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ENSURING AVAILABILITY AND SUSTAINABLE MANAGEMENT
OF WATER AND SANITATION FOR ALL

Securing water resources to build community resilience to water threats and climate variability in the Sahel

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This paper describes an approach to strengthen water security of communities living in water stressed parts of the Sahel. Threats to water security such as climate variability, climate change, growing demand, deforestation, erosion, pollution and poor service sustainability impact water availability and quality for domestic, livestock and livelihood needs, sometimes resulting in conflict. WaterAid's Securing Water Resources Approach (SWRA) involves collectively identifying threats that are likely to manifest themselves using participatory monitoring of groundwater, rainfall and surface water. Information from monitoring feeds into risk based planning aimed at agreeing allocations between water users as well as improvements to services. SWRA strengthens the link between communities and local government institutions that might assist with conflict resolution and service level improvements. The overall goal is to strengthen local level resilience to water related threats, complementing national plans for water resource management and climate change adaptation.

Introduction

People living in the Sahel region in West Africa face on-going threats to their water resources due to population growth and environmental degradation (Falkenmark 2011). Unpredictable rainfall, climate change, drought and lack of wells leave communities vulnerable to water shortages. These impact communities' health, livestock, livelihoods and wellbeing as water is needed for drinking, household and livestock use, irrigation and construction. Although demand is high, water is only available through a limited number of boreholes and hand-dug wells. People living in this region face long dry seasons of six to eight months, when there is a high risk of drought, and surface water sources are highly prone to seasonal drying and contamination. Additionally, during dry periods there can be long queues at water points and competition for access between different water users. Conflicts can emerge between women, livestock keepers and farmers in the absence of operating principles which ensure fair access, and this can result in the marginalisation of certain water users. These factors have an impact on communities' water security, defined by WaterAid as "reliable access to water of sufficient quantity and quality for basic human needs, small scale livelihoods and local ecosystem services, coupled with a well-managed risk of water-related disasters" (WaterAid 2012).

Unfortunately, the coping strategies of many affected communities are too fragile to deal with these threats. Un-coordinated water use can lead to localised depletion of valuable supplies. The affected communities are often remote and therefore inaccessible to authorities tasked with water resource management, who might otherwise provide support with water user allocation or mitigate disputes. Communities also need more than conventional water, sanitation and hygiene (WASH) services to be able to withstand on-going threats to their water supplies.

In order to ensure access to water, WaterAid has piloted the Securing Water Resources Approach (SWRA)I in 30 communities in Burkina Faso, Mali and Niger through a 'disaster reduction plan'. This participatory approach combines the delivery of WASH services with actions that strengthen management and allocation of water resources. It aims to support communities to identify, prioritize and monitor water

and climate related threats, using information from hydrological monitoring for well informed decision making.

This paper presents the SWRA approach and explains the methodology behind it, whilst demonstrating how it has enabled communities in the Sahel region to strengthen their water resource management and build resilience to water threats and climate variability.

Methodology

The approach works with the principle that communities collect monitoring data to be used for water resource management, and are supported by local government and technical agencies. Communities identify perceived threats to their water resources by undertaking a mapping exercise. These threats are monitored by the community by measuring water demand, rainfall, ground water, and surface water levels. The district government also monitors changes in ground water level over time. The data collected is shared at community, district and national levels, complementing national processes for water management. The information acts as an early warning system, alerting communities of wells drying up and indicates when water rationing is necessary. This information also supports the case for improved WASH services. The different steps of the approach are:

1. Community selection and identification of threats to water security
2. Participatory monitoring of demand, rainfall, groundwater and surface water
3. Agreement of allocations between different water users and improvements required to WASH services

Taken together these meet the required attributes for engaging in community based Water Resource Management, identified through the 2009-10 partnership between the Institution of Civil Engineers, Oxfam and WaterAid (2011).

Community selection and identification of threats to water security

Communities are the primary stakeholders in the approach and are selected to ensure that there is demand in the community to conduct the work and that the community are able to participate voluntarily.

The following criteria are used for community selection:

- Level of mobilisation among the community and experience in working together.
- Level of threat to the water resources considering the management aspect of the resource or impact of the climate variability.
- Willingness of the community to improve their conditions through better water resource management.
- Sense of ownership of the community over local water resources and their interest to develop and train water user groups and committees.

In Burkina Faso and Mali, the selection of communities has been supported by local actors that include local government representatives, traditional chiefs, community based organisations and WaterAid partners. Six communities were selected in Mali and 14 communities were selected in Burkina Faso. The threat identification process is a participatory exercise and involves community leaders, youth and women's groups and is conducted with the support of local government. Community vulnerability mapping combined with community household surveys are used to identify water security threats.

