

Armenia - Water to Market Credit

Mathematica Policy Research

Report generated on: November 10, 2015

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Overview

Identification

COUNTRY

Armenia

EVALUATION TITLE

Water to Market Credit

EVALUATION TYPE

Independent Performance Evaluation

ID NUMBER

DDI-MCC-ARM-MPR-WTMCREDIT-2011-v1.1

Version

VERSION DESCRIPTION

Edited clean data for internal use only

Overview

ABSTRACT

The analysis of WtM credit used baseline and final follow-up Farming Practices Survey (FPS) data to summarize beneficiary and loan characteristics, as well as to estimate the impact of MCA credit on the key outcomes of investment, production, sales, and income. To construct these estimates, the evaluator used regression modeling to compare farmers who did and did not receive MCA credit. The evaluator supplemented the quantitative analysis with qualitative information on program implementation and intended results based on interviews with MCA staff, RFF personnel, lending organizations participating in the program, and representatives from other donor organizations in Armenia.

EVALUATION METHODOLOGY

Ex-Post

UNITS OF ANALYSIS

The units of analysis are individuals and families/households.

KIND OF DATA

Sample survey data [ssd]

TOPICS

Topic	Vocabulary	URI
Agriculture and Irrigation	MCC Sector	

KEYWORDS

Credit, Finance, Agriculture

Coverage

GEOGRAPHIC COVERAGE

Rural areas in the 10 Armenian marzes excepting Yerevan.

UNIVERSE

The survey covered farming households in rural communities that were included in the evaluation sample for the Water-to-Market impact evaluation. It is not a representative sample of those who received or were eligible for credit.

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 Producer

DATE OF METADATA PRODUCTION

2014-12-11

DDI DOCUMENT VERSION

Version 1.1 (December 2014)

DDI DOCUMENT ID

DDI-MCC-ARM-MPR-WTMCREDIT-2011-v1.1

MCC Compact and Program

COMPACT OR THRESHOLD

Armenia

PROGRAM

The Water-to-Market (WtM) Activity included multiple elements designed to work in concert with each other and with the Infrastructure Activity to improve agricultural profitability and household well-being. The WtM Activity is divided into two subactivities, the Improved Profitability of Water User Association Members Subactivity and the Institutional Strengthening Subactivity. The first subactivity is further subdivided into three sub-subactivities, which in short include farmer training, agricultural credit, and technical assistance to agricultural enterprises. The WtM credit component made long-term credit, in the amount of \$8.5 million, available to qualified farmers who participated in WtM training and met other selection criteria. Access to credit would allow farmers who participated in HVA and OFWM training to adopt new irrigation and production technologies, and thus generate higher output and sales. MCA contracted with the Rural Finance Facility (RFF) to implement the WtM credit component, and participating financial institutions developed loan applications and submitted them to RFF for approval. MCA loans can be used to strengthen agricultural production, modernize equipment and build greenhouses, expand orchards and vineyards, and purchase root stock, as well as for agribusiness marketing, processing, establishing consolidation centers, and developing and expanding processing factories. The loans have a maximum interest rate of 12 percent and a loan term of 2-7 years. In addition, the maximum loan amount is 10.5 million Armenian drams (AMD, about \$30,000 USD).

MCC SECTOR

Agriculture and Irrigation (Ag & Irr)

PROGRAM LOGIC

The strategic goal of WtM credit was to provide long-term credit to individuals who were trained in High-Value Agriculture (HVA) and On-Farm Water Management (OFWM) through the WtM training. This credit was intended to provide beneficiaries with the necessary resources to finance new irrigation and production technologies introduced in WtM training. For instance, WtM loans could be used to strengthen agricultural production, modernize equipment, build greenhouses, expand orchards and vineyards, and purchase root stock, as well as for post-harvest agribusiness activities like marketing, processing, establishing consolidation centers, and developing and expanding processing factories. The adoption of new irrigation and production technologies was expected to generate higher output and sales.

PROGRAM PARTICIPANTS

Participation in training was required, but loan applicants also had to demonstrate that they would use the loan for approved agricultural purposes and were likely to be able to repay the loan. The scale of WtM lending-around 1,109 loans as of December 2011-was small in proportion to the 47,800 households trained in either OFWM or HVA through WtM.

Sampling

Study Population

The survey covered farming households in rural communities that were included in the evaluation sample for the Water-to-Market impact evaluation. It is not a representative sample of those who received or were eligible for credit.

