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**Impact Evaluation Strategy for the MCA-Nicaragua Program: Rica and Banana Farmers**

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Michael R. Carter and Conner C. Mullally  
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**Proposal to the Millennium Challenge Corporation: Impact Evaluation of the Rural Business Services Program for Rice and Banana Farmers in León, Nicaragua.**

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**Introduction:**

The Millennium Challenge Corporation (MCC) program in Nicaragua consists of Property Regularization and Rural Business Services development projects. The former consists of titling agricultural land so as to improve functioning of land markets and enhance tenure security, while the latter consists of offering technical assistance and inputs to farmers in order to increase production and incomes. We propose to evaluate the impacts of the Rural Business Services (RBS) project on rice and banana farmers in León, Nicaragua. The original RBS research design consisted of geographically-based randomization, in which farmers in randomly chosen areas would be eligible to participate in the program. However, this randomization did not take rice and banana farmers into account.<sup>1</sup> In the case of these two crops, farmer cooperatives were chosen for project eligibility based on their degree of organization. Rice and banana farmers belonging to these cooperatives were allowed to participate if they met certain farmer characteristics, had legal land titles, and were willing to make the necessary matching investments. This is a very different design than one based on a geographical randomization, and calls for a different evaluation strategy. In what follows, we outline our proposed strategy, and why we think it worthwhile to carry out our plan.

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<sup>1</sup> Honey producers are also part of the program and also were not part of the randomization. Virtually the whole population of these farmers in León has participated in the program, leaving no similar group with which to compare participants and rendering evaluation infeasible. Thus they will not be included in our impact analysis.

### Background and Selection of participants: Rice

The rice component of the RBS program in Nicaragua is currently in its first year, with a total of nine farmer cooperatives and 300 individual farmers participating. Individual participation in the program lasts for two years. At the farmer cooperative level, participating cooperatives receive “tendals,” tools used to remove moisture from rice and therefore increase the price that farmers receive for their harvests. All farmers in participating cooperatives have access to the tendals, regardless of whether they choose to participate in the individual level components of the program. The chief individual-level benefit is the provision of additional fertilizer and technical assistance with respect to fertilizer use and pest control. When soliciting assistance from the program, farmers put together a budget describing the activities they plan to undertake with the assistance of the MCC program. Farmers must be able to pay for 70 percent of the costs of these activities, including inputs and technical assistance, and describe how they plan to fund them. These details are confirmed in the field by MCC agents, and the decision to approve or reject the application is then taken by the MCC office.

To be considered at all, producers must meet several criteria, which include having sown at least 2 manzanas in rice at some point in the past (1 manzana is roughly 0.7 hectares), owning no more than 50 manzanas of agricultural land, and being at least 20 years of age. MCC chose rice cooperatives based on their ability to organize a sufficiently large number of farmers to participate in the program. In the first meeting between MCC and the cooperatives, each cooperative provided an estimated number of potential program beneficiaries. Any individual farmer within these cooperatives that met the criteria, and was willing to make the matching investment, was able to participate.

### Potential Impacts and Evaluation Strategies: Rice

The focus of the impact evaluation will be on three areas: price received per unit of output, production per hectare, and household consumption. We will also seek to isolate the impacts of the cooperative-level intervention (the tendals) and individual-level component (fertilizer and technical assistance). Estimated average gross benefits will then be used along with estimates of program costs to conduct cost-benefit analysis of the RBS rice program. In order to conduct such an analysis, we must compare participants (or eligible farmers) with a control group. An ideal control group would be a group of farmers that are identical on average to participating farmers, but not eligible to participate in the program. We may have such a group in the cooperative AMPROSOR. Farmers from this cooperative were set to participate in the program, but in the last week of the planting season, were excluded. There are 47 program-eligible farmers in this cooperative. Turnover in the leadership of AMPROSOR led to its failure to complete the necessary bureaucratic steps in order to participate in the RBS program. We can reasonably argue that whatever led to this failure was beyond the control of individual farmers, and that unobserved factors determining the inclusion of some cooperatives and the exclusion of AMPROSOR are not correlated with our outcomes of interest. This is a necessary condition to consistently estimate the impacts of the program, i.e., to guarantee that with a sufficient sample size we can estimate program impacts, and not a combination of program effects and unobserved farmer characteristics.

