

The Tragedy and Success of the Commons in Rural Ghana

Gian Nicola Francesconi

IFPRI, Development Strategy and Governance Division (DSGD),
West and Central Africa Regional Office (WCARO), Dakar-Senegal
g.n.francesconi@cgiar.org

Abstract.

The empirical evidence and simulations presented in this paper go in support of neo-institutional theory in claiming that the “commons” are not always associated with “tragedy”, but when the right externalities are in place they can be viable alternatives to exclusive privatization or inefficient public ownership. This is especially true in Ghana, which has, like many other African countries, a large and diverse population of farmer based organizations (FBOs), ranging from old-school agricultural cooperatives to more informal and fluid organizational forms. Through collective action, Ghanaian FBOs contribute to enhance and enforce local indigenous institutions defining and allocating property rights, as well as to improve social welfare, agri-business and access to public goods across rural communities. However, collective action does not always occur in FBOs. Whenever good governance or strong leadership are not in place, internal conflicts or collective shirking respectively arise to the detriment of organizational success.

Introduction.

African historians have long stressed the importance of ethnic/tribal institutions in development (Herbst, 2000). Political economists seem to agree on the limited capacity of African governments to enforce their laws and policies given that traditional/local customs remain dominant (Michalopoulos and Papaioannou, 2010; Gennaioli and Rainer, 2006). In particular, according to Platteau (2007) and Grischow (2006), in many African rural communities kinship remains the institution that defines property rights, especially for land.

Traditional leadership often plays a prominent role in enforcing indigenous institutions. This is particularly true in West Africa where pre-colonial chieftaincies, such as the Akan of Ghana, have maintained their power throughout colonial and post-independence periods (Belden, 2010).¹ As a result, many rural dwellers in Africa must rely on the goodwill of their traditional leaders for continued access to land and other resources; a condition that fuels clientelism and gender discrimination to the detriment of business and democracy (Bruce, 2004).

¹ http://en.wikipedia.org/wiki/Akan_Chieftaincy

Belden (2010) suggests that the clash of formal and informal institutions gives rise to strong exchange organizations in between rural tribes and the state. It follows that in Africa, an appropriate level of research to harmonize agricultural governance may be farmer-based organizations (FBOs) (see also Shiferaw et al., 2006). In rural West Africa in particular, FBOs are nowadays omnipresent and have managed to organize themselves into national and regional unions exercising considerable decision-power over policy-making processes and trade negotiations (Bernard et al. 2008a).

The rise of West African FBOs reflects also the interest of international donors, for whom FBOs represent preferential channels to access rural smallholders and influence national policy-making (Platteau, 2004). In Ghana, between 2000 and 2007, the World Bank alone allocated more than US\$9 million to the development of FBOs, through leadership training, credit, subsidies, technical advice and investments, as part of its Agricultural Services Sub-sector Investment Project (AgSSIP 2007a,b,c).

As a result of this convergence of international and national interests, the current population of Ghanaian FBOs is estimated to approximately 10,000 units, of which one third are expected to be old-fashioned agricultural cooperatives, while the rest comprises more informal and fluid organizational forms (Salifu et al., 2010).² Despite such a remarkable organizational architecture, Ghana appears to be still facing significant challenges in mobilizing rural collective action, which according to Schmid (2000) should instead be the main agenda to foster institutional innovation.

Collective action is when more than one individual is required to make an effort in order to achieve an outcome (Ostrom, 2004). African smallholders living in rural areas embark in collective action when they, for example: plant or harvest together; use a common facility for marketing their products; support each other financially through saving and credit schemes; maintain a local irrigation system or patrol a local forest or pasture to see that users are following rules; meet to decide on rules related to all of the above (Ostrom, 2004).

Numerous studies (Meinzen-Dick, 2009; World Bank, 2007; Karantininis and Zago, 2001; Rondot and Collion, 2001; Hoff and Stiglitz, 1993) argue that African FBOs are often dormant or rife with internal conflicts, while collective action remains scattered and volatile. Neo-institutional economists (Varughese and Ostrom, 2001) and organizational scholars (Cook and Chambers, 2007) seem to agree that collective action arises only when organizational conduct is aligned with membership structure.

