SAND DAM SITE IDENTIFICATION STUDY IN THE SAHEL REGION OF BURKINA FASO

EXECUTIVE SUMMARY

The Sahel region as well as the other regions of Burkina Faso, is affected by climate change. The main effect of climate change is a reduction of available water resources. A local NGO (VDS) is implementing the retention, recharge and reuse (3R) approach in collaboration with RAIN as part of the USAID West Africa Water Supply, Sanitation and Hygiene (USAID WA-WASH) Program. The approach consists of the collection and management of rainwater through the development of water harvesting and storage structures that also replenish the water table. These relatively small reservoirs or sand dams are used for harvesting water for domestic and agro-pastoral needs. A sand dam is a reinforced concrete structure constructed across the bed of a stream that contains sand. It allows water to be stored and infiltrate gradually into the surrounding sub-soil. This creates upstream of the dam an artificial reservoir capable of recharging the water table. This simple technology promoted by USAID WA-WASH Program is suitable for the Sahel region where the annual average rainfall is less than 500mm and the dry season lasts for eight months.

In this context, a study was conducted in May 2013 in three villages (Moussoua, Tiéna and Kéri) in the municipality of Tankougounadje in the province of Yagha of the Sahel region. The study aims to identify potential sites for sand dams, water harvesting tanks and other water harvesting infrastructures. The specific objectives of the study are: (1) to identify the most appropriate sites for sand dams in the villages of Moussoua , Tiena, and Keri; (2) to identify sites for water harvesting tanks and other water infrastructures in the three villages; (3) to indicate the sites on a map with their GPS coordinates; and (4) to identify the types of soils at the identified sites.

The identification of the sites was conducted following a participatory approach that included consultation with all stakeholders. Data collection started by identifying the Sorga water basin and other suitable water sheds on the topographic map. This was followed by the collection of technical data in the field which included collecting samples of sand and soil, survey of river beds, evaluation of the river banks and vegetation, measuring the gradient of the streams, taking GPS coordinates, assessment of the water levels during floods, and the appraisal of other characteristics of the rivers and lowlands. A survey was conducted in the local communities to complement the technical data.

The site selection was based on the technical characteristics of the target area including hydrology, rainfall, topography, and catchment area, the location of villages in relation to the water source, available roads,and the spatial distribution of communities within a village. Three river courses (Sorga, Keri and Najai) were prospected. As a result, eight potential sites were identified for sand dams. The sand dam sites are located where the slope is gradual to allow a moderate water flow and significant potential for infiltration. All prospected rivers contained silica sand of significant quality, average particle size, and the rates of saturation and extraction were satisfactory. The characteristics of the identified sites such as the width of the river bed, the nature of the rock formation under the sand, the height of the river banks and the vegetation of the river banks were determined. The GPS coordinates of the sites were collected as well.

Further, the study identified five potential sites for the construction of dyke-filters (usually built to improve agricultural production in semi-arid areas) which are constructed perpendicularly to water passages to slow down the flow rate and runoff, allowing the sedimentation of organic material upstream of the dyke-filters. They are located in the lowlands on seasonal water passages, which only run for a few hours after the rain. They consist of stones that allow water to infiltrate. The time during which the low lands remain flooded increases the amount of water that seeps to the sub soils. The construction of sand dams and dyke-filters, facilitates construction of hand-dug wells and boreholes in the immediate surroundings and upstream of the sand-dams to a maximum distance of 25m. The soils type in the identified sites was sandy-clay in nature in the low lands. The soils are permeable thus ensure seepage of groundwater and therefore recommended for the implementation of the 3R approach.

A feedback and discussion session at the end of the exercise was held with the authorities of the municipality and the provincial services. Similarly, feedback meetings were held in each village after the identification of sites in the presence of members of the village development committees, water users associations and members of the community. Engaging local communities will help get their buy-in for the project, an essential factor for the success of the project.

The study was conducted in the rainy season and there was water flowing in the rivers in the three villages. This did not allow the study team to collect baseline indicators on the lowest level of groundwater and vegetation conditions prior to the implementation of the water retention structures. Recommendations from the study include the necessity to take into account the management and conservation of the banks upstream and downstream of the dams while building the infrastructure; to conduct a geophysical study to define the nature, depth and orientation of underground faults to assess the capacity and level of infiltration due to the structure; and to monitor the fluctuation of the water table throughout the life of the project.

The full report is available (in French) upon request via our website. For more details about our program activities and other reports please visit http://wawash.fiu.edu/.

This publication was funded by the people of the United States through the Agency for International Development (USAID) within the framework of the West Africa Water Supply, Sanitation and Hygiene (USAID WA-WASH) Program. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Agency for International Development of the United States Government.