The Role of Rural Producer Organizations for Agricultural Service Provision in Fragile States

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Abstract

Using structural equation models and data from three provinces in the Democratic Republic of Congo, we assess the factors affecting external linkages among rural producer organizations and determinants of performance in agricultural service provision in a post-conflict setting. Environmental risks, membership in umbrella organizations, external assistance during set-up, and membership size are significant factors affecting external linkages. Measures of external linkages, members' financial contributions, management capacity, formal governance systems, and incidence of conflict events are statistically significant factors influencing performance. Results highlight the role of enabling environment for these grassroot organizations to thrive and benefit their communities.

Keywords: producer organizations; collective action; post conflict; agricultural services; structural equation model; organizational performance

JEL Classification: L25; L39; Q12; Q13

INTRODUCTION

Rural producer organizations (RPOs) have been argued to be an effective tool for solving problems in rural areas and promoting agricultural development. The empirical evidence of the effectiveness of RPOs on serving their members is scarce at best. Most studies on collective action and social capital are in the context of maintaining natural capital and public resources (see Madrigal et al. 2011; Agarwal 2010, 2009; Meinzen-Dick et al. 2002, 2001; Pretty and Ward 2001; Krishna 2001; and a synthesis by Poteete and Ostrom 2008; Agrawal 2001). Fewer studies analyze collective action in agricultural production, processing and marketing and rural livelihoods. Available studies consist mainly of case studies (e.g., Berdegué 2001; Jones 2004; Hellin, Lundy and Meijer 2007) and only a few analyze RPOs using quantitative methods (e.g., Karami and Rezaei-Moghaddam 2005; Bernard, Taffesse and Gabre-Madhin 2008; Bernard et al. 2008; Barham and Chitemi 2009; Bernard, de Janvry and Sadoulet 2009; and Bernard and Spielman 2009). These studies show mixed and varying results depending on the local context the RPOs operate in. This reflects the complexity of RPOs and the importance of accounting for diversity and uniqueness of the conditions they operate in for understanding how they function and perform. There is limited knowledge of RPOs' effectiveness and how they can best be supported and sustained. There are knowledge gaps in three key areas: (1) the type, nature, and form of organization that are most effective for serving their members; (2) the type of support, i.e., public versus private, and mix of approaches that are best placed to assist in the formation and maintenance of RPOs; and (3) the conditions necessary for ensuring their economic viability.

This paper analyses rural producer organizations in the post-conflict setting of the Democratic Republic of Congo (DRC), where rural organizations hope to bridge the gap in public sector provision of key productive and social services. Post-conflict countries are characterized by weak government institutions and provide an interesting context to study RPOs. RPOs and other community-based organizations tend to have a more active and leading role in promoting community development in this context. Analyzing how these organizations work will help understand the conditions, the institutional

environment, and the support needed for these rural producer organizations to realize their full potential in promoting community-driven development in the post-conflict setting.

The contributions of the paper are threefold. First, we provide new empirical evidence on internal and external conditions affecting RPOs effectiveness using a novel survey data set that has been collected exclusively for this purpose by the International Food Policy Research Institute in DRC. Second, we test a new set of potential determinants relevant to post-conflict and ethnicity-diverse countries, including incidence of conflict events, prominence of youth leaders, risk factors, and other territory- (or county-) level factors. Third, we apply a structural equation model to understand the functioning of RPOs. To our knowledge, this is the first quantitative analysis of RPOs in a post-conflict setting.

Our results suggest that a variety of factors can improve the functioning of RPOs. Improving the organizations' formal governance and management capacities as well as increasing the interaction with external organizations, such as service providers, donors or governmental agencies, seems to have a positive effect, while negative external events such as conflict incidence seem to hamper RPO performance. Whether RPOs engage with external organizations depends on a variety of factors including exposure to environmental risks, the establishment of linkages during the set-up, whether they are already part of an umbrella or higher-level organization, as well as their size.

The paper is structured as follows. A first section discusses the DRC context from a RPO perspective. A second section presents the data and discusses the measures and factors affecting performance within the context of the related literature. A third section describes the empirical model and the econometric issues that are addressed. After summarizing the results, a fifth section discusses the implications of our findings for DRC. A final section discusses policy implications from a broader perspective, and concludes.

THE DRC CONTEXT

The DRC has a huge agricultural potential with 80 million hectares of arable land and faces at the same time high food insecurity and severe child undernutrition. . If yields were to catch up with the global technological frontier, estimates suggest that DRC could feed around one-third of world's population (Tollens 2004). However, fifteen years of war have devastated a great portion of its human and physical infrastructure and its institutions, ranking it among the worst in terms of development and food security indicators in the world. In 2009, DRC was 182nd of 183 countries in business-friendly indictors in the World Bank's *Doing Business* report; ranked 176th of 182 countries in the UNDP's *Human Development Indicator* report; and last of 84 countries in IFPRI's *Global Hunger Index*. In 2007, nearly every second child aged below five in Bandundu and Bas-Congo Province (46 percent) and 23 percent of children in Kinshasa Province were stunted (DHS 2007).

While there has been much excitement that producer organizations and other rural institutions would play a more active and leading role in the provision of agricultural and rural services and solving problems in the rural areas, here is dearth of empirical evidence on the functioning, capacity and constraints of these RPOs in DRC. Two legislations exist to guide RPO operations: (1) 1949 decree on indigenous cooperatives, which was modified in 1956 to assign the cooperative structures to geographical coverage; and (2) 2001 law (Law 004) that provides legal provision to the establishment and operations of non-profit organizations or associations (Ragasa et al. 2012). Starting in 2008, the Agricultural and Rural Management Councils (*Conseils Agricoles Ruraux de Gestion* (CARG)), were set-up to provide a platform for policy dialogues and for linking RPOs with a broader set of stakeholders from the government, non-governmental organizations, universities, research institutes, and private sector (Ragasa et al. 2011). However, there are no empirical evidence on the implementation and enforcement of these legislations and management councils and no assessment on how RPOs are affected, constrained or supported by these initiatives. To date, numerous associations and organizations exist in DRC and they are in different forms, types and nature (e.g., farmer-based organization, women's organization, youth organization, local development group or committee, village association, union or federation), but there is no inventory of existing or registered cooperatives or associations available from any sources and no

information on what they do. Donors and international non-governmental organizations (NGOs) often require the rural population to be organized into these associations or groups for facilitating identification of beneficiaries and mobilization of partners in development projects. It has been argued that most of the existing RPOs were initiated by these external organizations and so lack ownership, which undermines their viability and sustainability (Van Hoof 2011; key informants' interviews). To date, there is limited understanding of the capacity and functioning of RPOs and how they can be effective channels for service provision in the rural areas and how they relate to the broader agricultural policy processes and institutional reforms in DRC. This paper addresses this major knowledge gap on the determinants and role of collective action in agricultural development in DRC.

