

Armenia - Irrigation Infrastructure

Report generated on: November 10, 2015

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Overview

Identification

COUNTRY

Armenia

EVALUATION TITLE

Irrigation Infrastructure

EVALUATION TYPE

Independent Impact Evaluation

ID NUMBER

DDI-MCC-ARM-MPR-IRR-2014-v1

Version

VERSION DESCRIPTION

Anonymized dataset for public distribution

Overview

ABSTRACT

This study evaluates irrigation infrastructure rehabilitation in Armenia. The study separately examines the impacts of tertiary canals and other large infrastructure such as main canals and pumping stations. The study also explores complementarities these types of infrastructure have with each other as well as with other activities included in the Armenia compact.

Although a random assignment design is considered the most rigorous evaluation approach and may have been feasible in this context, randomly selecting which tertiary canals would be rehabilitated was not done. Communities had to first apply to be considered for inclusion, and then canals were selected based on other factors, particularly engineering considerations and projected economic rates of return. Instead, the study uses a comparison group design. Under this approach, tertiary canals for which rehabilitation is planned will be matched to other canals sharing similar geography, pre-rehabilitation conditions, and where similar crops are grown. Examining how outcomes change for farmers in the comparison group, whose canals were not rehabilitated, will inform us about how those outcomes would have changed in the absence of the rehabilitation efforts.

Random assignment was also not possible for evaluating the large infrastructure projects. Moreover, there are too few pumping stations, gravity schemes, main canals, and drainage systems to evaluate any of those types of infrastructure separately. Thus, the evaluation uses a matched comparison group design to see whether there are impacts on communities in which any of these types of infrastructure were rehabilitated compared to those in which none was.

EVALUATION METHODOLOGY

Propensity Score Matching

UNITS OF ANALYSIS

Households, individuals

KIND OF DATA

Sample survey data [ssd]

TOPICS

Topic	Vocabulary	URI
Agriculture		
Infrastructure		

Topic	Vocabulary	URI
Irrigation		

KEYWORDS

Irrigation, Canal, WASH

Coverage

GEOGRAPHIC COVERAGE

Infrastructure was rehabilitated throughout rural Armenia.

UNIVERSE

A total of 2,990 farmers were originally interviewed across 175 communities. For the follow-up survey two communities (one treatment and one comparison) were dropped due to gunfire from across the Armenian border with Azerbaijan. Of the 173 that remain, 89 of these communities are in the tertiary canal treatment group and 77 communities are in the comparison group. The remaining nine communities will be excluded from the tertiary canal evaluation because their canals were ultimately not rehabilitated, as described previously, but we collected follow-up data on them for use in the large infrastructure evaluation. For the large infrastructure evaluation, 107 communities are in the treatment group and 66 in comparison.

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
Mathematica Policy Research	

FUNDING

Name	Abbreviation	Role
Millennium Challenge Corporation	MCC	

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
Millennium Challenge Corporation	MCC		Metadata Production

DATE OF METADATA PRODUCTION

2014-10-07

DDI DOCUMENT VERSION

Version 1.0 (October 2014)

DDI DOCUMENT ID

DDI-MCC-ARM-MPR-IRR-2014-v1

MCC Compact and Program

COMPACT OR THRESHOLD

Armenia

PROGRAM

The aim of the Millennium Challenge Corporation's Compact with Armenia ("the Compact"), a five-year agreement signed in March 2006, was to increase household income and reduce poverty in rural Armenia through improved performance of the country's agricultural sector. The Compact, managed by the Millennium Challenge Account with Armenia (MCA-Armenia), was originally designed to include two projects: (1) the Rehabilitation of Rural Roads Project and (2) the Irrigated Agriculture

Project. The Irrigated Agriculture Project comprised two complementary activities, the rehabilitation of irrigation infrastructure ("the Irrigation Infrastructure Activity", hereafter Infrastructure Activity) and the provision of training, technical assistance, and access to credit for farms and agribusiness ("the Water-to-Market Activity," hereafter WtM Activity). The Infrastructure Activity was intended to provide adequate and timely delivery of water to crop fields, and the WtM Activity was intended to help farmers harness these improvements to introduce new technologies and foster a shift to HVA crop production, both of which would improve household income. The WtM Activity also included technical support to regional water management organizations through the Institutional Strengthening Subactivity (ISSA), with the aim of creating more efficient and consistent irrigation supply and sustaining the investments in irrigation infrastructure. ISSA also included an irrigation policy reform component whereby a reform strategy was developed through a participatory process with stakeholders. By improving living standards among rural residents, these investments were designed to lead to future economic growth in rural areas and throughout the country.