The alignment between structure and conduct allows for collective action, while misalignment between the two allows for free-riding, defined as individuals that benefits from collective action without paying the costs. The free-rider problem can either induce collective shirking - members not exerting efforts to act collectively, i.e. the FBO is dormant - or conflicts - members exerting incompatible efforts to act collectively, i.e. the

² This figure has emerged from the comparison of four sources of data: (I) the DOC's database; (II) the proceedings of the 2006 and 2007 performance annual review workshops by MoFA; (III) a recent database built by MoFA based on the voluntary registration of FBOs and agri-coops; and (IV) the survey conducted in 2008 by the International Food Policy Research Institute and the Institute for Statistical, Social and Economic Research.

FBO is hyper-active - to the detriment of collective action (World Bank 2007; Cook and Chambers 2007; Hoff and Stiglitz, 1993).

Why some FBOs are affected by shirking and others by conflicts remains, however, unclear in both institutional and organizational literature. And shortfalls in the understanding of internal and external differences between dormant and conflict FBOs prevent the development of reciprocal coping strategies. To address these knowledge gaps the following analysis build upon extensive field-work carried out in the first quarter of 2010 and involving 500 FBOs throughout rural Ghana (study sites are depicted in Figure 1 in the Appendix).

Field activities involved: i) a structured digital questionnaire uploaded onto PDAs, which allowed to collect quantitative data through 500 focus groups, each one including at least 6 FBO representatives; ii) a paper-based, open questionnaire, which allowed for the collecting of qualitative information through discussions with the same 500 focus groups, as well as through individual interviews with 3 representatives, randomly selected from each FBO; and iii) a simulation/game played with the latter 3 representatives per FBO, but only with 100 FBOs.³

Theoretical Framework.

The structure-conduct-performance (SCP) pframework (Bain 1951) is a pillar of industrial organization theory. The SCP paradigm states that the “structure” of a given industry - defined by the degree to which an industry is dominated by a small number of firms or made up of many firms - determines whether the industry’s “conduct” is collusive or competitive, and this in turn explains the “performance” of the industry in terms of overall profitability and rate of innovation (Bannock et al. 2003; Kadiyali et al., 2001).

Due to complexity in defining the boundaries of an industry, SCP paradigms are often criticized for pooling different firms under the same industry and disparate industrial clusters in the same framework, affecting comparability and thus the meaningfulness of results. To address this criticism researchers have commonly resorted to control for geographic, temporal and governance fixed effects in their analyses (Boulding and Staelin, 1990, 1993; Prescott et al., 1986). Although the introduction of fixed effects contributes to controlling for exogenous determinants of inter-cluster variability, the problem associated with the hybrid and fluid nature of both industries and firms is arguably deeper, comprising also endogenous intra-cluster variability.

In addition to a detailed specification of potential geo-temporal fixed effects in our empirical model (see equations 2 and 3 below), and the consequent fragmentation of the empirical model on the basis of alternative governance regimes (see equation 4 below), we argue that our SCP framework is also substantially immune to endogenous variability. This is due to the fact that we apply the SCP paradigm at a more micro-level,

³ Field activities were carried out by a team of 17 bright and motivated MSc students selected from Accra, Tamale and Kumasi Universities, carefully trained and supervised by the authors of this paper.

focusing on clusters of farm households, namely FBOs, as opposed to industrial clusters of firms.

We argue that FBOs are more suitable units of analysis based on self-selection arguments. Self-selection means farm households must decide whether they want to join an FBO or not, as opposed to firms for whom the option for entrance in an industrial cluster is less explicit. Since participation is usually voluntary, FBOs are expected to pool farm-households with similar preferences and motivations. It follows that comparability issues are expected to be less relevant between farm-households belonging to the same FBO if compared to an industrial cluster whose firms are arbitrarily selected by researchers.

Another important concern associated with the SCP paradigm regards difficulties in establishing causal relationships between organizational structure, conduct and performance (Kadiyali et al., 2001). This means that when these three domains are described on the basis of cross-section data referring to one point in time it is difficult, if not impossible to establish any cause-effect relationship between them. Hence in most cases the SCP framework serves purely to describe correlations between organizational structure, conduct and performance.

One solution to this problem is to use instrumental variables. However, good instruments are hard to find in cross-section surveys and modern economic theory is raising growing concerns about the validity of instrumental variables (Duflo et al., 2007). The analytical solution proposed in this paper is based on both game theory and the use of re-called data. Game theory is applied to design the game described in the next section, which aims to simulate the causal effect of organizational structure on conduct.

