

IMPACT ASSESSMENT ON THE USE OF TREADLE PUMPS AND IRRIGATION BOREHOLES IN NIGER

EXECUTIVE SUMMARY

The USAID West Africa Water Supply, Sanitation and Hygiene (USAID WA-WASH) Program, through Winrock International, implemented the multiple use of water services (MUS) activity that aims to introduce economically and technically viable activities related to water services to enable rural households along the Korama valley in the Zinder region of Niger to improve sustainable access to water, income, health, hygiene and food security. Sub-activities include establishing MUS village committees, promoting garden boreholes, promoting the Sawki Da Riba (SDR) pump, building farmers' capacity, identifying promising agricultural value chains, and training drillers and manufacturers of the rope and the SDR pumps.

This study was conducted in relation to the promotion of garden boreholes and SDR pumps to identify the factors determining their adoption and use and to ensure the sustainability of the pumps. The objectives of the study were: (1) to conduct an inventory on the number of producers (by village and by municipality) who had acquired garden boreholes and SDR pumps; (2) to determine the outcomes resulting from the use of garden boreholes and/or treadle pumps, the number of crops grown, and level of production; (3) to estimate the revenue from the crops grown and their contribution to the welfare of the household; and (4) to identify the strengths and challenges of these technologies as experienced by producers. The study was conducted in eight villages in the municipalities of Bande, Gouna, Guidimouni and Wacha.

To achieve these objectives, a questionnaire was developed, pre-tested in the village of Barago and adapted to the realities in the field. A trained enumerator collected data with 17 producers in four villages in the commune of Gouna, with two producers in one village in the commune of Bandé,, with one producer in one village in the commune of Wacha, and with one producer in each of two villages in the commune of Guidimouni , reaching a total of 22 producers. The data collected from each respondent at each production site included the size of the land under production, the crops grown, estimated revenue from the crops and the strengths and challenges of use of the pumps.

The survey found that the sources of water for market gardening were garden boreholes, wells, and swamps. The three water sources were complementary, whereby all the producers used the garden boreholes, half of the producers used garden wells in addition to the garden boreholes and one producer used a swamp in addition to a garden borehole and a well. The water was mainly pumped using treadle pumps (SDR) and motor pumps. A bucket tied at the end of a rope was also used to draw water from the wells. Only one producer used all three methods i.e. bucket and rope, treadle pump and the motor pump. Thirteen of the producers used a single method, either the treadle pump or the motor pump, while the rest used a combination of treadle pump and bucket and rope (five producers), motor pump and bucket and rope (two producers) and motor pump and SDR pump (one producer).

Like any other productive activity supported by the USAID WA-WASH Program in Niger, the drilling of garden boreholes was not subsidized. Nevertheless, for beneficiaries that had acquired an SDR pump, four boreholes were drilled during the drillers' training. The cost of drilling was a function of the water table depth and the nature of the soil. The drilling cost ranged from 40,000 and 45,000 F CFA whereas, the cost of a treadle pump was fixed at 30,000 F CFA during a meeting between Winrock and the manufacturers of the treadle pump.

The study also revealed that the use of boreholes and treadle pumps contributed to the expansion of gardens under production. The majority of the producers (54.6 %) expanded their cultivated areas with an average increase of 26.2%. In addition, 27.3% of the producers developed new production sites after drilling the garden borehole. The newly developed production sites measured 12,113 m² on average. Moreover, the use of the pumps reduced the number of workers required to irrigate a field. The producers that used the SDR pump noted a reduction of the number of workers between 30% and 60%. Further, the producers increased the number of crops and their level of production. The crops produced included onion, sugarcane, cassava, squash, tomatoes, cabbage, lettuce, pepper, eggplant, potatoes, watermelon, corn, yellow melon, sweet potato, soybeans, carrots, and chilli and green peppers.

The study also considered the revenues accrued from crops grown by the farmers using the improved and newly introduced water technologies (treadle pumps). Income generation depended on the type of crop produced. These incomes ranged from 0 to 100,000 F CFA for lettuce, 2,000 to 420,000 F CFA for cassava, and 0 to 500,000 F CFA for chili peppers. The greater part of the production was consumed by the households, which explains the minimum income of zero from some of these crops. All producers used the income for household needs, 13.6% ploughed it back into farm capital, and 9.1% invested in fencing production sites (crop destruction by animals is one of the major challenges faced by producers). Similarly, only 4.5% of the producers invested in agricultural equipment and boreholes. This finding underscores the need to sensitize producers to invest more in their market gardening enterprises to improve production and contribute to food security. Other investments included the cultivation of rain-fed crops, buying land, acquisition of donkey carts and purchase of pumps. The advantages of the technologies as mentioned by the producers include increased yields per unit of land, increased incomes, improved food security, less tedious work, increased acreage under production, diversification of crops, source of clean water for gardening as well as for drinking purposes, low maintenance costs, and reduced seasonal migration during the dry season. Some of the drawbacks of the technologies were difficulties related to sinking boreholes and non-availability of spare parts.

Recommendations from producers included supporting access to inputs (seeds, fertilizer, drilling costs, equipment, fencing), supporting the marketing of the production, training in product preservation, training on pest management and conducting advocacy campaigns with local authorities to financially support the fencing of irrigated sites.

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.