DRG LEARNING, EVALUATION, AND RESEARCH (DRG-LER) ACTIVITY

CONCEPT NOTE AND EVALUATION DESIGN

TASKING N018

IMPACT EVALUATION OF THE DRG COMPONENTS OF USAID/PARAGUAY'S INCLUSIVE VALUE CHAINS PROJECT

TABLE OF CONTENTS

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BACKGROUND AND PROJECT OBJECTIVES

As part of the DRG Learning, Evaluation, and Research (DRG-LER) Activity, USAID has asked NORC to design and budget for an impact evaluation of the DRG component of USAID/Paraguay's Inclusive Value Chains project. Goals and Approach of the Inclusive Value Chain Project

The USAID/Paraguay Inclusive Value Chains project is designed to address rural poverty and inequality by improving the incomes of small farmers through their incorporation into agro-industrial supply chains in Paraguay's northern region. It is operating in the departments of San Pedro, Concepcion, Amambay, and Canindeyu and it aims to reach 20,000 small farmers. The development project's approach has four defining characteristics:

- *A Focus on Inclusion*: the expected outcome of the current project is to increase small producer incomes, rather than increase private-sector sales. This requires mechanisms to help small farmers overcome the multiple barriers they face in establishing relationships with agro-industrial buyers. Conversely, it requires mechanisms that reduce the elevated transactions costs that agro-industrial buyers face when sourcing from small farmers relative to larger agricultural enterprises.

- *A Market-driven Focus:* the project aims to identify already existing and unmet market demand and work backward, designing and implementing development interventions to allow small farmers to overcome supply constraints. This means supporting farmers to produce what can be sold, as opposed to helping them sell what they produce.

- *A Focus on Strengthening Collective Action within Farmer Organizations:* the project focuses on strengthening the capacities of farmers to cooperate within formal organizations to manage the investment, production, and commercial processes required to become suppliers of agro-industrial enterprises.

- *A Focus on Improving Coordination between Farmers and "Anchor Firms:"* the project identifies agro-industrial processors and exporters as anchor firms with unmet demand for raw materials that small farmer organizations are capable of providing. It then works to coordinate the flow of information, knowledge, and resources between these companies and farmer organizations in order to bring the demands of companies into alignment with the production of small farmers.

Current Status of the Inclusive Value Chain Project

Beneficiary recruitment. Project implementer FECOPROD has recruited approximately 100 producer organizations composed of approximately 4,000 farmers in two value chains (dairy

and medicinal herbs) in 25 municipalities (see annex). This year, FECOPROD will recruit additional farmers and anchor firms in the sesame, chia, and yuca starch value chains.

Interventions. The primary intervention USAID/FECOPROD has undertaken to date as part of this project has been to create a set of new coordinating institutions, called "Value Chain Management Units" (UGCV), located in the districts of San Pedro de Yucamandyyu, Curuguaty, Concepcion, and Pedro Juan Caballero. They have been created in each of the four program departments to guide the process of small-farmer value chain consolidation. Their staff consists of a dedicated supervisor, an extension agent, and an administrative assistant. These units also share multiple staff members that are specialized in gender issues, accounting and finance, and dairy and medicinal herb production.

These specialists will oversee a set of activities designed to further the goals of the project, including the transfer productive technologies to farmers, the adoption good agricultural practices, increased farmer access to credit, improved planning and project management capacities in farmer organizations, and efficient exchange and negotiation between farmers and their buyers. Specific activities will include organizational self-diagnoses, business plans, and trainings on administrative systems and budgeting, internal control systems and auditing, accounting and taxes, cooperativism, leadership and negotiation, farm-use planning, and other topics to be determined.

Incorporating a Municipal Governance Focus

Creating and consolidating inclusive value chains requires addressing a series of barriers related to local governance. In particular, government is a crucial provider of public goods and investment resources that can potentially complement and attract private-sector investment toward small farmer development. For this reason, USAID has made an additional USD1 million in funding available to incorporate a municipal governance-strengthening component into the project. It will be designed as a compliment and an extension of the activities already planned by FECOPROD. It will be executed through a subcontract with the *Centro de Información y Recursos para el Desarrollo* (CIRD), a local NGO. This set of governance interventions will be designed and evaluated using a randomized control trial.

The Role of Municipalities in Economic Development and Governance Failures

Paraguay has undergone a substantial degree of decentralization over the last decades, receiving new resources as well as new responsibilities for economic development. In addition to local property tax revenue, municipalities now receive a direct budget allocation from the royalties earned by the two bi-national hydroelectricity authorities. Moreover, departmental and municipal governments are key actors in allocating and distributing budgetary resources that come from the central government and the various national-level ministries that fund and implement economic development initiatives.

Decentralization received further formal legal backing with a revised municipal organic law, which in 2010 granted municipalities new responsibilities for economic development including technical assistance, support for SMEs, contributing to national, regional, and local development planning, and specifically developing employment plans in coordination with national-level

ministries. This set of changes means that municipalities have both new legal imperatives and new fiscal means to support local economic development.

At the same time, municipal government must overcome a difficult set of challenges so that these resources translate into broad improvements in the incomes and livelihoods of citizens. Three factors may impede the effective and efficient allocation of development resources at the local level. First, municipal governments generally lack planning skills and technical capacities to allocate resources to the most developmentally valuable investments. Many municipalities' structures consist of no more than the mayor, the city council, and one or two administrative and custodial staff. Only the larger and more developed municipalities have program staff dedicated specially to agriculture or economic development. Moreover, even where permanent, dedicated staff exist, they may lack the technical skills and knowledge to accurately judge the costs, benefits, and risks of alternative investments and to coordinate complex transactions within global value chains.

Second, municipal governments may misallocate resources because they are insufficiently accountable to their constituents or insufficiently informed about citizen priorities. Constituents seek individual private accountability from their elected officials as opposed to collective public accountability. Consequently, elected officials use development resources to distribute individual benefits and secure short-term political support, as opposed to investing in public goods that generate long-term growth. As a result, development resources are stolen or used clientelistically and diverted from their most developmentally rational use.

Finally, media reports suggest that an informal, illicit political economy that is sustained by marihuana cultivation and drug trafficking has arisen in Paraguay's north, providing a barrier to improved development governance. This illicit economy is highly stable and profitable relative to existing formal economic opportunities that are available to economic and political actors in rural and agricultural regions. It absorbs private resources, specifically land and capital, and generates illicit profits which in turn provide a source of immediate payoffs for public officials. In addition to subverting the rule of law, this illicit economy creates a major disincentive for municipal governments to invest in other forms of economic development. For elected officials, the investment and administrative costs of developing new formal agro-industrial value chains are high and the economic and political payoffs are uncertain when compared to maintaining the already consolidated and high-value marihuana value chain.

