Mozambique - Rural Water Supply

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Overview

Identification

COUNTRY
Mozambique

EVALUATION TITLE
Rural Water Supply

EVALUATION TYPE
Independent Impact Evaluation

ID NUMBER
DDI-MCC-MOZ-StanfordVT-2014-v01

Version

VERSION DESCRIPTION
Anonymized dataset for public distribution

Overview

ABSTRACT
This report provides the results from (1) an impact evaluation of the MCA's Rural Water Point Implementation Program ('RWPIP') in Nampula and (2) an evaluation of the SSSS in Cabo Delgado.

The objective of the impact evaluation of the MCA's RWPIP in Nampula is to examine the extent to which the program objectives have been realized. Rigorous impact evaluations should allow causal claims to be made about program interventions and observed changes in outcome indicators, typically by comparing the beneficiaries of the program to a non-beneficiary comparison group.

The objective of the SSSS study in Cabo Delgado was to qualitatively analyze the performance of the systems from a financial, technical, and managerial perspective. The research was driven by the hypothesis that in larger, more densely settled communities, the SSSS and private operator model better serves water users' needs, is more cost effective, and more sustainable over the long term, as compared to the a handpump with water committee management approach.

EVALUATION METHODOLOGY
Difference-in-Difference

UNITS OF ANALYSIS
Communities

KIND OF DATA
Sample survey data [ssd]

TOPICS

Topic	Vocabulary	URI
Water, Sanitation and Hygiene	MCC Sector	
Gender	MCC Sector	

KEYWORDS
Hand pumps, Rural water, Small-Scale Solar Systems

Coverage

GEOGRAPHIC COVERAGE
Rural communities across the provinces of Nampula and Cabo Delgado.

UNIVERSE
For the household survey, the study population were members of households within the sampled communities. For the Water Committee interviews, the study population were water committees. Users of the handpumps and the small scale solar systems were the study population for the water point observations.

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
Jenna Davis	Stanford University
Ralph Hall	Virginia Polytechnic Institute

FUNDING

Name	Abbreviation	Role
Millennium Challenge Corporation	MCC	

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
Millennium Challenge Corporation	MCC		Review of Metadata
Stanford University/Virginia Polytechnic Institute			Production of Metadata

DATE OF METADATA PRODUCTION
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DDI DOCUMENT VERSION
Version 1.0 (February 2014). This is the first version of the document.

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MCC Compact and Program

COMPACT OR THRESHOLD
Mozambique Compact

PROGRAM
In 2007, the Millennium Challenge Corporation (MCC) signed a $506.9 million compact designed to reduce poverty in Mozambique by promoting sustainable economic growth. Among the planned investments was the installation of 606 improved water points in rural communities across the provinces of Nampula and Cabo Delgado. In addition to the installation of the water points, the Rural Water Points Installation Program (RWPIP) also mobilized water committees to maintain the infrastructure and provided trainings to water committees and community members. Most of the water points are boreholes equipped with Afridev handpumps, but in Cabo Delgado eight boreholes have been upgraded to small-scale solar systems ('SSSS') where there is sufficient water supply and unmet demand. The Rural Water Supply Activity ('RWSA') of the Mozambique Compact is intended to increase sustainable access to improved water supply in some of the country's poorest districts.

MCC SECTOR
Water, Sanitation and Hygiene (WASH)

PROGRAM LOGIC
Providing time savings by reducing the time burden of water collection. Time savings from an improved water supply will

increase beneficiary productivity and incomes. Reducing water-related illnesses (diarrhea, dysentery, etc.). Health improvements resulting from an improved water supply will increase beneficiary productivity and incomes.

PROGRAM PARTICIPANTS

The rural population of Nampula and Cabo Delgado.

Sampling

Study Population

For the household survey, the study population were members of households within the sampled communities. For the Water Committee interviews, the study population were water committees. Users of the handpumps and the small scale solar systems were the study population for the water point observations.

Sampling Procedure

The sample frame was designed to draw confident causal inference about the impacts attributed to the installation of handpumps in Nampula. In order to monitor these impacts, the following activities were undertaken:
• A baseline study in Phase 1 and 2 treatment and comparison communities was completed in June-July, 2011, which was mainly targeted at collecting pre-intervention information.
• A follow-up study in Phase 1 and 2 treatment and comparison communities was completed in June-July, 2013, to capture the changes that had occurred in these communities over a two year period.