Sampling Procedure

The evaluation design for the WtM activities dictated the sampling frame and approach to the FPS. The FPS focused on constructing a sample appropriate for rigorously assessing impacts of the farmer training component of WtM. The credit evaluation used the same data, but for the credit evaluation it was a sample of convenience rather than representative of any broader population.

The target was to complete interviews with approximately 25 farmers in each of 189 village clusters that was selected to be in the evaluation of WtM training. Village clusters consist of up to 4 small, neighboring villages, and the 189 selected village clusters cover 211 villages.

The baseline survey did not randomly sample respondents from the village clusters. The field team identified respondents for the FPS by working with village mayors to identify farmers who were likely to participate in WtM training so that a high proportion of farmers who were interviewed would have participated in training. The criteria were designed to align with the characteristics of farmers participating in ACDI's training programs, most notably, being actively engaged in farming, having modest farm area, living in the community for several years, and being between 25 and 70 years old.

AREG updated the sample list with the assistance of village mayors and marz officials, either at the marz offices or in the village itself. AREG and mayors targeted the households of farmers who were actively engaged in farming and had lived in the community for several years. Ultimately, a total of 4,715 farming households were interviewed for FPS1 in relevant communities. These same households were targeted for FPS3, which achieved a response rate of 75%.

Deviations from Sample Design

Three villages that were originally sampled for the FPS were not surveyed at final follow-up. Two villages that were surveyed at baseline were not surveyed at final follow-up because they were found to have almost no active farmers. A third village was not accessible for the baseline FPS due to heavy snow. The rest of the villages in these WUAs were surveyed at baseline and final follow-up according to the sample design.

For FPS3, MCA-Armenia also added the objective of surveying recipients of MCA credit. As a result, the FPS3 was administered to 33 new farmers who had not been interviewed in FPS1 and had received MCA credit.

Response Rate

The FPS3 was administered to 3,547 households, 75 percent of households that participated in FPS1.

Weighting

Nonresponse weights were constructed to account for households that responded to FPS1 and did not respond to FPS3. The nonresponse weights were computed by first calculating the propensity of a household's nonresponse in the FPS3. The second step in creating nonresponse weights was to use the predicted values from the response propensity models to create weighting cells. Within each research group (treatment and control), five weighting cells were created that were determined by the size of the predicted likelihood that the household responded to the survey. This resulted in a total of 10 (5 x 2) weighting cells. The same nonresponse weight was assigned within each of these 10 cells.

The third step was to create the nonresponse weight for each cell. The nonresponse weight was calculated by dividing the total number of households in each cell by the total number of households that responded to the survey in each cell. Finally, the weights were rescaled such that the sum of weights for the treatment group and the sum of weights for the control group each equal the original sample size of 4,715. Additional details of the calculations of nonresponse weights are

provided in Appendix A of the Water-to-Market Evaluation report, which is provided as a resource document.

Questionnaires

Overview

There is one questionnaire for the Farming Practices Survey 3 (FPS3). The FPS3 is based on the questionnaire used in FPS1 and the Integrated Survey of Living Standards (ISLS) implemented annually by the National Statistical Service of Armenia (NSS). The FPS3 is published in Armenian and English. It is intended to be administered to the person in the household with the most knowledge of farming activities on the household's land holdings.

The FPS3 was designed with guidance from MCA-Armenia, MCC, and Mathematica. Relative to FPS1, FPS3 has some minor changes in structure and an additional section on agricultural credit. In addition to questions regarding agricultural credit, the FPS3 asks about various demographic and socioeconomic characteristics for each member of the household, including sex, age, relationship, education level, and occupation. At the household level, the FPS3 asks the respondent about agricultural trainings, land holdings, agricultural practices, production of major crops, agricultural sales and revenues, income, and expenses.

Data Collection

Data Collection Dates

Start	End	Cycle
2007-11-15	2008-02-21	Round I
2008-11-04	2009-02-07	Round II
2010-12-09	2011-03-15	Round III

Data Collection Notes

Thirty interviewers and two reserve interviewers were selected from AREG to administer the FPS3. AREG selected the interviewers based on prior experience administering FPS1 and FPS2, geographic location, and prior experience conducting surveys in rural areas. The interviewers were trained in early December of 2010 to administer FPS3. The training provided interviewers with an overview of the study and the questionnaire. Topics in training included sample verification, identifying and coding skips in the sampling lists, and validity checks on completed questionnaires and other materials. Bilingual interviewers were available to conduct the FPS3 in Armenian or Russian, and the FPS3 was pre-tested from October to November of 2010.