The Role of Farmer Organizations and their Challenges

Farmer organizations play a key role in consolidating small famer value-chains, serving as vehicles for economic and political collective action among smallholder farmers. First, farmer organizations allow farmers to reach economies of scale in production and commercial activities. They may, for example, coordinate individual (farm-level) investments and pool capital in order to undertake collective investments in productive and administrative infrastructure. Such activities lower production and commercialization costs and support collective efficiency and competitiveness among an organization's members. Second, farmer organizations aggregate the interests and articulate the needs of their members to the external actors with whom farmers engage in economic and political exchanges. Conversely, they mediate and articulate

external economic and political demands back onto their members and may organize collective responses.

Chief among these external actors are private firms within agro-industrial value chains. These firms are typically monopsonistic (i.e., they face little or no competition as buyers of agricultural raw materials). This gives them the power to set prices, and impose costs and risk onto suppliers. This is particularly attractive where buyers are cash-strapped or risk averse and wish to avoid fixed capital investments. On the other hand, agro-industrial firms are under increasing pressure to meet escalating demands from their clients for product quality, environmental protection, and social responsibility. This makes a competent supply base an important competitive advantage and creates incentives for investing in suppliers. Thus, farmer-firm relationships are often ambiguous, ranging from competitive to collaborative.

Where they exist, farmer organizations are a key institution and their leaders are key actors in mediating this relationship and coordinating transactions of between farmers and firms.

In Paraguayan agricultural value chains, political and informal means of coordination (negotiation and informal agreements among organized farmers) are becoming more common than individual spot-market (arms-length) transactions. Legal forms of coordination (i.e., individual or collective contracts) are still rare. In this process of negotiation and coordination, farmer organizations can serve both as a source of countervailing power vis-à-vis monopsonistic firms, as well as a means of disciplining the supply base to the demands of buyers.

Second, farmer organizations aggregate and articulate farmers' demands and interests vis-à-vis the multiple public sector institutions that provide development resources. These include municipalities, departmental governments, the ministry of agriculture, and donor agencies. They provide a range of benefits such as technical assistance, subsidized credit, agricultural inputs, and production and processing equipment. Most of these programs require smallholder farmers to be organized into committees or associations in order to qualify for assistance. Overall, public investment in small farm development is low. However, smallholder farmer organizations play an important role in shaping how these resources are used.

There are three reasons farmer organizations may misallocate development resources. First, they may make poor use of development resources because their leaders are not held accountable for their decisions. This may permit leaders to use organizational resources in self-interested ways, either appropriating them or directing them toward personal as opposed to collectively rational ends. Democratic participation in farmer organizations' decision-making processes may be low because members lack sufficient market and political information to form and articulate rational preferences about the use of development resources and hold their leaders accountable. Alternatively, democratic participation in farmer organizations' decision-making processes may be low because wide-spread authoritarian norms of deference to leaders discourages open deliberation and debate over the use of resources even in the presence of good information.

Second, farmer organizations may misallocate resources because their leaders lack the technical and managerial skills to accurately judge the costs, benefits, and risks of alternative investments and to coordinate complex transactions within agricultural value chains. In this case, the

problem is not self-interested use of resources by leaders, but instead the technical barriers they face in making rational decisions about their use.

Third, farmer organizations may misallocate resources because of the subsistence risks faced by their members. Climate variability, crop disease, and market volatility, make crop production a risky investment, particularly when they involve crops, production techniques, and markets that are unfamiliar to farmers. Moreover, development initiatives that require collective economic action (such as pooled investments or collective commercialization) introduce an additional set of risks. Having observed the failure of many similar schemes, rational farmers are aware of these risks and accurately estimate the low probable payoffs of many small-farmer development initiatives. In the absence of social welfare policies that guarantee a minimal level of subsistence income, poor farmers may prefer to receive a stream of individual material benefits and look to leaders to provide access to development projects as a source of individual benefits to meet short-term needs rather than as a source of investment capital for collective infrastructure and long-term growth. If this is the case, then increased democratic participation in organizational decision-making may worsen rather than improve the allocation of resources toward developmental ends.

Clientelism and the Governance of Small-Farmer Value Chains

The confluence of governance pathologies within municipal government and farmer organizations infuse the interactions among farmer organizations, local government, and private firms involved in the development of small-farmer value chains with a strong *clientelist dynamic*. Farmers, their leaders, and the institutions that fund them use development resources to fuel the exchange of political support and short-term subsistence guarantees rather than support long-run investment and growth.

Clientelism and the misallocation of development resources are broadly generalized problems in developing countries. It is widely believed that this governance problem prevents the efficient use of public resources and effective supply of public goods and services. This, in turn, drives poor economic performance and also reinforces inequality by concentrating resources among the politically influential and preventing them from reaching the poor. At the same time, as in Paraguay, fiscal decentralization and the fragmented governance structure of contemporary economic development projects give local actors all over the developing world increasing influence over the use of development resources.

The Inclusive Value Chain project and the municipal governance component are conceived as a set of interventions to alter this dynamic, improving development governance to better direct development resources toward profitable investments that increase the income and wellbeing of poor farmers. More specifically, it seeks to increase technical capacities of municipal leaders, increase the technical capacities of farm organization leaders, and increase democratic accountability in the exchanges between farmers and their leaders and between farmer organizations and municipalities.

The project aims to address these goals in a way that creates impacts that are measurable and quantifiable using random control trial evaluation methods. In turn, employing this methodology will permit the research team to address a broader set of theoretical questions about whether

participatory planning processes, when coupled with capacity building at the municipal level, can curb the clientelistic use of public resources and improve economic development outcomes.

START UP AND SCOPING TRIP

The evaluation team has sought to lead a collaborative design process in which USAID, the contractors and subcontractors arrive collectively at a design that is both technically feasible, relevant to the development challenges that exist in the field, and linked to a set of theoretical and policy questions with broader implications. As part of this process, from February 16-21, 2015, Cyrus Samii, Cynthia Gonzalez and Gustavo Setrini held a series of meetings, interviews, and a workshop in Paraguay in order to collect the background information necessary for the design of the governance component of the USAID/Paraguay inclusive value chain project (to be carried out by a FECOPROD and a local subcontractor) and the experimental impact evaluation (to be carried out by NORC and the research consultants).