DATA AND METHODS

This study uses survey data on 181 rural producer organizations in 145 randomly-selected villages in Bandundu, Bas-Congo, and Kinshasa provinces in Western DRC collected during August to October 2011 (Figure 1). This survey is complemented by a series of key informants' interviews with producers, community leaders, and government officials to further understand the functioning of RPOs and the environment in which these organizations operate in. The sample includes different types of RPOs, such as, development associations, farmer-based organizations, women's organizations, youth groups, cooperatives, and local development committees. Interviews were held with the chairperson or a knowledgeable representative of the RPO. All sample RPOs are involved in agricultural production and marketing as their main or secondary activity. About 63 percent of the sample RPOs have proof of formal registration with a public institution, are known by local political authorities, have written membership registry and financial statements, possess a written code of conduct, provide evidence of regular internal gatherings, and have financial contributions, as well as signs of active leadership. The majority of RPOs in our sample appear to be formally well established. RPOs vary in size, ranging from 7 to 3,700

members. About 8 percent have 10 or less members; the majority (70 percent) of the RPOs interviewed has11 to 50 members; 13 percent have 50 to 100 members; and the rest have more than 100 members. The majority (73 percent) of RPOs were set-up during the past decade and 23 percent are more than 10 years old (of which, 10 percent are more than 20 years old). Table 1 presents additional descriptive statistics of the sample RPOs.

[figure 1 and table 1 here]

(a) Performance indicators in the literature

The focus of the paper is on measuring performance of RPOs and understanding what factors help explain the variations in RPO performance. Whether RPOs are successful depends on the purpose and reason for setting-up the organization. For example, RPOs can be categorized based on their objective including: (1) production RPOs, which can be further categorized into production for consumption, also known as production-oriented RPOs, or production for markets, also called market-oriented RPOs; (2) processing RPOs; (3) marketing RPOs and (4) multipurpose RPOs. [1] Due to the different purposes of village organizations, there are different empirical measures of their outcomes and so their performance.

Table 2 summarizes the empirical evidence on the determinants of performance of rural producer organizations and agricultural cooperatives. The table shows that several measures have been used to proxy performance of rural producer organizations in the literature. For instance, Bernard, de Janvry, and Sadoulet (2009) use a dummy indicator for village organizations that are active at the time of the data collection, as measured by having a development project. Bernard et al. (2008) define performance of

[1] Production RPOs are formed mainly to facilitate access or provide credit and agricultural inputs to members. Processing FBOs are usually formed to support the processing of agricultural output. Marketing RPOs are typically to purchase agricultural output from farmers to sell it to traders or directly to final consumers. Multipurpose RPOs are those involved in one or more of the activities mentioned above and engage at the same time in livelihood protection activities, environmental management, or both. See Ragasa et al. (2012) for more details on these types of RPOs.

village organizations as the "effectiveness of servicing their members," which they measure by the percentage of members that are said to have benefited from these organizations.

[table 2 here]

Based on members' satisfaction, Karami and Rezaei-Moghaddam (2005) define performance of agricultural production cooperatives using a Likert scale measure based on members' satisfaction. Also in terms of marketing performance, a set of different measures have been used. Bernard and Spielman (2009) use a dummy variable if an agricultural cooperative has sold or not its members' output at a specific point in time. Barham and Chitemi (2009) construct a three-category marketing performance rating to evaluate market improvements through the project intervention based on the groups' own assessment. Bernard, Taffesse and Gabre-Madhin (2008) use two agricultural commercialization indices to measure whether agricultural cooperatives have been beneficial to their members: (1) the household-specific price compared to average price received by the households in the sample; and (2) the household-specific quantity of crops produced compared to average output produced and sold in the sample. Although not primarily focused on agricultural production, the literature on natural resource management is also concerned with explaining the effectiveness of groups in pursuing joint interests in the rural public good setting. Shiferaw, Kebede and Reddy (2009) use aggregate indices to measure the level and success of collective action in watershed communities in Andhra Pradesh, India. In particular, the authors use three measures of collective action: (1) existence of ground rules for cooperation (i.e., dimension of NRM covered by rules) and percentage of members respecting various rules, also called 'institutional capacity'; (2) effective participation, proxied by cash and labor contributions and maintenance funds mobilized per household and (3) organizational performance, measured by the proportion of well-managed user groups and the share of members attending committee and association meetings. For measuring success of collective action, the study uses the number of well-managed and jointly owned water management facilities (i.e., wells, check-dams, ponds, tanks, and woodlots) and the application of collective land

conservation practices, as well as measures of changes in household assets and community poverty profiles.

(b) Measuring the performance of DRC RPOs

The RPOs in our sample constitute a comparatively homogenous group: all RPOs are involved in agricultural production, although with varying extent, as one of their main activities. The majority of the RPOs states agricultural production as the main area of support they provide to their members. These RPOs explicitly aim to facilitate access to credit, training and information, inputs, and marketing of their products. About 29 percent of the RPOs explicitly mention agriculture, farming, livestock, aquaculture, or vegetable production, in their official names. A small fraction of the RPOs provide public goods and services, such as, road maintenance, bridge maintenance, public sanitation, and building canals as their main activity. Still, these RPOs also include agricultural production, marketing and/or livelihood-orientated activities as one of their activities. Eight cooperatives (4 percent of our sample) are multipurpose s, i.e., RPOs engaged in various activities, such as trading, credit provision, production, without a main/primary activity, and also facilitate access to agricultural inputs, credit, information and marketing to their members. Seven percent (12 RPOs) of the RPOs in our sample consist of local development committees. Key informants' interviews indicate that local development committees tend to focus on health and sanitation projects and activities, although they can have some activities related to agricultural production and marketing.

In this paper, we use the following measures to evaluate RPO performance: whether RPO have facilitated or provided inputs, technical advice, training or information on agricultural production and marketing, credit, and marketing or processing of agricultural produce. Table 3 summarizes the fraction of RPOs by the type of agricultural service they provide.

[table 3 here]

Despite pursuing relatively homogenous objectives, the table shows divergence in the actual provision or facilitation of agricultural services by the RPOs to their members. Half of the RPOs have facilitated group marketing; more than a third have facilitated or provided inputs; more than a quarter facilitated or provided technical information on agricultural production and marketing; and only one percent have facilitated credit to their members. About 29 percent of RPOs reported not having facilitated access or provided any of these four services. The variability in performance measures across the sample RPOs provides a basis for analyzing and understanding differences in their structure, functioning and capacity.

(c) Factors affecting performance

The factors that potentially explain RPO performance can be grouped into: (1) governance and management; (2) group composition; (3) membership commitment; (4) external linkage and support; and (5) community and agroecological factors. Table 4 shows the various indicators used for each of these factor groupings and the hypotheses based on findings from related studies. For governance and management, we used various indicators and principal component analysis (PCA)to estimate these indices[2]. In particular, we use an index for formal rules and legal personality; an index for participatory decisionmaking; dummy for management training received; index of internal interactions among members and management; and index on family influence in decisionmaking. Annex 1 shows the scoring coefficients used in the models. For group composition, we used the size of membership and indices representing the proportion of female in membership and leadership, proportion of youth in membership and leadership; and ratio of the number of distinct ethnicities and religions on RPO membership to RPO

[2] PCA allows clustering of variables on the basis of their correlations and variances and identification of variables based on the similar factors that they capture. The higher the loading of a variable, the more influence it has on the formation of the principal component score and vice versa. The advantage of using principal component score is that the new variables are not correlated and the problem of multicollinearity is avoided (Sharma, 1996, p. 79-481).

size. For membership commitment, we used membership fee and dummy for labor and land contribution. For external linkage and support, we used dummy for the presence of any external interaction; presence of external support during set-up and registration, and membership in higher-level umbrella organizations. For community and agroecological factors, we used the number of conflict events in the proximity of the RPO; rainfall variability and distance to market.