Interviewers reported at least weekly to supervisors (Team Leader, Administrative Assistant to the Team Leader, and Senior Researcher) at AREG. In turn, AREG submitted detailed reports to Mathematica and MCA-Armenia regularly and after finishing fieldwork in each marz. Separate teams were designated for sample verification and quality control.

The fieldwork began by sending a letter describing the purpose of the FPS to the head of the marz (marzpet). Each marzpet was asked to appoint a staff member to assist the sample verification team. After sample verification was completed, the fieldwork coordinators contacted village mayors and made appointments to organize interviews with the selected farmers.

Interviews were conducted at a local government or state building on a specified day, in rooms that had been prepared for the FPS. The field coordinators organized follow-ups with any selected farmers who were absent. The average time taken to complete an interview for FPS3 was 24 minutes.

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Data Collectors

Name	Abbreviation	Affiliation
Jen Finance, Engineering, and Management Consult Ltd		
AREG Scientific Cultural Youth AREG Scientific Cultural Youth Association Non-Governmental Organization	AREG	

Supervision

The thirty interviewers were divided into 5 groups, each led by a field coordinator. The Administrative Assistant to the Team Leader at AREG supervised the fieldwork and observed several interviews in the field. The field coordinators reported at least weekly to the Team Leader, Senior Researcher, and Administrative Assistant to the Team Leader at AREG. The role of the Team Leader was to manage all aspects of the pre-test, sample verification, and data collection. The Team Leader also

communicated the progress of the fieldwork with MCA-Armenia and MPR. The role of the Senior Researcher was to provide guidance on survey implementation, pre-tests, and revisions to the FPS3. The Senior Researcher was also responsible for interviewer training and developing the data processing and quality control approaches. The Administrative Assistant to the Team Leader was responsible for selecting the interviewers, scheduling interviewers, and supervising fieldwork coordinators, the sample verification team, and the quality control team.

Data Processing

Data Editing

After interviewers completed each questionnaire, the interviewers reviewed the questionnaire entries and submitted them to the field coordinator for cross-editing. During data entry in SPSS, mistakes were corrected using visual and program control. In the analysis phase, subsequent edits were made to logically impute data where appropriate.

Other Processing

The data was entered in SPSS format by 4 specialists. Each set of responses for a questionnaire was entered by 2 specialists independently to cross-check skips and prevent mechanical mistakes. The first thousand and final five thousand entries were reviewed by Mathematica and MCA-Armenia, who compared the data entries to the hardcopy questionnaires and provided feedback on the data entry process. These data were transmitted to Mathematica for analysis.

After receiving the data, Mathematica merged the FPS3 and FPS1 data. While analyzing the data, Mathematica identified several inaccurate records of farming households. These farmers were identified systematically based on their reported amounts harvested and sold at baseline versus follow-up. First, Mathematica identified specific crop harvests and amounts sold where the farmer's report changed by over 200 tons from baseline to follow-up. This identified fourteen farmers with harvests and sale amounts for barley, grape, peach, sweet cherry, potato, red beet, haricot, and gramma. None of the 14 identified harvests and sale amounts were accompanied by large changes in crop land area or revenues. Mathematica concluded that these results were likely to be outliers and replaced the outlying number based on the information about land and crop revenues. For many of these 14 harvests, this consisted of treating a reported amount sold as the revenues for that crop. This is plausibly a data recording error in that the FPS3 records crop revenues next to crop harvest amounts. Seven additional records were similarly recoded because they implied implausible prices per unit sold.

A second approach was used to address outliers for which there was insufficient evidence to conclusively determine if the reported value was accurate. The approach was to systematically censor outcome and baseline measures of income, production, cultivated land area at the 98th percentile for each measure, or the 2nd-highest value for that measure if the 98th percentile was less than or equal to zero. This process also helps de-identify any individuals with especially large amounts of income, production, or land.

The censored variables were used to construct nonresponse weights to adjust for differences in observed characteristics between households who did and did not respond to the FPS3. Nonresponse weights were calculated using the procedure described in Appendix A of the Water-to-Market Evaluation report. The code to construct these weights are located in the Stata program "1_armenia_construct.do". These materials are provided as external resources.

Data Appraisal

Estimates of Sampling Error

Impacts of the WtM training program were estimated within a regression framework that controlled for baseline measures. Standard errors for the impact estimates were clustered at the village cluster level using Huber-White style "sandwich" estimators. Standard errors for key impact estimates are provided in Appendix B of the Water-to-Market Evaluation report, which is provided as a resource document.