The 13 interviews and a two-day visit to the field sites where the inclusive value chain project is already underway were geared toward giving the research consultants better information about what areas of municipal governance are most relevant to smallholder farmer value chains, what practices and capacities are currently in place in the project municipalities to support smallholder farmer value chains, and what kinds of interventions could be proposed to improve these areas of governance.

The workshop held on February 20, 2015 had two purposes. First, the workshop was convened to collect suggestions and feedback about the initial proposal for the governance interventions from NGOs that are experienced in designing and implementing democracy and governance development projects in Paraguay. Second, it provided an opportunity to inform the set of NGOs that will most likely respond to the RFP about the basics of the impact evaluation design and the methodological constraints it places on the design of the implementation of the intervention. The workshop consisted of a presentation by the research consultants about the methodological proposal and a guided brainstorming session with the NGOs structured around the following questions:

- What specific activities can improve the effectiveness of farmer organizations in their interactions with municipal governments?

- What key capabilities do municipalities need to support economic development?

- Which of these capacities can be installed quickly and with minimal investments?

- Specifically, what kinds of capacities to strengthen smallholder farmer value chains could be installed in municipalities in less than two years with a management budget of approximately $ 50,000 per municipality?

Preliminary Findings

The information collected from the interviews and workshop will be used to craft an RFP that is more likely to elicit relevant and high quality proposals.

Both mayors and farmer organizations see municipal activities as marginal to the successful formation of value chains. The governance of value chain development is primarily determined by the relationships between private firms and farmer organizations.

The interactions between farmer organizations and municipalities are largely confined to the ad hoc (and most likely clientelistic or politicized) distribution of financial and in-kind support for committees' productive projects. These include, for example, small donations for the purchase of equipment, direct donation of inputs (such as seeds, fertilizers, animals). Municipalities seem to use their resources for agricultural development only in a highly reactive way, responding to the petitions made by farmer organizations, as opposed to identifying municipal level development goals, defining strategies, and making a plan to implement them.

Behind the USAID project is the belief that municipalities can and should play a positive role in value chain development. However in field interviews, it was a challenge to extract any concrete proposals for what this role should be or how to facilitate it. The mayors and farmer organizations that were interviewed tended interpret their development challenges as primarily a lack of budgetary resources and suggested that with more resources, more donations could be made to farmer organizations. The most consistent and relevant suggestions from farmer organizations about improving municipal management were to improve the management of rural road maintenance in order to lower farmers' transport costs and to improve access to municipal and rural extension services. We have chosen to focus the intervention on these two areas.

The NGOs in the workshop emphasized participatory planning as a mechanism to improve the use of public resources and to make municipal programs more relevant to small farms' needs. However, they also raised concern about many of the political and practical barriers to making a planning process work especially in the context of a field experiment. The remainder of this document summarizes the research question, hypotheses, methodology, intervention measures, and evaluation timeline that have been selected on the basis of the scoping activates.

THEORY OF CHANGE

Core mechanisms

The evaluation considers institutional strategies for promoting responsiveness to smallholder constituents and public goods provision by municipal leaders. In particular, we ask,

What is the effect of participatory budgeting on public goods provision to rural constituents?

Based on the design of the intervention and existing political science theories, we hypothesize two main mechanisms through which the participatory budgeting process could increase public goods provision. The first is by *democratizing* farmer and municipal government interactions, through which participatory budgeting equalizes the power of rural constituent groups (that is, producers' organizations) over municipal budget decision-making. The second is by *institutionalizing* the interactions between farmers, buyers, and municipal governments, through which informal two-way interactions give way to public, formal negotiation that includes all three parties.

Figure 1. Theory of Change.
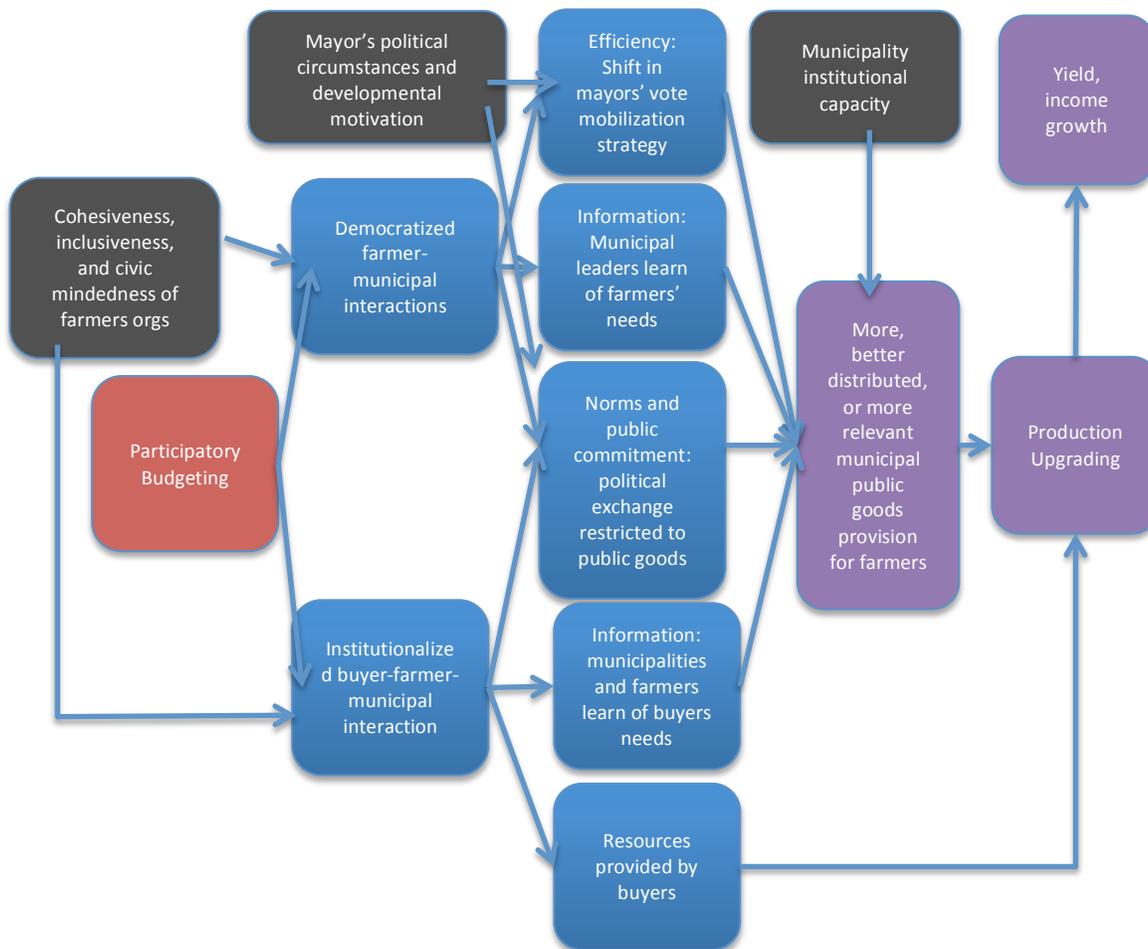
The democratization of farmer-municipality interactions could improve public goods provision in three ways. First, it may alter the *efficiency* calculus by which municipal leaders decide the most efficient way to use public resources. Facing a much broader set of interests, they may come to view public goods provision as an efficient means of satisfying them. Second the participatory budgeting process may generate *information* about farmers' needs in their municipality. This allows municipal leaders to target such needs with their expenditures. Third, the participatory budgeting forums will be conducted in a manner that essentially promotes an open discourse of broad based development and public goods provision. This may alter the *norms* that govern political demand making, reducing clientelism by encouraging mayors to make *commitments* in public. The institutionalization of buyer-farmer-municipality interactions could improve the *information* shared among these three groups about the needs and resources available for rural development. It may also induce buyers to provide *resources* and public goods directly to localities that are home to farmers in their supply chain. Clearly, these different mechanisms can interact as well.