[table 4 here]

EMPIRICAL MODEL

Measuring performance of rural producer organizations is difficult given the diversity of organizations and objectives. Given the complexity and diversity of RPOs, there is often no single aggregate measure of their performance. While some studies have used a single measure based on RPO members' subjective scoring based on their satisfaction of performance, this approach can be problematic as subjective performance measures may deviate from the organizations' actual performance.

In this paper, performance is described as a latent variable that is reflected by various indicators. Performance is related to other variables, such as the governance structure and characteristics of the organization and the environment the RPO operates in, which may be related to a further set of variables. A statistical model that allows to model performance in this complex set-up is the Structural Equation Model (SEM). Structural equation models are multivariate regression models, combining elements of analysis of variance and factor analysis (Fox, 2002). They can be used to examine the effects of both manifest (observed) and latent (unobserved, inferred) variables (Hox and Bechger 1998; Maccallum and Austin 2000), both of which can be either exogenous or endogenous. SEM is an especially useful method where Ordinary Least Squares (OLS) regression analysis is impossible because multi-directional causality among variables violates the assumption of zero covariance between the residual and the independent variable (Fox 2002).

SEM consists of two parts: a measurement model and a structural model. The measurement model describes the relation between the indicator variables and the latent variables using factor analysis. The structural model relates the latent variables to each other and to covariates using path analysis. SEM analyzes the covariance structure of the data. When all variables are continuous, SEM employs confirmatory factor analysis to estimate the factor loadings in the measurement model. For each factor, one loading is fixed to one.

The SEM can be specified using a path diagram. The square boxes represent observed and ellipses the latent variables. Arrows indicate the paths and imply causation. Double arrows indicate covariance. A path diagram for our model can be written as:

[figure 2 here]

Structural Model. For translating the path diagram into an empirical model, we denote for each RPO *i*=1,..., 181 performance as η_i and write

$$\eta_i = \alpha_\eta + x_i\gamma + z_i\delta + \nu_i, \quad (1)$$

$$z_i = \alpha_z + \upsilon_i\xi + \upsilon_i. \quad (2)$$

The vector x_i comprises RPO-specific and location- and territory-specific factors explaining performance; α_η is a constant and ν_i is an idiosyncratic error term; z_i is a binary indicator of interaction with external organization. It depends on a sub-set of the variables in x_i and factors that do not directly affect performance, as captured by υ_i.

Measurement model: Our model has three indicators for the latent dependent variable. Indicator y_{1i} captures whether the RPO provided inputs, y_{2i} whether it facilitated joint marketing of members' products and y_{3i} whether any technical information and advice on agricultural production, processing or

marketing was provided to members. Due to limited variation on access to credit provided to members, we do not include it as an indicator. The measurement model can be specified as

$$y_{1i} = \alpha_{y1} + \lambda_{1\eta i} + \mathcal{E}_{1i}$$

$$y_{2i} = \alpha_{y2} + \lambda_{2\eta i} + \mathcal{E}_{2i}$$

$$y_{3i} = \alpha_{y3} + \lambda_{3\eta i} + \mathcal{E}_{3i},$$

where $\lambda_1 = 1, \forall\, i$. Arranging all indicators in a single vector *y*, we can re-write the model:

$$y = \alpha_y + \lambda\eta + \mathcal{E}. \qquad (3)$$

The parameters to be estimated can be grouped into the following categories: $\alpha = \ \alpha_\eta, \alpha_z, \alpha_y$ with five parameter estimates, $\beta = \ \beta, \gamma, \delta, \xi$ with sixteen and $\lambda = \ \lambda_2, \lambda_3$ with two parameter estimates.

A key difference to a standard SEM is that all indicator variables are categorical. In this case, the continuous latent response y_{ji}^*, with *j*=1, 2, 3, can be related to the observed binary indicator variables y_{ji} via a threshold model (Skrondal and Rabe-Hesketh 2004; Rabe-Hesketh, Skrondal, and Zheng 2011), where

$$y_{ji} \begin{matrix} 0 \ if & \leq \infty < y_{ji}^* \leq K_{1i} \\ 1 \ if & K_{1i} < y_{ji}^* \leq \infty \end{matrix}.$$

This paper uses Stata's "sem" and "GLLAMM" commands for estimation, following Kupek's (2006) review and summary of structural equation models with binary latent dependent variables. Results from these two approaches are compared.

RESULTS

Table 5 summarizes the results of the structural equation model using different estimation methods. The indicators of performance are strongly and positively correlated with each other, suggesting an underlying latent variable construct. The results suggest the model fits the data comparatively well, as the likelihood ratio test of comparing our models to a model that perfectly fits the data does not show significant differences (reported in the bottom of Column 2 and 4). Also, RMSEA and CFI statistics suggest a decent model fit. For identification purposes, the factor loading of the input indicator is fixed to one. Across all model specifications, the provision of advice y_2 explains much of the RPOs performance. In particular, increasing performance by one unit is expected to increase the likelihood of providing advice to the members by about 0.8 in the first two model specifications. In the "GLLAMM" model, the estimates suggest that a unit change in performance will increase the continuous latent response y_{2i} by 0.9. The significance of provision of technical advice and joint marketing suggest the complementary of the indicators of RPO performance. Key informants' interviews suggest that inputs or the lack thereof, is a much more important constraint in villages visited by the research team than extension or advisory services or marketing support.

[table 5 here]

(a) Governance and management

Results of the various models consistently show that governance and management are significant factors affecting performance among RPOs. The presence of formal governance rules and registration as a legal entity are positive and have a significant effect on performance. In-depth interviews suggest that registration enables RPOs to work on projects by international NGOs and donors and helped them interact with other organizations and associations at higher levels. These interviews also suggest that RPOs that are not registered were susceptible to harassment and undue fees by local authorities. These results are

consistent with the findings by Bernard et al. (2008) on community-oriented and market-oriented RPOs in Senegal.

The literature on RPOs is mixed in terms of the role of top-down versus bottom-up or participative decisionmaking approach. Some authors argue that participative governance is a mean of enhancing the sustainability and effectiveness of grassroot organizations as it empowers and better reflects the needs and priorities of its members (Atwood and Baviskar 1987; Bernard and Spielman 2009). In DRC, themeasures of participatory decisionmaking and internal interactions among RPO membership and leadership are not signficant. In contrast, management capacity, proxied by having received management training, has a positive and significant effect on performance. This reflects that it is the strength of management and leadership that may be more important than participative processes in the surveyed areas and RPOs in DRC. This observation is consistent with key informant interviews suggesting the lack of management and organizational skills among the major constraints faced by RPOs. Those RPOs that received management training reported that the training was very useful to them and to their organizations. It helped them interact more with other organizations and service providers. These results are also consistent with several studies highlighting the role of strong leaders to provide technical expertise, drive, and continuity on organizations and the role of strong leadership for better economic outcomes (e.g., Tendler 1983; Bianchi 2002; Salifu et al. 2010).

However, management committee members can favor their peers. Close social relations within the group may hinder the leadership's capacity to enforce rules of sanctions due to group pressure (Hellin, Lundy and Meijer 2007), which may ultimately hinder group effectiveness. Alternatively, close family ties within the group may foster solidarity, familiarity among its members and may, as such, facilitate collective action. In DRC, about 25 percent of RPO respondents said that there are close relatives, friends and family members in the RPO leadership and 42 percent of RPO respondents said these are present in the RPO membership. Still, we do not find evidence that family affect RPO performance and service provision in a significant way.