The following lists provide a summary of the activities that were undertaken during each of the fieldwork expeditions. In both the baseline and follow-up study, two weeks of enumerator training and a pilot study were undertaken prior to the commencement of the fieldwork. The pilot study enabled the Stanford-VT team to test the logic in the household survey and review the structure of the data collected for omitted or incorrect values. It also provided the enumerators with an opportunity to follow all the fieldwork protocols and practice administering each of the surveying instruments. Following the pilot study, final adjustments were made to the surveying instruments and fieldwork protocols, and enumerators were retrained as needed to address any data entry errors made during the pilot study. The training of enumerators continued throughout the fieldwork when the Stanford-VT team's 'on-the-ground statistician' regularly reviewed potential data entry errors with each enumerator. This regular (nightly) review of data improved the overall data quality and prevented the enumerators from making systematic errors throughout the fieldwork.

2011 baseline study:
• 1,579 households surveys were completed in 54 communities (27 treatment and 27 comparison);
• 54 water committee or leader interviews were completed; and
• Water sampling was undertaken in 11 communities (from 39 community water sources and 259 household containers).

2013 follow-up study:
• 1,826 households surveys were completed in 62 communities (32 treatment and 30 comparison);
• 31 water committee or leader interviews were completed;
• 17 water point observations were undertaken in 17 communities;
• Water sampling was undertaken in 11 communities (from 32 community water sources and 873 household containers); and
• Water source variability sampling was undertaken in four communities (which consisted of 412 water samples).

In the baseline and follow-up studies, an average of 29 household surveys were completed in each community. Around three quarters (73%) of the households interviewed during the baseline study were surveyed again in the follow-up study. If the head of a household was not available after two attempts to contact them or had left the community, a replacement household was randomly selected into the follow-up sample. In the follow-up study, 78% of the households in treatment communities in our sample used a handpump.

Deviations from Sample Design

During the follow-up study, if respondent from the baseline study was not available to interview or had left the community, a replacement household was randomly selected.

Phase 1 treatment communities received a handpump before the baseline study, whereas Phase 2 treatment communities received a handpump between the baseline and follow-up study.

During the two years that passed between the baseline and follow-up studies, a number of events impacted the original classification of the Phase 1 and 2 treatment and comparison communities. For example, as a result of poor geophysical conditions, several treatment communities did not receive a handpump and were subsequently reclassified as comparison communities. Further, during Phase 3 of the RWPIP, a number of handpumps were installed in comparison communities that

were then reclassified as treatment communities. In total, nine treatment communities were reclassified as comparison communities and one was removed from the sample (due to the installation of a World Vision handpump), seven treatment and one comparison community in Moma were added to the sample; and eight comparison communities were re-classified as treatment communities.

Response Rate

73% of the households surveyed in the baseline study were resurveyed in the follow-up study.

An unknown number of households were skipped in the baseline and follow-up studies because of absence or refusal or inability to participate in the study.

Weighting

N/A

Questionnaires

Overview

Baseline and follow-up household questionnaires in Portuguese with short English translations with the following modules: household composition, water sources, health, participation, sanitation, income and expenditures. Water committee interviews about perceptions of the project and the handpumps. One-day water point observations in 17 communities with a MCC handpump.

Data Collection

Data Collection Dates

Start	End	Cycle
2011-06	2011-07	Baseline
2013-06	2013-07	Follow-up

Questionnaires

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Data Collectors

Name	Abbreviation	Affiliation
WE Consult Mozambique		

Supervision

Three teams of four enumerators, including the team leader, were supported in the field by the logistics manager from WeConsult and the on-the-ground statistician from LISA, Virginia Tech's Laboratory for Interdisciplinary Statistical Analysis. A runner contacted district, local, and community leaders to gain permission for surveying within the communities before the survey teams arrived. The on-the-ground statistician, a statistics PhD student from Virginia Tech, reviewed data with the individual enumerators and team leaders to ensure high quality data were collected.

Data Processing

Data Editing

Data editing took place in the field and was conducted by the on-the-ground statistician, a PhD student from the Department of Statistics and LISA at Virginia Tech. Water Committee and water point observation data were reviewed at multiple times, both in the field and during the analyses stages.

Other Processing

Data were entered by enumerators during interviews into handheld PDAs running TSS (The Survey System) software. The data files were transferred to Windows laptops in the field. The on-the-ground statisticians used 'R' and 'SAS' to clean the data and identify questionable values. For the water committee interviews and water point observations, data were recorded on paper by 1-2 data collectors and then entered into Excel. The paper copies were retained in case any values needed to be double-checked.

Data Appraisal

Estimates of Sampling Error

Sampling of housheholds was based on a random walk. No sampling errors were calculated.