Beyond this first order interest in public goods provision, the evaluation also seeks to address the second order question of whether integrating a governance dimension can enhance the effect of the integrated value chain project on rural producers' income and well being. Thus, a secondary evaluation question is whether participatory budgeting, and any benefits that result, translate into increased access to markets and incomes among rural producers.

We must also consider the possibility of adverse effects. For example, bringing producers into the participatory budgeting process may cause them to relinquish using conventional, and potentially more practical, means of influencing municipal leaders. This could free leaders to pursue their particularistic interests at the expense of the community. Hetherington, for example, documents how Paraguayan *campensinos* submission to the liberal "pro-transparency" and "anti-corruption" agenda to deal with the problem of misappropriated land in the 1990s and early 2000s took the steam out of the movement to pursue broad based land reform.[1] Such perverse consequences should never be ruled out, although our intention is to work with the implementing NGO to minimize this possibility.

Moderating factors

We hypothesize that these various effects will be moderated by three factors:

1. *Cohesiveness, inclusiveness, and civic mindedness of farmers organizations*, which could affect the intensity and broad-based nature of the pressure that farmers organizations will be put on municipal mayors as a result of their participation in the budgeting process,

2. *Mayor's political circumstances and developmental motivation*, and in particular the extent of local competition he faces, whether he is aligned with the departmental and national leadership, and his background in working for development-related causes, all of which may affect the extent to which he will feel the need to be responsive to farmer-constituent concerns, and

3. *Municipality institutional capacity*, which may affect the ability of a mayor to respond to increased farmer-constituent pressure by increasing public goods.

These three moderating factors appear as the gray boxes in Figure 1.

METHODOLOGY

The proposed methodology for this impact evaluation involves three steps. First, the evaluators will co-design the intervention with a competitively selected subcontractor. Second, the evaluators will randomly select from the inclusive value chain project's population of 32 municipalities and the participating farmer organizations within them a treatment group with which the CIRD will implement the governance intervention and a control group that will not receive the governance interventions. Third, the evaluation team will conduct baseline and endline surveys with a sample of the treatment and control groups in order to estimate the impact of the governance intervention.

Intervention Design

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[1] Hetherington, Kregg. *Guerrilla auditors: the politics of transparency in neoliberal Paraguay*. Duke University Press, 2011.

Based on findings from a scoping trip, observations of the project sites, and co-design workshops with the evaluation team arrived at the following components for the intervention:

1. *Pre-intervention workshops (Oct. 2015-Jan 2016)* in both treatment and control groups). Workshops were held with farmer groups in 28 of the 32 targeted municipalities in October and November, prior to the November 15 municipal elections. They were provided with information about the functions and responsibilities of municipal government and asked to prioritize 10 different potential municipal functions related to agricultural development (ranging from private goods like input distribution to public goods like road maintenance). Participants were given individual entry and exit surveys to measure their individual preferences. They were also asked to engage in a collective prioritization exercise, assigning 100 budget 'points' among the 10 selected areas. The deliberation exercise was recorded and transcribed, and facilitators were asked to fill out an instrument to give a qualitative assessment of the discourse and interaction. This exercise gives the evaluation team data on producers' individual preferences, their correspondence with the collectively expressed preferences, the authority relations among producers as they are manifest in deliberation, and on how preferences change as a consequence of deliberation. The results of these deliberations will be used for the first set of moderating factors---the cohesiveness, inclusiveness, and civic mindedness of the farmers organizations.

   In the month of January 2016, CIRD will conduct workshops with the newly elected mayors to ask them to prioritize among the same municipal investments based on their perception of their constituents' needs and preferences. A short survey instrument will also be administered about the structure of municipalities. This will provide data about how well informed mayors are about their rural constituents and what capacities are in place to support rural development. The mayors will also be informed about the Inclusive Value Chain Project, the governance component, and the randomized selection of beneficiary municipalities at these workshops. Other data will also be collected, including data on mayors' professional backgrounds, their staffing, and other capacity indicators. These data will be used for the second and third sets of moderating factors, relating to mayors' political circumstances and motivations and their municipalities' institutional capacities.

   Data from these activities will also be used for the selection of the treatment and control groups.

   The remaining activities will take place only in the treatment group and constitute the core of the governance intervention:

2. *Training in Participatory Planning (Mar-May 2016).* CIRD will provide farmer organizations training to improve their capacities to meaningfully participate in a planning process. This includes a) training on the functions and responsibilities of local government with regard to rural development, b) training on citizenship rights to participation, and c) basic technical training related to rural road maintenance and rural extension services so that farmers understand the range of technically feasible options.

CIRD will also provide a parallel set of training to municipal officials (mayors or their delegates) to provide them with the basic skills (budgeting, technical knowledge) necessary to participate in a planning process.

3. *Participatory Rural Development Planning Exercise (Jun-Sep 2016).* CIRD will support the creation of rural development tables (Mesas de Desarrollo Rural) where they do not exist or their reactivation where they exist only nominally. These tables will include representatives from the municipal government, the local offices of national-level ministries, and of local civil society. The tables will convene a participatory planning process with the goal of creating a municipal rural development plant that includes a proposed budget and plan for rural road maintenance, rural extension services, and two other areas chosen by the participants. The rural development plan will include activities for the municipal government to fund directly, as well as activities that should be solicited by the municipal government from departmental and national agencies. This plan will then be submitted to the mayor and the city council as an input for their budget preparation.