(b) Membership composition and heterogeneity

Commonly used measures of heterogeneity in membership are ethnicity, religion, and gender indicators. Group heterogeneity is strong in the DRC context. On average, there are 3 distinct religious affiliations and 4 distinct ethnicities of members in a single organization. These can go as high as nine distinct religions and 23 distinct ethnicities of membership in a single RPO. In terms of gender composition, female participation in RPOs is comparatively high. On average, females represent about half of RPO members and a third of RPO leadership[3]. However, the data on group heterogeneity in terms of ethnicity, religion, and gender were found to be statistically insignificant in explaining variations in RPO performance in agricultural service provision.

Empirical evidence in the literature show mixed findings. Higher management and transaction costs as well as complementarity of skills, ideas, and resources and diversification of risks are associated with more heterogeneous groups. Some authors suggest that more heterogeneous RPOs are weaker than those that are more homogenous in membership (e.g., Agarwal 2010 in the context of NRM). Similarly, Ratner et al. (2010) argues that shared norms and values are positively correlated with credibility and trust leading to more collective action. According to Bernard, de Janvry and Sadoulet (2009), social homogeneity at the community level can reduce management costs and facilitate group cooperation. These authors also find empirical support for the role of social homogeneity as proxy for community resistance to social differentiation in constraining the first market-oriented RPOs to emerge, but not the subsequent ones. In DRC, membership heterogeneity or homogeneity is not significant.; other factors are more important in explaining the variations in RPO performance.

[3] Interestingly, we find that if women are holding leadership positions, they are found to be likely to be treasurers. Studying also female participation in farmer groups, Gotschi, Njuki and Delve (2008) find that women are less likely to be members of the leadership and when they do, they constitute the treasurer position, which is stigmatized by trustworthiness in the Mozambique setting.

In this paper, we also added another dimension, which is the representation of youth. Youth, defined as being aged 18 to 35,[4]represent 42 percent of RPO membership and 20 percent of RPO leadership. The dominant political party in 1965-1990 had strong emphasis on organizing youth. Among others, this led to the creation of various youth committees such as for agriculture and security. This historical emphasis on youth is reflected in the prominence of youth groups in the villages. In the 145 villages surveyed, youth organizations seem to be the most frequent and most prominent type of organizations (68 percent of sample villages reported having at least 1 youth organization or youth's group).[5]

We hypothesize that youth are more active, more connected and more innovative and thus more youth in the leadership and membership will positively affect RPO performance. Simple mean comparison tests of the proportion of youth in RPO leadership and membership with external linkages, internal interactions, membership commitment and service provision suggest that more youth in the leadership is correlated with greater internal mobilization and membership commitment. However, we find that youth composition in leadership and membership is not statistically significant factor in explaining external linkages and RPO performance in service provision.

(c) Membership commitment

While membership composition and heterogeneity were found to have no significant effect on performance, membership commitment, as reflected in the financial member contributions, are strongly and positively correlated with performance. This finding is consistent with Meinzen-Dick (2009) and Cook and Chambers (2007), who argue that collective action is not automatic and it depends on the contribution and commitment by each and every member of the group to pursue their common interests.

[4] Since there is no official definition in DRC, this paper based the definition of youth on personal communication with Director Makabu (National Statistics Institute) and Director Ngonde (Statistics Unit of the Ministry of Agriculture, Livestock and Fisheries).

[5] Of these villages with youth groups, 58 percent has 1 youth's organization in the village; 28 percent has 2-4 youth's organization in the village; and the remaining has more than 4 youth's groups in a single village. This indicates that youth are quite organized and their groups offer a great opportunity to get them engaged in development and livelihood projects.

This is also consistent with the findings by Shiferaw, Kebede and Reddy (2009) on NRM in India. In our estimations, both a dummy variable for the presence of financial contribution and the amount of contribution are consistently significant whenever either one is included. About 80 percent of RPOs collect financial contributions from their members, which provide an average monthly contribution payment of 1,400 FC (roughly $1.50 or a daily wage of a government extension agent) (Ragasa et al. 2012). Half reported having members contributing in the form of labor; while about 15 percent reported land contribution from members. In-kind contributions did not show as statistically significant in explaining RPO performance in service provision.

(d) External linkages and support

The greater the interaction of RPOs with other actors (including other RPOs, NGOs, government agencies, extension agents, research institutes, and others), the greater the likelihood of agricultural support services provided to RPO members. This is consistent with the significance of grants provided by external partners on performance of community-oriented (CO) organizations in Burkina Faso and loans from external partners to performance of COs in Senegal (Bernard et al. 2008). Results are also consistent with the positive significance of loans and machineries from government on agri-coops in Iran (Karami and Rezaei-Moghaddam 2005). Results on DRC is contrary with finding by Barham and Chitemi (2008) in Tanzania suggesting that structural social capital in the form of membership in other groups and ties to external service providers are not significant factors in a group's ability to improve its market situation.

External assistance during set-up increases RPO performance. This is consistent with a general consensus in the literature that collective action may as well not emerge at all in the absence of external interventions (see Varughese and Ostrom 2001). Although, some authors suggest that more offensive organizations driven by collective entrepreneurship need to emerge spontaneously, in the absence of external interference of any kind. "When government and/or NGOs are involved, there is a danger that at the first signs of financial trouble, the outside agencies will be tempted to bail out the farmer

organizations" (Hellin, Lundy and Meijer 2007 p. 7). In DRC, with a post-conflict environment characterized by widespread lack of capacity and high levels of illiteracy among rural population, especially poor women, external assistance in setting-up groups, community awareness, and mobilizing collective action seems to be crucial in the performance and viability of these RPOs.

Interestingly, this result is not driven by the positive impact of set-up assistance on external interaction in general. External linkages are modeled as endogenous and are affected by environmental risks, membership in umbrella organization, external support during set-up, and the size of the RPO. The more variable rainfall is or more risky the environment is, the more likely that RPOs will have external linkages as a risk coping/management mechanisms. RPOs that are members of umbrella or higher level organizations are more likely to interact and link with other stakeholders, NGOs, and donors than those that are not members. RPOs that received external help to initiate activity are 6.9 percent points more likely to interact with external organizations than those that did not receive help. Also, as the size of the RPOs increases, the likelihood of interaction with other organizations and stakeholders increases, which could be due the greater membership linkages or better organizational capacity.

(e) Community and agroecological factors

The variable representing the incidence of conflict events is statistically significant, with negative effect on performance. Conflict events are defined as battles, riots, protests, violence against civilians, headquarters or base established, non-violent activity by a conflict actor, and non-violent transfer of territory (county).

Results on DRC are consistent with some findings of past studies. On the one hand, trust, for instance, is likely to erode when victims and perpetrators originate from the same communities or regions, thus opening the way for new acts of violence. Moreover, entire communities may be tagged as perpetrators or victims independently of their personal involvement in the violent events, which in turn is likely to increase polarization which has been shown to induce violence. Lack of trust within communities

may also result from displacement experiences. Montalvo and Reynal-Querol (2005) show that conflict erodes trust; and Hellin, Lundy and Meijer (2007) argue that mistrust between farmers may undermine cooperation. On the other hand, Cramer (2006), Bellows and Miguel (2008), Voors et al. (2010) argue that experiences of hardship can open new windows of opportunity in post-conflict situations, which suggests that victims or displaced people may actually be more likely to contribute to collective action and help the social fabric to be rebuilt in the post-conflict phase. Indeed, post-conflict settings in particular offer opportunities for organizational, institutional, and policy reform in the formal and customary land tenure sectors (Unruh 2002). One can also argue that conflict can lower trust and lead to greater transaction costs to cooperate. Furthermore, war-related displacement and the desire to live with people with similar characteristics may actually result in locally more cohesive populations.