Re-called variables, reconstructing the bargaining process that led to FBO establishment, are instead used to specify an empirical model that isolates the effect of organizational structure on performance. In this way, gaming is expected to complement modeling techniques (and vice-versa) in providing a holistic understanding of the cascade of events in this structure-conduct-performance framework, which is depicted in Figure 2 (in the Appendix) and explained in further details in the following two sections.

Game Design.

The design of this game draws upon consolidated risk and dictator game theory (see Kugler et al., 2007; Bolton et al., 1998; Binswanger, 1980), in order to capture collective behavior as well as its structural determinants. In particular the scope of this game is to estimate the effect of individual members' preferences on collective decision-making. To overcome obvious complexity in capturing heterogeneity in members' preferences and resulting collective choices in real life scenarios, this game creates a constant, artificial setting that simplifies and standardizes the options available.

Although specific institutional arrangements characterizing organizational conduct in real life will not be possibly reckoned, the game is thought to dig out major trade-offs underlining unobservable institutional design. In particular, the collusive/competitive trade-off defining organizational conduct in classic SCP paradigms is here re-defined on

the basis the relationship between the degree of heterogeneity in members' preferences with regard to risk taking/aversion and the position generally taken by an FBO vis-a-vis equity-efficiency dilemmas regarding the way to allocate property rights among members.

The steps to play the game are the following:

- 1- Randomly select (through ballot) 3 members of an FBO. Make sure that each participant sees who else is participating in the game.
- 2- Split the 3 participants so that they can play the game without observing or communicating to each other.
- 3- Tell them the game will be played twice and in both cases they could gain real money but will not lose any. The potential monetary gains are set to be significantly lower in the first game than in the second one, in fact the first game is meant to serve as a trial.
- 4- Ask each of the participants to pick one of the following risk choices (Table 1) and make sure they understand the potential gain associated with each choice, given the result of the coin toss (and given that tail is the positive result):

Table 1: Risk choices

First Game:	Second Game:
Choice 0: head=0.5 GHC & tail=0.5 GHC	Choice 0: head=2.5 GHC & tail=2.5 GHC
Choice 1: head=0.45 GHC & tail=0.95 GHC	Choice 1: head=2.25 GHC & tail=4.75 GHC
Choice 2: head=0.4 GHC & tail=1.2 GHC	Choice 2: head=2 GHC & tail=6 GHC
Choice 3: head=0.35 GHC & tail=1.25 GHC	Choice 3: head=1.75 GHC & tail=6.25 GHC
Choice 4: head=0.3 GHC & tail=1.5 GHC	Choice 4: head=1.5 GHC & tail=7.5 GHC
Choice 5: head=0.2 GHC & tail=1.6 GHC	Choice 5: head=1 GHC & tail=8 GHC
Choice 6: head=0.1 GHC & tail=1.9 GHC	Choice 6: head=0.5 GHC & tail=9.5 GHC
Choice 7: head=0 GHC & tail=2 GHC	Choice 7: head=0 GHC & tail=10 GHC

GHC=Ghana Cedi (1USD = 1.45GHC)

5. Toss a coin in front of each participant, show them the outcome (head or tail) and confirm their corresponding pay-off.
6. Before handing out the money, ask each participant whether he/she prefers to add his/her payoffs to those of the other participants (unknown) and then share the total amount equally (equity-based decision), or if he/she prefers to receive the exact payoff corresponding to his/her risk-choice (efficiency-based decision).
7. Share the payoff according to the equity-efficiency decision indicated by the majority (at least 2) of the participants.

Examples of the information obtained through gaming are presented in Tables 2 and 3 (in the Appendix). In particular, the two variables to be considered for analysis are: a)

the standard deviation, σ , in the risk choices made by the three members of each FBO;⁴ and b) the outcome of the votes expressed by the three members with regards to equity-efficiency dilemma, Y , where a pro-efficiency vote take a value of 0 and a pro-equity vote takes a value of 1.