4. *Advocacy of Plan and Monitoring of Municipal Service Provision (2017-2018).* CIRD will train producers to create an advocacy plan to place pressure on the municipalities to execute the rural development plans created by the development councils. Producers will also fill out community score cards to measure municipal service provision in the selected areas. CIRD will support the development councils to convene a public audience where municipal officials will report on their expenditures and the progress made toward the rural development plan.

Randomization Procedure

The intervention will be a municipality-level, blocked cluster-randomized design, with blocking on moderator data as well as other important social and development indicators. We will use such municipality, organization, and farmer covariates to pair-match municipalities, and then use a restricted randomization to assign treatments within the matched pairs. The restricted randomization will allow only assignment profiles that maintain a high level of overall covariate balance. We have 32 municipalities with which to work, and these define our treatment and control clusters.

SAMPLING AND DATA COLLECTION

Preliminary Data

Municipal data. We will collect data on a variety of municipal variables that are related to the study's outcomes. These include budgetary data such as tax receipts, royalties and other transfers, and spending by major budget categories, the existence of a municipal agriculture secretary, electoral results for last two elections, population, agricultural production by value-chain type, soy production, and agro-ecological characteristics (rainfall, soil types, etc).

Farmer organizations. FECOPROD has designed an instrument that measures the level of institutional development of the farmer organizations along a 62-point scale. This will provide very useful information for study design, sample selection, and blocking. In addition we have requested from FECOPROD examples of the participatory self-diagnoses and business plans that they have completed with participating farmer organizations.

Farm households. During the month of March FECOPROD will conduct a survey with each of the farmer households that have been selected as beneficiaries of their project. We are working with them to simplify the instrument FECOPROD has designed so that it includes the data we need for sample selection and the data they need for monitoring and evaluation without overburdening the beneficiaries and FECOPROD's administrative staff. We have included questions to measure the following variables:

- The value chains the farmer participates in or hopes to participate in.

- The amount of landholdings and the status of tenure

- The amount of land dedicated to each of the crops for the targeted value chains.

- Whether farms have cash savings and the extent of their livestock holdings

- Access to credit

- Membership in farmer organizations

- Access to municipal land or collective grazing land

- The quality of the road and electrical infrastructure adjacent to the farm.

- Request for and access to municipal assistance (e.g., grants or in-kind assistance)

Main Dependent Variables

The main outcomes this study will measure are income and agricultural yields at the household level. This will be collected through baseline and endline surveys of the beneficiaries. In addition, surveys will be used to measure of covariates such as household assets, debt burden, debt-income ratio, and debt-wealth ratio in order to evaluate the impact of the interventions on these variables.

However, because the governance intervention's effect on income and yields is indirect and likely to be fully realized only over a medium term, it is possible that we will not detect any difference between the treatment and control groups within the span of time available for the evaluation. Therefore, we propose also collecting and analyzing data on the direct outcomes of the governance intervention as well. These include a direct (objective) measure of farmers' access to municipally provided infrastructure and services (e.g. the quality of rural roads or electrical networks), as well as farmers perceptions about the fairness, efficiency, and quality of municipal services related to value chain development. The precise outcome variables we study will depend on the nature of the final intervention, which will be determined jointly by FECOPROD, the NGO sub-contractor, and the evaluation team. Qualitative evidence from

interviews and participant observation will also be used to trace out the causal process linking the intervention to the observed outcomes (see Tables 1 and 2).

Data Sources for the Evaluation

As indicated in Tables 1, 2, and 3, the following data sources will be generated and used in the impact evaluation:

- *Producer Surveys.* Producer-household surveys will be conducted at baseline and at endline to collect household level data from the treatment and control groups.
- *Mayor Surveys.* A short survey of the complete population of mayors will be taken at workshops held at baseline and at endline.
- *Buyer Surveys.* A short survey of the complete population of 'anchor firms' participating in the Inclusive Value Chain Project will be taken at baseline and at endline to collect data regarding their activities and relationship with local government in the municipalities they source from.
- *Municipality Administrative Data.* We will collect a variety of municipal-level data from publicly available administrative records (see description above under Preliminary Data).
- *Direct Observation:* Enumeration teams fielded for the producers surveys will also complete direct observation instruments that will measure quality and reach of municipality-supported infrastructure.
- *Monitoring Instrument.* During the intervention, the evaluation team's monitoring assistant, in collaboration with CIRD, will collect quantitative and qualitative data about the participatory planning process carried out by the rural development tables. The evaluation team will design an instrument for this purpose.
- *Pre-election workshops.* Data from the workshops, as described above, will allow for an assessment of farmers organizations cohesiveness, inclusiveness, and civic mindedness.

Table 1. Proposed Indicators and Hypothesized Effects for Causal Mechanisms

Mechanisms and Indicators	Data Source	Direction of Hypothesized Effect
Democratizing Producer-Municipality Interactions		
- Producers perception that organization can meaningfully engage with municipal leaders	Producer Surveys	+
- Proportion of producers whose organizations have met with municipal leaders in the last year	Producer Surveys	+
- Producer perception that budgeting process is fair, open	Producer Surveys	+
- Producer perception that engaging municipal leadership can be beneficial	Producer Surveys	+
Institutionalizing buyer-municipality-producer interaction		
- Number of participatory planning meetings that included all three actors.	Monitoring Instrument	+
- Proportion of producer organizations that have participated in joint meetings.	Producer Surveys (organization leaders' responses)	+
- Producer perception that buyers and municipality have a good relationship	Producer Surveys	+
- Buyers' perception of accessibility of municipal leadership.	Buyer Surveys	+
Change in mayors efficiency calculation for goods distribution		
- Number of direct beneficiaries of municipal spending.	Producer Surveys	+
- Amount spent per direct beneficiary	Municipality Administrative Data and Producer Surveys	+
Information (municipal leaders learn of producers needs)		
- Correspondence between producers ranking of their preferences for spending and the mayors perception of producers preferences.	Producer Surveys and Mayor Surveys	+
Resources from buyers		
- The value of investments or grants made by buyers in each of the municipalities.	Buyer Surveys and Municipality Administrative Data	+