The three provinces in DRC that were the focus of the survey of RPOs were not hardly hit by wars and riots over the past years as compared to the eastern part of the country. However, there is wide variability of the incidence of conflict events across villages and territories in these three provinces – ranging from 0 to 99 events. This enabled the modeling of the effects of variations in conflict incidence on variations in RPO performance. The frequency of conflict events in the proximity of the RPO is strongly and negatively correlated with poorer performance in agricultural service provision among RPOs. The inclusion of conflict variable reduces the effect and significance of formal governance systems on RPO performance, suggesting that there is not enough formal governance can do without a broader enabling environment for RPOs to thrive and provide benefits to its members.

The level of development and level of infrastructure can affect transaction costs and affects the ability to interact with service providers and other actors. Francesconi and Heerink (2009), Bernard and Spielman (2009), and Bernard, Taffesse, and Gabre-Madhin (2008) show that Ethiopian agricultural-coops usually have less than 100 members who are typically better-off socioeconomically and live in rural areas with high potential for agricultural production and commercialization. In DRC, proximity to markets and the level of development, proxied by distance to travel in nearest market, are not statistically

significant in affecting performance of RPOs. In other words, RPO performance is not systematically different for those that are located far and close to urban areas and large markets. It is the incidence of conflict that provide a disenabling environment for RPOs and directly affecting their performance.

Empirical evidence on environmental risk suggests positive correlation with collective action. Thompson and Wilson (1994) show that common property regimes are often associated with rainfall variability at the local level. Bernard, de Janvry and Sadoulet (2009) suggest that community's exposure to environmental risk can induce collective action and the need for sharing norms. Rainfall predictability or variability induces group mobilization because of the need to get insured (Bernard, de Janvry and Sadoulet 2009; Bernard et al. 2008). In DRC, performance is not directly affected by environmental risk but the effect is through the external interactions with external actors. More environmental risk requires more external linkages, which then results to greater performance.

CONCLUSIONS

This paper presents empirical evidence on the role of rural producer organizations and the determinants of their performance within a post-conflict and fragile environment. While the majority of these organizations are registered and have legal status, only a few have been effective channels for services, information, and training to their members. A majority of these organizations have limited interaction with other actors who are potential sources of services, information, technical support and market outlets. Using a unique dataset on 181 rural producer organizations in three provinces in DRC (Bandundu, Bas-Congo and Kinshasa), this paper statistically identifies the factors affecting external linkages and performance in agricultural service provision among rural producer organizations.

Findings suggest that conflict is a highly significant factor affecting RPOs performance. Higher conflict intensity means poorer performing rural producer organizations, suggesting that enabling environment in which these organizations operate is of crucial importance. While there is great hope that rural producer organizations will fill the gap in service provision due to weak public institutions, they are

not silver bullets. RPOs need an enabling environment, good governance, and security in order to perform well and benefit their members as they are expected to do.

The greater the interaction with other key actors, the greater the likelihood that services and information are provided to members through the RPOs. This finding suggests that while some authors romanticize the role of rural producer organizations in service provision especially in weak states, there is a need for a greater recognition of the importance of linking with other actors who are potential sources of services, information, technical support and market outlets. Policies and investments to help RPOs link more to each other and to other organizations will be critical. More importantly, from the supply side, strengthening the capacity of service providers and external actors (government, NGO, church-based, and private sector) will be needed to complement strategies supporting linkages.

Strong institutions and management systems are positively correlated with RPO performance. Especially in the context of weak capacity and institutions in fragile states, external support during set-up will be crucial. Management and organizational training among RPOs' key officials can be an important strategy for supporting these RPOs.

Membership commitment is highly and positively correlated with performance. Awareness-raising among members and management of the importance of financial contributions and capacity building for financial and organizational management are important strategies. More importantly, in order to sustain financial contributions from members and to sustain operations of RPOs, support will have to focus on their economic viability and increasing incomes for their members. Marketing training and extension approaches, including training on value chain approaches, will be an important strategy for supporting RPOs. Addressing broad market and private sector development in DRC is also a critically needed intervention to support RPOs' economic viability.

Further research is needed to understand the costs and benefits of supporting and promoting these rural producer organizations and the type and timing of support needed. Measures of performance used in this paper are own accounts of the leaders or representatives of RPOs, and this study can be complemented by information collected on satisfaction or accounts from the members on the value or

effectiveness of RPOs. Follow-up studies using in-depth qualitative assessment of selected RPOs will be useful in identifying what members really gain from these organizations, what the transaction costs are, what the quality of participation and feedback mechanisms are within RPOs, and factors that affect sustainability of these organizations. Assessment studies on impact of RPOs on their members' incomes, food and nutrition security, and welfare are other areas for future research.

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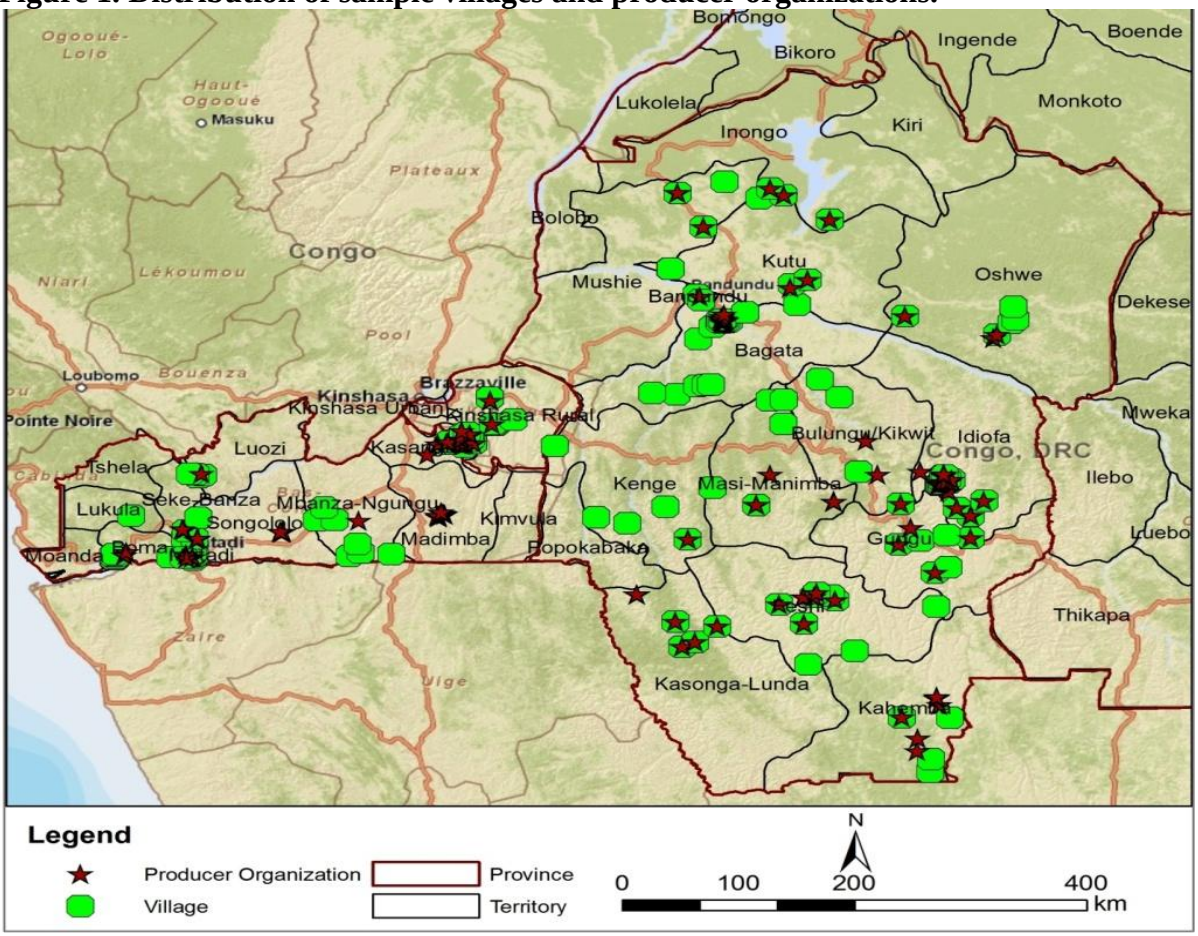
Figure 1. Distribution of sample villages and producer organizations.



