many years neither community had crossed the road to visit the other. The work on the catchment saw community members cross this road and visit each other again.

At the time of writing there is a dispute over the location of one of the dams. It seems that there are some powerful interest groups trying to change the plan from what the committee had agreed. The context is complex as Darfur seeks to resolve land disputes arising from displacement and potential return. Managing this situation calls for careful diplomacy, negotiation and consideration of a range of possible solutions.

Case Study 5: Qala en Nahal, Gadaref – water quality, piped systems and mixed use

Project description:

Qala is in the wide open rangeland plains of Gedaraf. Water resources in this area are limited because there are no significant wadi channels and limited groundwater. There is, however, a remarkable piped supply of the Hawata project that is operated by a very strong technical committee with oversight of the water users.

The Hawata project was started as a response to a refugee crisis in the 1980s but has transformed into a successful long term water supply programme. The project uses a high level of technology and engineering. It doesn't cover all its costs, but it does have an important level of user accountability as a result of the tariff and oversight from water users.

Water problems

The population in the area has grown and demands have increased. People and livestock both use good quality water in the central part of the scheme but this means there is insufficient water in terms of quality and quantity for the peripheral areas of the network. The IWRM challenge here is to find alternative sources of water for livestock and gardening so as to relieve the pressure on the piped system and increase the availability of safe water for drinking.

A large committee to enable marginalised groups to be heard

There are 24 villages depend on Hawata within the Qala en Nahal locality. Under the current initiative representatives from these villages have been brought together with representatives of the Hawata scheme to analyse the problems they face and consider the options together. Nine of 30 committee members are women of whom three represent their village. The group is ethnically diverse and includes descendants of the original Ethiopian refugees and others who have arrived from Darfur. Pastoralists are semi-settled here and are represented through the village system. The process this group has undertaken to develop a committee and a plan are a close reflection of the standardised process described in this document.

Work ongoing

The catchment plan includes the following interventions

- Number of hafirs in grazing areas to provide water for livestock.
- A water yard and a recharge dam have been built in Qala in Nahal town. This has increased the amount of water in the piped system. The water yard was made by upgrading a hand-dug well with a borehole and providing the dam to increase the reliability of the aquifer.
- One of the hafirs is being built on a livestock migration corridor, which means that transhumant herds don't need to leave the corridor to take water from the local communities. The corridor has been demarcated as part of this project.

Committee currently is currently working in conjunction with the locality authorities on local regulations for the operation and maintenance of the scheme. There is a strong precedent from of water user management that can be drawn on from the Hawata scheme.

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If you want to find out more about this case study, please contact iced.programming@uk.pwc.com or read the full case study on the ICED website.