Table 2. Proposed Indicators and Hypothesized Effects for Outcomes

Outcome and Indicators	Data Source	Direction of Hypothesized Effect
Public goods and services provided by municipality		
- Size and proportion of municipal expenditures spend on public goods	Municipality Administrative Data (public budget records)	+
- Producer access to publically financed public goods	Producer Surveys	+
- Producer satisfaction with public expenditure	Producer Surveys	+
- Direct assessment of the availability and quality of public goods.	Direct Observation by enumeration teams	+
Production upgrading		
- Proportion of farmers employing improved production technologies	Producer Surveys	+
- Proportion of farmers employing improved production methods employed by farmers	Producer Surveys	+
- Proportion of farmers employing higher quality varieties, products	Producer Surveys	+
- Proportion of farmers that have diversified their commercial crops, products	Producer Surveys	+
- Proportion of farmers that report collective processing, commercialization.	Producer Surveys	+
Income		
- Farmer Agricultural Income	Producer Surveys	+
Yield		
- Farmer yields for crops from selected value chains	Producer Surveys	+

Table 3. Proposed Indicators and Hypothesized Effects for Moderators

Outcome and Indicators	Data Source	Direction of Hypothesized Moderator Effect
Cohesiveness, inclusiveness, and civic mindedness of farmers organizations		
- Cohesion scores from deliberation exercise	Pre-intervention workshop data	+
- Inclusiveness scores from deliberation exercise	Pre-intervention workshop data	+
- Civic mindedness scores from deliberation exercise	Pre-intervention workshop data	+
Mayors political circumstances and developmental motivation		
- Electoral win margin	Producer Surveys	-
- Partisan alignment with department and national leaders	Producer Surveys	-
- Professional background in development	Producer Surveys	+
Municipal institutional capacity		
- Size of budget	Administrative data	+
- Existence of personnel assigned to small holder development issues	Pre-intervention interviews	+
- Municipality capacity index	Implementing partner assessment tool	+

Sampling

Our main analyses will be conducted on a sample of 1,800 producer households drawn from inclusive value chains projects' beneficiaries and that have been randomly assigned to treatment and control groups in the manner described above. The power calculations below motivate our proposed sample. We will collect data from all producers organizations in all of the program municipalities. The only level of random sampling that will occur will be at the level of producer household *within* producers organizations. In sampling producer households, the organizations will function as sampling strata. The sampling procedure will be to draw a proportional simple random sample from each organization using the organization's membership roster. The sampling proportion will be set so as to achieve our target of 1,800 while ensuring a minimum of two producers per organization (necessary for standard error estimation that accounts for our stratified sampling design).

Power Calculations

Our proposed sample of 1800 producer households was based on power calculations summarized in Table 1 and explained below. As a benchmark for comparison, Table 1 shows the power that we would have in testing for a given outcome (in standardized units) if we were able to survey the entirety of the set of eligible households (the bottom row). The power for such a test would not change appreciably compared to what our proposed sample provides. This is because the number of municipalities dictates power in this setting. Our assumption in doing the power analysis was that the number of municipalities would be 30. As it turns out, we ended up with 32, and so our analysis is conservative. Nonetheless, in our original analysis, the assumption of 30 municipalities means that a completely randomized clustered design would yield a minimum detectable effect size (MDES) of about 0.42 standard deviations, which is quite large and therefore does not look very promising. We thus draw upon additional methods that will allow us to boost power for detecting effects even without increasing sample size. These additional methods include blocked and restricted random assignment, covariance adjustment, and the use of multiple indicators and index-based omnibus tests. The following paragraphs explain.

First, we can derive our starting MDES approximation. We have 30 municipalities with which to work, and we intend to randomly assign the treatment to half. Our FECOPROD data suggested an average of 7.6 eligible farmer organizations per municipality, and then an average of 44 farms per organization. Because treatment is assigned at the municipality level, we need to account for the fact that there may be "clustering" in the organizations' and farms' behavior, attitudes, and production outcomes. Mathematically, one needs to specify an anticipated level of "intra-class correlation" (ICC), a measure from 0 to 1 that indicates the level of homogeneity (where an ICC of 1 means all units within a cluster are identical, and 0 means that they are totally different).

Based on our analysis of available data and our understanding of the types of organizations in the study, baseline data from FECOPROD's farmer surveys suggested a moderate degree of homogeneity of outcomes at the level of organizations within municipalities---an ICC 0.25. At

the level of farmers within organizations, baseline data suggests using an ICC of about 0.40 (after centering the data on the municipal-level means to control for municipal-level variation). We assume that we will have 10 percent attrition.

Such clustering and attrition means that even though we start with a nominal sample size of 1,800 farms, the "effective sample size"---that is, the actual information value of the sample---will be considerably smaller. Attrition means that we expect to have a final sample of about 1,600 farms. The ICCs at the two levels described above mean that the information content would be equivalent to being able to run a completely randomized (as opposed to cluster randomized) experiment with 177 farms. At 95% confidence and 80% power, this yields a "minimum detectable effect size" (or MDES, that is, an effect size for which we will have the power to detect against the null hypothesis) of about 0.42 standard deviations. This sample size also allows us to conduct subgroup analyses that split the sample into subgroups *within farmer organizations* as small as 455 farms while still being able to detect less than a half of a standard deviation effect. Of course, if we were to split the sample across farmer organizations or across municipalities, the minimum detectable effects would be quite large and most likely beyond the reach of this study.

Table 1. Basic Power Calculations

Sample	Munis*	Orgs/ Muni*	Total Orgs*	DE Orgs**	Farms/ Org (Target)	DE farms**	Eff N Farms	Total N (Target)	Attri- tion Prob	Total N (Actual)	Farms/ Org (Actual)	MDES***
Proposed	30	7.6	227	2.65	7	3.4	177	1,596	0.1	1,773	8	0.42
Population	30	7.6	227	2.32	44	18.2	208	10,032	n/a	n/a	n/a	0.39

* These numbers are fixed. The number of organizations per municipality is the average per municipality based on data from FECOPROD.

** DE stands for design effect. With a sample of size N and a design effect of DE, the effective sample size ("Eff N") is N/DE. We compute DE as 1 + (M-1)*ICC, where M is the number of units per cluster and ICC is the cluster interclass correlation. Given the results of analysis of baseline data, we assume that organizations within municipalities have ICC=0.25, and farms within organizations have ICC=0.40. This implies a design effect of 1+(7.6-1)*.25 = 2.65 for the number of organizations per municipality, in which case the effective number of organizations is 227/2.65≈86. For the proposed sample, it also implies a design effect of 1+(7-1)*.40=3.4 within organization when we sample 7 farms per organization, in which case the effective number of farms per organization is 7/3.4=2.06. Putting these two figures together yields a total effective number of farms equal to 86*2.06≈177. The nominal number of farms would be 30*7.6*7=1596. Given 10% attrition we would want to sample 1596/.9=1773, or 8 farms per organization. Similar calculations yield the figures for a sample of the entire population.