Source: IFPRI Survey (2011). Note: Green squares indicate the location of sample villages and the red stars indicate the location of sample RPOs. As noted, there are multiple RPOs in a sample village, while some sample villages did not have any RPOs.

Table 1. Descriptive statistics of sample RPOs.

Characteristics	Ave.	Std. Dev.	Min.	Max.
Types of RPOs				
Village-level RPO /1	0.69	0.46	0.00	1.00
Age of RPO	9.06	8.97	0.00	57.00
Size of membership	117.90	435.76	7.00	3700.00
Association	0.49	0.50	0.00	1.00
Cooperative	0.04	0.21	0.00	1.00
Local development committee	0.07	0.25	0.00	1.00
Women's group	0.20	0.40	0.00	1.00
Youth group	0.10	0.30	0.00	1.00
Market-oriented	0.41	0.49	0.00	1.00
Governance and management				
Registered	0.78	0.41	0.00	1.00
Known to political authority	0.83	0.38	0.00	1.00
With code of conduct	0.82	0.38	0.00	1.00
With membership registry	0.92	0.27	0.00	1.00
With sanction rules	0.78	0.41	0.00	1.00
With financial statement	0.85	0.36	0.00	1.00
With bank account	0.16	0.37	0.00	1.00
Yearly meeting with members	0.92	0.27	0.00	1.00
Quarterly meeting with management	0.76	0.43	0.00	1.00
Management training received	0.55	0.50	0.00	1.00
Participatory decisionmaking	0.20	0.40	0.00	1.00
Family influence in management	0.25	0.43	0.00	1.00
Family influence in membership	0.42	0.49	0.00	1.00
Group composition				
Proportion of female in leadership (%)	33.46	32.49	0.00	100.00
Proportion of female in membership (%)	48.81	29.33	0.00	100.00
Proportion of youth in membership (%)	42.25	21.64	0.00	92.31
Proportion of youth in leadership (%)	20.25	24.85	0.00	100.00
Number of distinct ethnicities within RPO	4.23	3.00	1.00	23.00
Number of distinct religions within RPO	3.44	1.45	1.00	9.00
Membership commitment				
Financial contribution	0.80	0.40	0.00	1.00
Labor contribution	0.15	0.36	0.00	1.00
Land contribution	0.49	0.50	0.00	1.00
External linkages and support				
Member of umbrella organization	0.41	0.49	0.00	1.00
With any external interaction	0.76	0.43	0.00	1.00
Received help during set-up	0.53	0.50	0.00	1.00
Asked help during set-up	0.52	0.50	0.00	1.00

Source: Author's compilation based on IFPRI survey (August-October 2011). Note: /1 All are dummy variables except if otherwise indicated.

Table 2. Summary of past microstudies on determinants of RPO and cooperative performance.

Author	Country	Dependent Variable	Sample	Community and agro-ecological factors	Governance and management /1	Resources and Members' Contributions	Group composition and heterogeneity /2	External support
Bernard, de Janvry and Sadoulet (2009)	Burkina Faso	(1) Initial size of VO in the first stage; (2) index for leadership in the second stage; (3) (active at time of survey (dummy)	646 village-level organizations	**(1) Social heterogeneity within a village; (2) Rainfall variability;** (3) travel time	(1) index on whether leader is deciding on major decisions (+ non-first MO); (2) index on formal governance rules (+ CO, non-first MO)	None	None	None
Bernard et al. (2008)	Senegal and Burkina Faso (BF)	Percentage of members reporting having benefited from VOs	434 VOs and 8,114 HH in Senegal; 647 VOs and 11,998 HH in Burkina Faso	(1) rainfall, (2) ethnic fragmentation	**(1) Formal rules/codes (- MO, BF; + CO, Senegal); (2) professional management (+ MO, Senegal)**	(described in the context of externally-provided resources to VOs)	Size of membership	**Dummy for loan (insig); grant (+) ; training (-) in CO, BF; loan (+); grant and training (insig) in CO, Senegal**
Bernard and Spielman (2009)	Ethiopia	Cooperative has sold members' output in 2005 (dummy)	(1) 7186 households randomly drawn from 293 kebeles; (2) 161 cooperatives	Dummy variable for market access	**Participatory governance (insig); participation* heterogeneity (-)**	**log of the total landholding of members (+)**	**Log size of membership (-); greater heterogeneity (+);% Committee members who can read (insig)**	**Dummy for financial help at start (+);management training at start (+); assets (insig);**
Karami and Rezaei-Moghaddam (2005)	Iran	Performance rated by members (Likert scale (0-3))	52 agri. production coops; total of 260 members	**Rainfall (insig)**	**Years of manager's education (insig); perceived ability of managers (insig); job satisfaction of managers (insig); coop knowledge of manager (insig)**	**Value of building (+); Initial capital (+); land (insig); machinery (insig); Self-reliance (ratio of employees paid by coop to govt) (+)**	**Members' trust toward mgt (insig); perceived solidarity (insig)**	**Loan from govt (+); machinery from govt (+), aid (- insig)**
Barham and Chitemi (2009)	Tanzania	Marketing performance rating (0-2) constructed based on author's qualitative assessment of the testimonies from groups	34 groups; total of 388 members	**Reliable water source (+); distance to market (insig); road conditions (insig); land (insig); commodity types (- for staple crops)**	None	**Wealth ranking (insig)**	**Education (+); altruism, measured by intra-group trust (insig); ratio of male to female leaders (+)**	**Membership in other groups (insig); partner NGO (+ for TIP); linkage with other market actors (insig)**
Bernard, Taffesse and Gabre-Madhin (2008)	Ethiopia	Commercialization index: used to assess whether membership in coop enabled higher prices or higher output	202 kebeles (68 treatment where at least one coop can be found; 134 comparison where no coop exist); 2,532 households	None	None	None	None	None

Sources: Authors' compilation based on references listed in the References section. Note: 1/ Also called institutional capacity and includes managerial capacity, organizational capacity, and quality of leadership. 2/ Includes social structure or social factors within group or organization. Variables in bold letters are the focus in the papers reviewed. VO=village organizations; MO=market-oriented organizations; CO=community-oriented organizations. Other controls used: age (mixed results); main ethnicity dummies; region dummies; and village size. Bolded figures indicate source and principal focus of analysis.