In both Mali and Burkina Faso, rainfall variability (spatial and temporary) and ground water fluctuation during the dry and rainy seasons were identified as major threats in the communities.

Participatory monitoring of demand, rainfall, groundwater and surface water

Participatory monitoring helps to build community ownership and willingness to manage water security issues. In Burkina Faso and Mali, water security is monitored by two to three community monitors. The community monitor measures the ground water level in the wells on a weekly basis and records the rainfall in villages on a daily basis. Examples of community data collected on average rainfall is shown in Figure 1 and Figure 2.

Training sessions are provided to community monitors to equip them to measure, record, consolidate and interpret hydrometric data. The results are analysed using graphs which are shared during community assemblies. This is organised with the support of the district water security groups. These groups are established in all local governments to provide assistance for community work and advocate at national level for improved water resource management.

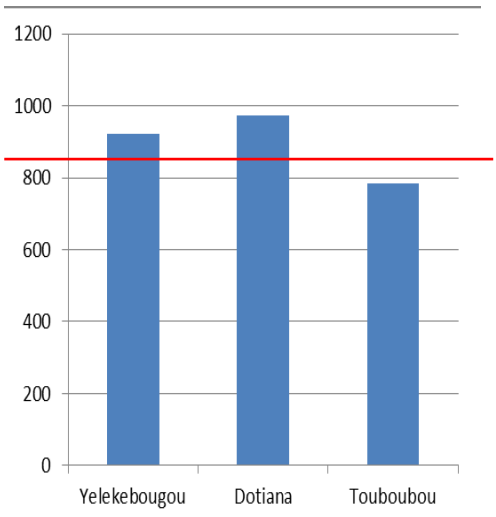

Figure 1. Average rainfall in three stations in Mali (2012- 2015)

Source: Community data collection

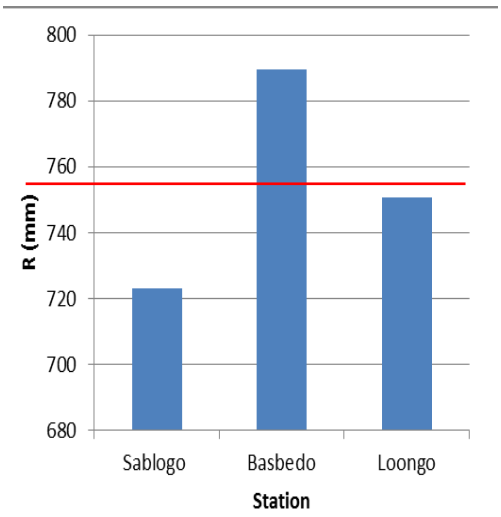

Figure 2. Average rainfall in three stations in Burkina Faso (2012- 2015)

Source: Community data collection

Agreement of water allocations between different users

Data from the hydrometric monitoring is used to inform decisions aimed at improving water security. These include:

- Water allocations - use of water points at specific times for specific purposes and needs. For example, boreholes to be prioritised for drinking water and hand dug wells to be used for livestock and bucket irrigation. Boreholes only to be used for livestock watering at certain times.
- Rationing when necessary - temporary restrictions on certain water uses during dry periods, for example for brick making or construction.

These rules are agreed by the community with the aim to improve water resource management, thus contributing to the prevention of potential conflicts with regard to water use during critical periods.

Participatory monitoring and having a record of how decisions have been made helps the communities to strengthen their resilience to climate change through community water security planning. This community water security plan includes:

- Need for better infrastructure (new and rehabilitation)
- Seasonal agricultural agenda
- Activities for ground water recharge and protection
- Organisation of resources monitoring
- Community advocacy plan for water security

Preliminary findings

This approach has been used for six years and the findings so far have been:

- As already known, rainfall is spatially variable over short distances.
- The rainfall received in the month of August is 30% of the total annual rainfall in the project areas in Burkina Faso and 36% of the total annual rainfall in the project areas in Mali (Figure 3 and 4).
- The rainfall received in the months of July and August is 50% of the total annual rainfall in Burkina Faso and 60% of the total annual rainfall in Mali.
- The rainfall varies year to year.
- The average annual rainfall of three stations does not exceed 750 mm during the last four rainy seasons in Burkina Faso and 850 mm in Mali as shown in figure 1 and figure 2 respectively.
- August and September appear to be the rainiest months in Mali receiving 1228mm and 530mmm rainfall respectively (Figure 3).
- The month with the most rainfall varies between July, August and September.