*** The MDES is the "minimum detectable effect size," expressed in standard deviation units. Assuming lower ICCs will result in more power and thus smaller MDESs. The formula for the MDES is based on H. Bloom Eval Rev19(5):547-566. Given a balanced design, standardized outcomes (that is, standard deviation of 1), 80% power and 95% confidence, the formula is: MDES= $5.6/\sqrt{(\text{Eff N})}$, which yields $5.6/\sqrt{(177)}=0.42$ and $5.6/\sqrt{(208)}=0.49$ for the proposed and full population samples, respectively.

Conventionally, an MDE of 0.42 standard deviations is considered as a "medium" effect size, but in field experimental research, it would actually be quite large. Moreover, this power analysis is relevant to the producer level sample, but of course with the organization and municipality level data, we are even more limited.   Therefore, we take a number of measures to boost the power and information content of the study despite the limited sample size. There are four ways that one can boost the information context of a study without increasing sample size: (1) efficient methods for treatment assignment, (2) efficient methods of analysis, (3) having multiple follow-up rounds rather than a single endline, and (4) using efficient methods to combine analytical results. We describe how we apply these three approaches in turn.

First is pair-matched blocking at the municipality level. McKenzie and Bruhn (2009, p. 222) use simulations with real-world development data to suggest that such pair matching combined with stratum fixed effects can boost power for detecting small effects in a development field experiment by anywhere between about 11% to 70% with a sample size of 30.[2]

Second, our analysis will adjust for organization-level and farm-level covariates. These will be gathered from the data collected by our implementing partners (FECOPROD and CIRD). We can also collect at any time covariate information for things like subject's age and size of land holdings, in which case we may not need to carry out baseline surveys prior to the intervention. This is important with respect to third power-boosting strategy, described below.

Third, following the recommendations of McKenzie (2012), our design can use two rounds of outcome follow-up, one following the first year implementation of the budgeting intervention, and another following the second year.[3] Adapting McKenzie's results, we can characterize the power gains obtained by going from a simple difference in means to the combination of adjustment for pair-matching, adjustment for additional covariates, and using the average of two rounds of post-treatment follow-up measurements. Such a strategy can reduce the variance of the treatment effect estimator by a factor of

$$\frac{1 + \rho_y}{2} - R^2,$$

where ρ_y is the correlation in outcomes and R^2 is the coefficient of determination that characterizes the variance reduction from the matching and from regressing control or treated outcomes on covariates and matched-pair . Using $\rho_y = 0.5$, which would be conservative relative to the values presented by McKenzie (p. 215) for income and expenditure, and $R^2 = 0.4$, this would imply a reduction in estimator variance of about 65%.

Fourth, to test our evaluation hypotheses, we will use omnibus tests on sets of indicators that capture outcomes and patterns of interest rather than on one single outcome variable. In this way, we can evaluate if patterns of effects correspond to what we hypothesize. By combing a set of outcomes into a test, we can boost power. Methods include the construction of "mean effect" indices, inverse covariance weighted indices, as well as other combination statistics.[4] The extent of the power boost depends on the degree of correlation between the outcomes,

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[2] Bruhn, Miriam, and David McKenzie. 2009. "In Pursuit of Balance: Randomization in Practice in Development Field Experiments." *American Economic Journal: Applied Economics*, 1(4): 200-232.
[3] McKenzie, David. 2012. "Beyond Baseline and Follow-up: The Case for More T in Experiments." Journal of Development Economics 99: 210-221.

[4] For example, Caughy et al. (2015) reanalyze a campaign field experiment in Benin that involved two treatments and a control condition being randomly assigned over 24 clusters, and so only 8 clusters per treatment group. Single-contrast hypothesis tests yielded p-values of 0.22 and 0.03 for the two treatments, but a joint test that also accounted for the fact that the two treatments were varying "doses" of the same the underlying treatment yielded p<.01. See Caughy, Devin, Allan Dafoe, and Jason Seawright, 2015, "Global Tests of Complex Hypotheses: A Nonparametric Framework for Testing Elaborate Theories," Working Papers, MIT/Yale/Northwestern. See also Anderson, Michael L, 2008, "Multiple inference and gender differences in the effects of early intervetion: A reevaluation of the Abecedarian, Perry Preschool and Early Training projects," *Journal of the American Statistical Association 103*(484), 1481–1495; and Casey, Katherine, Rachel Glennerster, and Edward Miguel, 2012, "Reshaping Institutes: Evidence on Aid impacts Using a Preanalysis Plan," *The Quarterly Journal of Economics*, 127(4):1755-1812.

but even a 20% boost would be analogous to having an MDE of 0.22 standard deviations with a single outcome variable. We can put this into more tangible terms. The FECOPROD baseline survey measured whether farmers received of any material assistance from the municipality, (including municipal, producer organization, or buyers, etc., but excluding what FECOPROD is providing), showing that 37.0% had. A 0.22 standard deviation effect would amount to about a 10 percentage point effect -- that is, an increase from 37.0% access to 47.3% access.

Data Collection

Data collection entails four stages: the collection of baseline data, monitoring data, and endline data. For the baseline data, needed to design the randomization, the evaluation team will rely on pre-existing administrative data and farmer- and organization-level survey data collected by FECOPROD. Endline data will consist primarily of numerical data collected through surveys conducted after the intervention. In addition, the evaluation team will supplement survey data with midline and endline deliberation exercises, mayor interviews, qualitative interviews with project beneficiaries, and a review of administrative outputs such as municipal budget proposals. Monitoring data will consist of numerical and qualitative data collected by a monitoring assistant over the duration of the intervention.

Survey data collection will entail a diverse set of activities before, during, and after the field operations. Preliminary activities will include designing the survey instrument, the field manual with instructions for completing the questionnaire for the enumerators, the instruction manual for the supervisors, and a series of data quality control measures. Preparations also include designing the field operations strategy, hiring a survey team (office and field staff), training them, piloting the survey instrument, and preparing the materials for conducting the survey.

During and after the data collection activities include coordinating and supervising field operations, and receiving, checking, coding, digitizing, and validating the completed survey instruments.

We propose working with a single field coordinator and four survey teams, each composed of a supervisor and three enumerators. This team would be sufficient to complete the survey in a maximum span of eight weeks. The survey teams will arrive at the farm households, apply the survey instrument with a household member, measure the GPS coordinates of the farm, and collect observational data. The minimum daily survey quota per enumerator would be four surveys. The data will be digitized in the evaluation team-members offices in Asunción, where the completed instruments will be delivered two or three times per week. Data collection will continue while completed surveys are checked, digitized, and validated.

After data collection, they will be checked for consistency and analyzed as part of the impact evaluation.