Table 3. Distribution of RPOs based on facilitation of service provision to members.

Service provision and facilitation through RPO	% of RPO
(1) **Input provision to members through RPO**	38
(2) **Group marketing conducted through RPO**	49
(3) **Information, technical advice, training provided to members through RPO**	28
(4) **Credit provided to members through RPO**	1
All 4 of the above	1
Only 3 of the above	10
Only 2 of the above	23
Only 1 of the above	37
None of the above	29

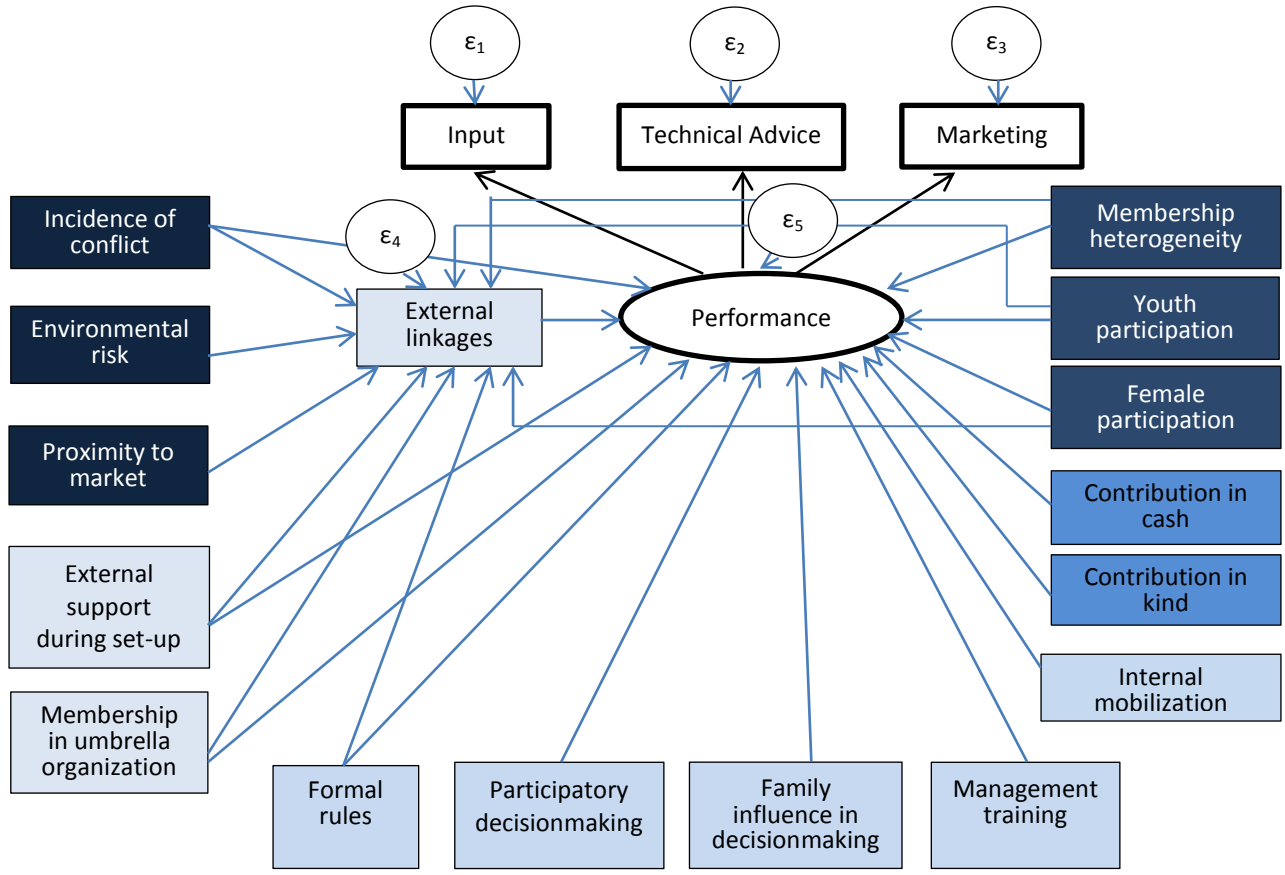
Source: Authors' calculation based on IFPRI survey (2011).

Table 4. Covariates used to explain RPO performance from literature review

Variable	Definition	Hypotheses for this paper	Findings from literature	Related literature
Governance and management				
Formal governance rules and professional management	RPO is registered, known in the local political authority, has code of conduct, has sanction rules for violation of codes, has membership registry, and has financial statements (index)	+/-	mixed	Bernard, de Janvry and Sadoulet (2009) and Bernard et al. (2008) had mixed findings depending on CO versus MO and depending country
Management capacity	RPO management received training (dummy)	+/-	mixed	Bernard and Spielman (2009) show that "committee members who can read" is insignificant; various indicators of management capacity used by Karami and Rezaei-Moghadda (2005)
Participatory decisionmaking	Both RPO membership and management decide on all 5 key areas (index)	+/-	mixed	Bernard, de Janvry and Sadoulet (2009) show mixed results depending on CO, MO, First MO or Non-first MO; Bernard and Spielman (2009) show insignificance, but negatively significant when it is interacted with group heterogeneity
Family influence in decisionmaking	RPO membership and management have several family members, close friends or relatives of the chairperson (index)	+/-	none	
Internal mobilization	Frequency of RPO membership and management meetings (index)	+	none	
Group composition and heterogeneity				
Gender composition	Women's group (dummy); proportion of women in membership and leadership (index); gender-balanced proportion in leadership and membership (25-75 percent and 40-60 percent are women) (dummy)	+/-	mixed	Barham and Chitemi (2009) show that ration of male to female is +; Agarwal 2001, 2009, 2010 show positive significance of female proportion in leadership
Youth composition	Youth's group (dummy); proportion of youth in membership and leadership (index); age-balanced proportion in leadership and membership (25-75 percent and 40-60 percent are youth) (dummy);	+/-	none	
Ethnicity/religious composition	Number of distinct ethnicities and religion as a ratio of size of membership (index)	+/-	mixed	Bernard, de Janvry and Sadoulet (2009) show mixed results depending on CO, MO, First MO or Non-first MO
Membership commitment	RPO membership has financial contributions (dummy); Amount of monthly financial contribution (CF)	+	+	Shiferaw, Kebede and Reddy (2009) show positive significance
External linkages and support				
Presence of external linkages	RPO interacted or met at least once in the previous year with any external actors (dummy)	+/-	mixed	Karami and Rezaei-Moghadda (2005); Bernard et al. (2008); and Bernard and Spielman (2009) show mixed results depending on the type of external support received; Barham and Chitemi (2009) show mixed results depending on the indicators used
External support during set-up	RPO asked and received support during set-up and code of conduct drafting (index)	+/-	mixed	Karami and Rezaei-Moghadda (2005); Bernard et al. (2008); and Bernard and Spielman (2009) show mixed results depending on the type of external support received
Membership in higher-level structures	RPO is a member or part of a higher-level, umbrella organization or federation (dummy)	+/-	mixed	Karami and Rezaei-Moghadda (2005) show insignificance
Community and agro-ecological factors				
Incidence of conflict	Number of conflict events within a distance of 2-hour travel time	+/-	mixed	Montalvo and Reynal-Querol (2005) show that conflict erodes trust; Cramer (2006, Bellows and Miguel (2008), Voors et al. (2010) argues that experiences of hardship can open new windows of opportunity in post-conflict situations.
Rainfall variability	Standard deviation of rainfall in the nearest station across 50 years	+/-	mixed	Bernard, de Janvry and Sadoulet (2009) show positive significance in dummy for representative of poor; Karami and Rezaei-Moghadda (2005) show insignificance
Market access	Travel time to closest market in the territory, to closest city with 100,000 population, and to Kinshasa (in minutes)	+/-	mixed	Bernard, de Janvry and Sadoulet (2009) show positive significance for MO but not CO; Barham and Chitemi (2009) show insignificance

Source: Authors' compilation based on various sources listed in the Reference section.