- August is the wettest month of the year in both countries (Figure 3 and 4).
- Number of days in which all three stations received rain varies over time
- Well water levels respond quickly to local rainfall-recharge and to indirect recharge from river flows and valley flooding as shown in figure 5.
- After the rainy season there are high ground water levels. However, in some wells groundwater level recession is steep, leading to potential challenges to water access in mid- to late-dry season as depicted in Figure 5.

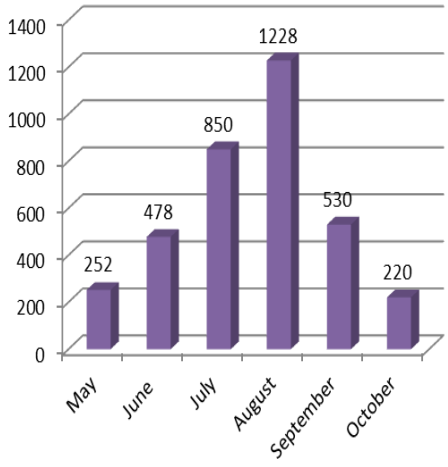

Figure 3. Cumulative average rainfall in three stations in Mali (2012-2015)

Source: Community data collection

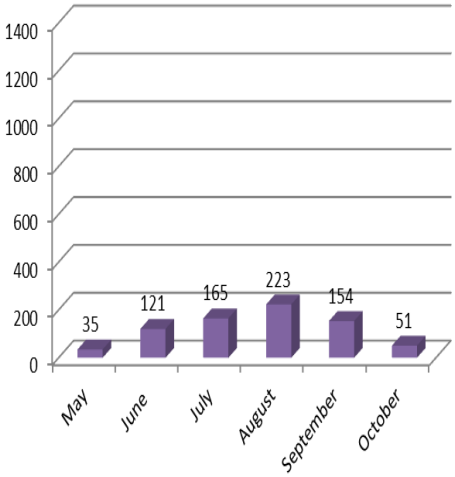

Figure 4. Cumulative average rainfall in three stations in Burkina Faso (2012-2015)

Source: Community data collection

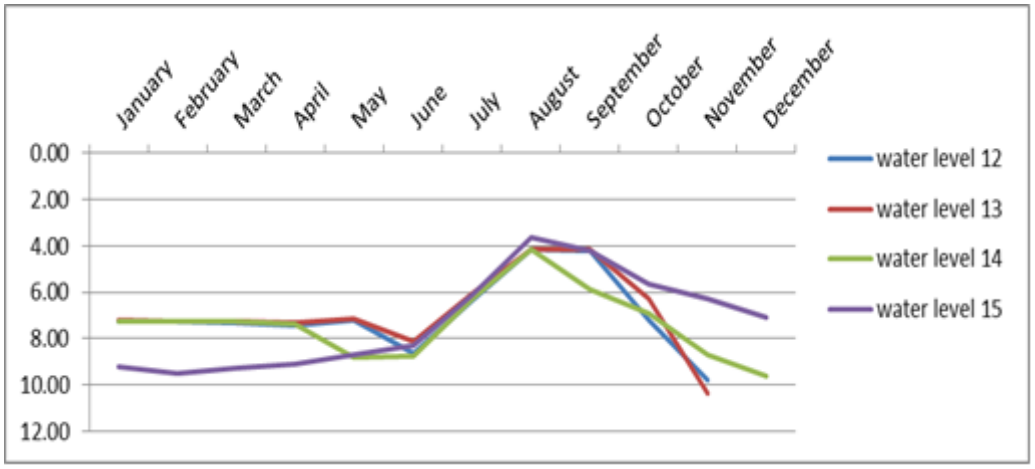

Figure 5. Ground water level in three wells in village Yelekebougou in Mali (2012-2014)

Source: Community data collection

Conclusion

SWRA as shown by the above methodology and examples can effectively contribute to ensure water availability, and support sustainable management at the community level and beyond, through rooted advocacy.

The approach is participatory and uses adequate tools for community mobilisation and engagement for water resource management. This approach couples sound management of available water with progressive investment in water supply services designed for multiple uses. It is not a blanket solution and requires refinement as well as testing in different scenarios; however it offers a way to become resilient to the harsh conditions of the region. It has been implemented in parts of the Sahel, namely in Mali, Burkina Faso, Niger and Ghana, and the results from Mali and Burkina Faso will be used to strengthen and further build the approach.

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Note

SWRA has its foundation in the community based water resources management defined by Institution of Civil Engineers, OXFAM GB and WaterAid.

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