Our strategy for evaluation of the RBS rice program will be to collect data on our outcomes of interest and factors that might affect these outcomes (household wealth, access to credit, household demographics, etc.) from eligible farmers in participating cooperatives, and farmers who meet program participation criteria but were excluded by virtue of membership in

AMPROSOR. 300 households will be surveyed in total, and all 47 from AMPROSOR will be included in the sample; the remainder will consist of 150 participating households, and 103 eligible non-participating households. The primary estimation strategy will be to estimate the impact of program eligibility by comparing outcomes between AMPROSOR members and members of participating cooperatives. To guard against the unlikely possibility that participating cooperatives typically have higher or lower outcomes than their counterparts in AMPROSOR, we will ask farmers to recall their production levels and prices received for output in the previous year. This will allow us to control for any systematic time-invariant differences between AMPROSOR and the other cooperatives, as well as to estimate the impact of eligibility on the change in production levels from 2008-2009 to 2009-2010. To estimate the impacts of the program itself, the estimated impacts of eligibility will be divided by the probability of participation in the participating cooperatives. This is an instrumental variables estimate of the “average treatment on the treated,” i.e., the average increase in the outcome variable due to participation in the program among those who participated. Given the manner in which AMPROSOR was excluded from the program, it seems unlikely that its members would have systematically different outcomes if they were to participate in the RBS program, or not to participate. If this assumption holds, then our instrumental variables estimate is a consistent estimate of the average treatment on the treated. Data collected from non-participating households not in AMPROSOR will also be used to estimate impacts. These estimates will require stronger assumptions to be consistent, but will yield greater precision.

### Background and Selection of participants: Banana

The RBS banana program is currently in its third year, with individual participation lasting two years. Participation has increased dramatically over time, from 60 participants in 2007, to 154 in 2008, and 240 in 2009. Program benefits include availability of fertilizer, technical assistance, and installation of irrigation infrastructure. Selection of participating farmer cooperatives functioned in much the same way as it did in the case of rice, with MCC picking the cooperatives judged to be the most organized. Conversations with farmer cooperative leaders indicate that farmers did not trust the program before seeing the benefits that it could bring, which explains low participation in 2007 and 2008. The selection of participating households works just as it does in the rice program, although the criteria farmers must meet in order to be considered are slightly different. Farmers must have at least 2 manzanas irrigated land, year-round access to water, and a maximum of 20 non-irrigated manzanas in agricultural land.

### Potential Impacts and Evaluation Strategies: Banana

We had the same objective in identifying potential control groups for the banana program as in the case of the rice program: to find a group of non-participants that are identical on average to participating farmers. In the case of banana, there were no pseudo-randomly eliminated cooperatives with which to form the basis of a control group. Furthermore, unlike in the case of the rice program, many of these farmers have little past production of bananas, meaning we cannot just draw a random sample of non-participants from participating cooperatives in order to fill out our control group with banana farmers. There are, however, 53 farmers who planted bananas with the intention of participating but could not satisfy either the program's matching investment requirement or the title requirement. The nature of land tenure in

Nicaragua is such that we might expect exclusion due to land title issues to be an exogenous factor affecting program participation, at least in many cases. However, we do not know at this time which farmers were excluded due to tenancy status, and which were excluded for financial reasons. Therefore we will collect data from all 53 rejected applicants. The remainder of the sample will consist of 50 households that began participation in 2009, and 47 that began participation in 2008.

The evaluation strategy will consist of estimating program impacts using a difference-in-differences approach. We will collect data at two points in time: before the initial post-intervention banana harvest of new program participants, and shortly afterwards. The main outcome of interest will be household consumption. The impact of the initial year of the program will be estimated by comparing the growth in consumption between the two period of data collection in first year participating households and non-participating households, and the cumulative effects of multiple program participation years will be estimated by comparing the household that joined in 2008 with the two other sub-populations in the data set. For these estimates to be consistent, we must assume that changes in outcomes of interest in the absence of the program would have been the same between all 3 groups in the absence of the program, and that outcomes prior to program participation are not affected by participation (e.g., households do not consume more in period 1 instead of saving because they expect larger harvests due to program participation).

### Budget:

A total of 600 surveys will be carried out in León, the cost of which will be borne by the MCC office in Nicaragua. Budgetary needs will thus consist of the salary and travel expenses for Conner Mullally, one of the two primary investigators in the project. These costs include:

Salary for Conner Mullally:	\$20,342.00
Two round-trip tickets from San Francisco, CA to Managua, Nicaragua:	\$1,200.00
3 weeks lodging in a hotel in León, Nicaragua and food:	\$1,100.00
Total:	\$22,642.00

The salary is based on an expected workload of 4 hours per day for 194 days (January 3 to September 30<sup>th</sup>, 2010) at \$26.21 per hour.

### Timeframe:

The initial round of data collection will consist of interviewing the sample of rice farmers, and the first visit to the banana farmers, or 450 surveys in all, and will take place in late January through the first week of February, 2010. The final round of data collection will take place in late August to early September of next year, and will consist of the final visit to banana farming households. Analysis of the rice data will be completed in the summer of 2010, and analysis of the banana data will be completed in winter of 2010. Exact dates of data collection will depend on availability of surveyors.



### Conclusion:

The MCC RBS in Nicaragua for rice and banana farmers extend levels of technical assistance and input availability never previously available to farmers, and therefore present an unprecedented opportunity to expand production and increase consumption for program participants. However, gauging the success of the program requires a rigorous evaluation strategy that takes account of how farmers selected into the program, and what sorts of impacts should be expected due to participation. We propose to carry out such an evaluation, the results of which will inform policy makers with respect to impacts of programs such as MCC RBS, and how such programs might be modified for greater future success.