Figure 2. Coneptual model of factors explaining performance of rural producer organizations.



Source: Constructed by authors. Round with thick border represent the latent dependent variable. Rectangles with thick borders represent the indicators for the latent variable. Circles represent the error terms, which correspondents to the number equations being estimated simultaneously. For the covariates, the colors represent the difference groupings (from lightest to darkest shade): external linkages and support; governance and management; membership commitment; group composition and heterogeneity; and community and agroecological factors.

Table 5: Performance and external linkages of Rural Producer Organizations*

	SEM[a]				GLLAMM[c]		
	(1)	(2)	(3)	(4)	(5)	(6a)	(6b)
Structural model	z_i	η_i	z_i	η_i	z_i	η_i	η_i
External linkages and support							
External interaction		0.1789***		0.1789**		0.7320*	−0.4068
		(0.061)		(0.069)		(0.427)	(1.297)
Member of umbrella orga.	0.1077*		0.1108*		0.1343**		
	(0.061)		(0.066)		(0.062)		
Received help to initiate	0.0696**	0.0444	0.0718**	0.0397	0.0632*	0.2607	0.3219*
	(0.034)	(0.029)	(0.033)	(0.030)	(0.036)	(0.164)	(0.166)
Governance and management							
Formal rules	0.0130	0.0486*	0.0150	0.0530*	0.0155	0.3954*	0.3499*
	(0.035)	(0.029)	(0.034)	(0.032)	(0.036)	(0.208)	(0.193)
Interaction		0.0068		−0.0005		0.0117	0.0336
		(0.032)		(0.033)		(0.174)	(0.160)
Family influence in decisionmaking		0.0481		0.0472		0.2718	0.2217
		(0.044)		(0.049)		(0.259)	(0.241)
Received management training		0.1531***		0.1590***		0.9546***	0.9292***
		(0.053)		(0.058)		(0.346)	(0.339)
Membership commitment							
Contr. in kind		0.0056		0.0173		0.0883	0.0789
		(0.044)		(0.047)		(0.243)	(0.228)
Contr. in cash		0.0000***		0.0000**		0.0002**	0.0002**
		(0.000)		(0.000)		(0.000)	(0.000)
Membership composition and heterogeneity							
Female participation	0.0371		0.0377		0.0384		
	(0.028)		(0.032)		(0.030)		
Community and agroeco. factors							
Conflict incidence		−0.0021***		−0.0021*		−0.0156*	−0.0138*
		(0.001)		(0.001)		(0.009)	(0.008)
Market proximity	0.0003	−0.0001	0.0003	−0.0001	0.0003*	−0.0004	−0.0003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Rainfall variability	0.0138*		0.0141*		0.0165**		
	(0.008)		(0.008)		(0.008)		
Other controls							
Start year	−0.0036	−0.0024	−0.0037	−0.0025	−0.0035	−0.0154	−0.0177
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.018)	(0.017)
Log of size	0.0530**	−0.0277	0.0517*	−0.0229	0.0593**	−0.1075	−0.0550
	(0.025)	(0.024)	(0.028)	(0.027)	(0.026)	(0.144)	(0.150)
σ_{zy_2}[d]		−0.0426*		−0.0375**			
		(0.022)		(0.017)			
Measurement model							
α_{y_1}		5.0365		5.1963		29.3930	34.7507
		(6.503)		(6.478)		(35.418)	(34.264)
α_{y_2}		4.1582		4.4919		26.8774	31.7584
		(5.426)		(5.650)		(32.857)	(32.259)
α_{y_3}		4.8265		4.0687		16.3872	28.3882
		(6.159)		(4.855)		(20.102)	(29.623)
λ_1		1.0000		1.0000		1.0000	1.0000
		(0.000)		(0.000)		(0.000)	(0.000)
λ_2		0.8339***		0.8755***		0.9361***	0.9315***
		(0.205)		(0.170)		(0.351)	(0.357)
λ_3		0.9323***		0.7440***		0.5471**	0.8043**
		(0.349)		(0.198)		(0.252)	(0.380)
Likelihood ratio test							
$\chi^2_{ms}(38)$[e]				40.431			
Prob > χ^2				0.363			
$\chi^2_{bs}(62)$				163.117			
Prob > χ^2				0			
RMSEA				0.019			
Log likelihood		−7076.016		−7078.96	−89.64	−317.11	−318.98
N	181	181	181	181	181	181	181

* Structural Equation model estimates reported. Standard errors in parenthesis. *** p< 0.01, ** p< 0.05 and * p< 0.1. The model jointly estimates equations (1) and (3) of the main text.

[a] Column (1) and (2) report model estimates using Stata's SEM command. Model (2) adjusts the correlation matrix for tetrachoric correlation between the indicator variables and uses summary statistic data to fit the model.

[b] Column (4a) and (4b) report model estimates using GLLAMM. Column (6a) treats external interaction as exogenous. Column (6b) reports two stage results with Column (5) being the first stage.

[c] Linear probability model of external interaction.

[d] Covariance external interaction and market access.

[e] Model vs. Satured denoted by "ms" and Baseline vs. Satured denoted by "bs".

Annex Table 1. Scoring coefficients of indices used in the structural equation models.

Characteristics/Indices used	Formal rule	Contribution in cash	Contribution in kind	Internal mobilization	Participatory decision-making	External support during set-up	Family influence in decision-making	Female participation	Social heterogeneity	Youth participation
Registered /1	0.460	-0.111	0.039	0.013	-0.091					
Known to political authority	0.449	-0.113	0.038	0.033	-0.053					
Apply sanction rules	0.120	0.111	0.049	-0.049	0.346					
With written code of conduct	0.084	0.307	-0.249	-0.200	0.225					
With membership registry	0.089	0.448	0.072	-0.083	-0.369					
With financial statements	0.018	0.403	0.037	0.021	0.014					
With financial contribution	0.137	0.358	-0.104	0.289	0.110					
With land contribution	0.083	-0.137	0.655	0.105	-0.001					
With labor contribution	0.081	0.108	0.494	-0.128	-0.042					
RPO membership meeting in 2011	0.056	-0.037	0.065	0.591	0.136					
Quarterly meeting of RPO management	0.134	-0.047	-0.026	0.520	-0.184					
Participatory decisionmaking	0.077	-0.059	0.020	0.044	0.664					
Received help during set-up						0.567				
Asked help during set-up						0.567				
Family influence in management							0.636			
Family influence in membership							0.636			
Proportion of female on management (%)								0.581	0.087	0.122
Proportion of female on membership (%)								0.533	0.032	0.035
Ratio of the number of distinct ethnicities to RPO size								0.056	0.585	0.020
Ratio of the number of distinct religions to RPO size								0.055	0.584	0.014
Proportion of youth on management (%)								0.095	-0.036	0.656
Proportion of youth on membership (%)								0.031	0.009	0.591

Note: /1 dummy otherwise indicated.