MCC SECTOR

Agriculture and Irrigation (Ag & Irr)

PROGRAM LOGIC

The Infrastructure Activity was implemented by the Irrigation Project Implementation Unit of the World Bank and rehabilitated several different types of irrigation infrastructure, including main canals, the Ararat Valley drainage system, pumping stations, gravity schemes, and tertiary canals. Prior to rehabilitation, water user associations (WUAs), the regional organizations that manage the distribution of and payment for irrigation water in Armenia, estimated that only 25-40 percent of irrigation water actually reached the fields in most of the affected villages. The Compact provided funding of \$121 million to rehabilitate irrigation infrastructure schemes across Armenia. The short-term goals of the Infrastructure Activity were to improve the efficiency of irrigation and to increase the area of irrigated land by more than 40 percent. With access to a more consistent supply of irrigation water, farmers could increase their agricultural production.

PROGRAM PARTICIPANTS

Over 100 communities selected for rehabilitation

Sampling

Study Population

A total of 2,990 farmers were originally interviewed across 175 communities. For the follow-up survey two communities (one treatment and one comparison) were dropped due to gunfire from across the Armenian border with Azerbaijan. Of the 173 that remain, 89 of these communities are in the tertiary canal treatment group and 77 communities are in the comparison group. The remaining nine communities will be excluded from the tertiary canal evaluation because their canals were ultimately not rehabilitated, as described previously, but we collected follow-up data on them for use in the large infrastructure evaluation. For the large infrastructure evaluation, 107 communities are in the treatment group and 66 in comparison.

Sampling Procedure

The sample frame for the TCS comprises the farming households served by the rehabilitated tertiary canals and the matched tertiary comparison group. Prior to the baseline TCS, the survey team worked with village mayors to identify the farmers served by each tertiary canal. Fifteen farmers were selected for interviews in most treatment communities, with rare deviations if a sampled farmer did not show up. Twenty farmers were interviewed in each comparison community. The larger number of respondents in tertiary comparison communities was to allow some cushion in case a few of the comparison group farmers were appreciably dissimilar to the associated treatment group farmers.

The large infrastructure sample should be considered a sample of convenience, that is, not statistically representative. The large infrastructure evaluation was requested and designed after the TCS baseline had already been fielded, and it was too late to commission a dedicated household survey. Instead, the large infrastructure evaluation uses the TCS data, which has a good mix of communities that were and were not served by rehabilitated large infrastructure, but it is not a representative sample of such communities.

Response Rate

Eighty-three percent of the baseline sample was successfully re-interviewed for the follow-up survey in the 173 communities in which interviews were attempted.

Weighting

We will next use the estimated propensity scores to reweight the comparison group communities to be observably similar to the treatment communities. Separate weights will be constructed for the tertiary canal and large infrastructure analyses. Each comparison community will be assigned a weight of $pc/(1 - pc)$. Intuitively, tertiary comparison communities that look most similar to treatment communities (pc closer to 1) receive more weight than communities that look less similar (pc closer to 0). Each treatment community will be assigned a weight of 1. These weights are constructed so that we are estimating the average impact of treatment for the communities in the treatment group.

Questionnaires

Overview

The primary data source will be a household survey tailored to this impact evaluation, the Tertiary Canal Survey. The TCS is modeled closely after the survey used for the Water-to-Market impact evaluation, the Farming Practices Survey (FPS), and was fielded by the same survey team led by AREG. As with the FPS, the key outcomes of interest from the TCS include crops cultivated, crop production, agricultural profit, household income, and poverty. The TCS also features questions about reliability and quality of irrigation water. We conducted two rounds of the TCS.

Data Collection

Data Collection Dates

Start	End	Cycle
2013-11-01	2014-03-31	N/A
2009-12-01	2010-03-31	N/A

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Data Collectors

Name	Abbreviation	Affiliation
Jen Consult		
AREG NGO		
AVAG Solutions		

Data Processing

No content available

Data Appraisal

No content available