Spillover

Potential sources of positive spillover include the following:

- Learning and adaptation effects, for example if municipal administrations in control municipalities learn about the effectiveness of practices in treatment municipalities, and take them up; such learning and adaption could occur at the level of farmers as well;
- Buyers' being induced to change their behavior as a result of the intervention, but then doing so with farmers in both treated and control communities.

Either type of spillover would bias our estimates of effects toward the null --- that is, it would make it difficult to distinguish between no effect or a small effect, on the one hand, and a pronounced effect that then spills over into control areas. Possible sources of negative spillover include the following:

- Departmental- or ministerial-level resources could be reallocated to favor treated areas based on their more effective budgeting procedures.

Given the small number of municipalities, we are very limited in what we can do to study such spillovers empirically. Therefore, our strategy will be (i) to *limit* the potential for such spillover by communicating closely with the implementing partners and adjusting plans as needed and then (ii) to use *qualitative assessments* to trace out any spillovers that occur despite these efforts to limit them. For the latter, we will investigate whether in control municipalities leaders were aware of activities in treated municipalities and whether they changed anything that they did on the basis of what they learned. We will ask buyers about any changes that they undertook as influenced by the intervention and whether these changes were applied to farmers in both treated and control municipalities or not. Finally, we will interview those involved in resource allocation at the departmental or ministerial level whether reallocations of the kind described above may have occurred.

EVALUATION TIMELINE

A provisional timeline for evaluation activities is as follows:

November-December 2015: Finalize Study Design with Implementation Subcontractor

The evaluation team is collaborating with CIRD, FECOPROD, and USAID in Asuncion to develop and revise their technical proposal for the governance intervention into a detailed work plan that is consistent with the impact evaluation methodology described in this document.

To design these interventions the evaluation team travelled to Paraguay for one week in November 2015 to carry out a design workshop.

March 2016: Select Municipalities and Farmer Organizations for Governance Intervention

The evaluation team will assemble municipal-level administrative data for the random assignment of municipalities to the treatment and, with USAID/FECOPROD's collaboration assemble preliminary farmer and farmer organization data for the random selection of farmer organizations.

April 2016-December 2017: Governance Intervention and On-going Monitoring

The evaluation team will develop an intervention monitoring instrument to be filled out by a monitoring assistant who will be employed for a two-year period on a part-time basis by the evaluation team. He or she will travel to the project locations to observe the interventions firsthand, to fill out the monitoring instrument, and conduct qualitative interviews. This will serve as an independent verification that the intervention is proceeding in accordance to the experiment design and also as a source of qualitative data on the interventions as they unfold. The evaluation team will review this data monthly, trouble-shooting any problems that arise in coordination with USAID, FECOCOPROD, and the governance subcontractor. In the second year of the intervention, the evaluation team leader will travel to Paraguay for one week to observe the intervention and conduct interviews with beneficiaries and key actors.

May 2017-June 2017 2018: Midline activities

The evaluation team will conduct a round of deliberation workshops, modeled on the pre-intervention workshops, to assess any change in farmers organizations' cohesiveness, inclusiveness, and civic mindedness. Interviews with mayors will also be conducted to assess the extent to which the participatory budgeting process has started to affect their view of the steps necessary to meet constituent interests.

October 2017-March 2018: Prepare and Administer Endline Survey Wave i

The evaluation team will pilot and revise the endline survey instrument, select the sample of farmers for the endline survey, and supervise the selection and training of a team of enumerators to be hired and managed by the data collection subcontractor. They will also monitor and trouble shoot during the survey process. The entire team will travel to Paraguay for 1 week during the survey period to conduct qualitative interviews with the treatment and control groups.

August 2018 – September 2018: Prepare and Administer Endline Survey Wave iI

As discussed above, for both power reasons and as a check on intermediate term sustainability, a second wave endline will be implemented six months after the first wave.

February-November 2018: Prepare and Present Impact Report

A research assistant will transcribe qualitative interview data. The evaluation team will develop an impact study outline and data analysis plan, analyze the survey data, and prepare an impact report that can be presented in Washington, DC and Asuncion, resources permitting.

DELIVERABLES

September 2016	Baseline Report
December 2018	Final Evaluation Report
December 2018	All Data sets and instruments used

PROPOSED STAFFING

NORC has selected a strong research team on the basis of a competitive procurement, consisting of a Principal Investigator and a Co-Investigator / Methodologist from NYU and a Co-Investigator / Data Analysis from E+E in Paraguay.

Principal Investigator: Gustavo Setrini, Ph.D. Assistant Professor of Food Studies at New York University's Department of Nutrition, Food Studies and Public Health. Prof. Setrini's research focuses on the political economy of agricultural globalization and rural development in Latin America and the Caribbean. He is currently writing a book on Fairtrade and Organic certification and smallholder farmer organizations in Paraguay's sugar industry which investigates the role of local governance in promoting small farmer upgrading in global value chains. His research other research has examined the impact of donor-funded, NGO-led small farmer development projects in Paraguay, Food System entrepreneurship in Puerto Rico, and cocoa quality upgrading in the Dominican Republic. He holds a Ph.D. in political science from MIT.

Co-Investigator, Methodology: Cyrus Samii, Ph.D. Assistant Professor of Politics at New York University's Wilf Family Department of Politics. Prof. Samii writes and teaches on quantitative social science methodology, with an emphasis on causal inference, and on substantive topics related to governance in contexts where formal institutions are weak, the political economy of development, and social, economic, and psychological causes of violent conflict. His work has appeared in the *American Political Science Review*, *American Journal of Political Science*, *Journal of Conflict Resolution*, *Journal of Peace Research*, *Journal of Politics*, and *Survey Methodology*. He has designed and carried out field studies in Afghanistan, Burundi, Colombia, Cote d'Ivoire, Indonesia, Israel, Liberia, and Nepal. He holds a PhD from Columbia University.

Co-Investigator, Data Analysis: Cynthia Gonzalez. Executive Director, E+E Economía y Estadísticas para el Desarrollo, Asunción Paraguay. Ms. Gonzalez is a labor market and impact evaluation researcher. She has over fifteen of experience as a research consultant and data analyst for academic institutions, international and donor organizations, and the Paraguayan government. She has designed impact evaluations for the Japanese International Cooperation Agency (JICA) and collaborated with Innovations for Poverty Action (IPA) on experimental impact evaluations. Ms. Gonzalez recently served as Vice Minister of Labor and Social Security. She holds a degree in economics from the University of Asunción and has graduate studies in economics at the University of the Andes in Colombia and training in quantitative research design from ORT University, Uruguay.