The simulated effect of σ on Y for an FBO i is estimated using an Ordered Logistic regression (1). This is justified by the discrete and ordered nature of the dependent variable, which varies from efficiency-based consensus (value of zero) to equity-based consensus (value of 3), including the intermediate values of 1 (when efficiency voters are the majority), and 2 (when equity voters are the majority).

$$Y_i = f(\sigma_i, y_i) \quad (1)$$

It is important to note that both σ and Y specified in this regression are computed from the results (exemplified by Table 3 in the Appendix) of the second game, since the first game is thought to be a trial. However, the right hand side of regression (1) includes also the variable y , which specifies the outcome of members votes in the first game (exemplified in Table 2 in the Appendix). We do so to control for behavioral bias that may emerge because of the history of associated with the first game.

Overall, this game is expected to provide “realistic simulations” of the effect of organizational structure on conduct. The major discrepancy with real life scenarios is that game participants cannot possibly lose any of their own money and wield only a limited amount. Besides, the game is played with three members randomly selected from 100 FBO, which is a clear simplification of FBO reality in Ghana.

It is also important to note that in real life scenarios not all decisions are taken democratically (although most decision are indeed taken democratically in Ghanaian FBOs, especially important ones) since the process of gathering members and voting can be very time-consuming, especially for large FBOs. Finally, this game reproduce only individual risk, since the coin is separately tossed for each game participant. Behavioral responses to collective risk (i.e. environmental, policy or market events that can affect or favor all members of an FBO at the same time) are not taken into account.

Empirical Model.

The level of reality reproduced through gaming can then be tested against the following empirical model, which aims at estimating the causal relationship between organizational structure and performance in three analytical steps. First, we reconstruct the start-up process underlying current organizational structure. In other words, we explain the structure, S , of an FBO i , on the basis of re-called information referring to the start-up bargaining process, b , as well as geographic, l , and temporal, t , fixed effects:

⁴ $\sigma_i^2 = [(x_{1i} - \mu_i) + (x_{2i} - \mu_i) + (x_{3i} - \mu_i)] / 3$
 $\sigma_i = \sqrt{\sigma_i^2}$

where $x_{1,2,3}$ are the risk choices (0-7) of the three members of an FBO (i), and μ is their average risk preference.

$$S_i = f(b_i, l_i, t_i) \quad (2)$$

where S is measured by membership heterogeneity and size. While membership size can be simply set equal to the number of members per FBO, indicators of membership heterogeneity merits further discussion. Following Varughese and Ostrom (2001), membership heterogeneity can be expressed by differences in location, in wealth disparity and socio-cultural characteristics here computed as Herfindahl concentration indices: $(H_i = \sum_{n,i} f_{n,i}^2)$ where f is the share of members from sub-group n in FBO i .

It follows that in a perfectly homogeneous organization $H=1$, while in a perfectly heterogeneous organization $H=1/n$. Differences in location are expressed by sub-groups corresponding to different rural villages; wealth disparity is based on sub-groups defined on the basis of landholding (from landless to more than 12 acres of land) and socio-cultural differences comprise sub-groups distinguishing males and females, Muslims and Christians, major age categories (from less than 30 to more than 60 years old), ethnicities and education levels (from illiterate to tertiary education).

Geographic fixed effects refer to the demography, agro-ecology and public goods (infrastructure, services, institutions) characterizing the district where a FBO is located.⁵ Temporal fixed effects are captured by the age (or the year of establishment) of an FBO. While b explains whether an FBO was established through a top-down or a bottom-up process, whether eventual top-down processes were driven by government or NGOs, and whether eventual bottom-up processes emerged upon grass-root movements or were driven by rural elites.

It may be argued that the use of re-called information of the type discussed above entails a large margin of error in the data due to respondents' difficulties in re-calling past events. However, it is also true that respondents are usually more comfortable to talk about the past than the present, simply because the past cannot be changed while the current situation could influence the allocation and type of future support. The use of re-called variables is further justified by difficulties in identifying adequate instrumental variables.

It should be noted that Equation (2) is estimated by eight OLS regressions since the eight indicators of organizational structure described above are all continuous and normally distributed. In the second step, the predicted values, \hat{S}_i , from equation (2) are used to explain organizational performance, P , given spatial and temporal fixed effects:

$$P_i = f(\hat{S}_i, l_i, t_i) \quad (3)$$

In equation (3), the identification of suitable indicators for the dependent variable is far more complex than in equation (2). In fact, SCP models are commonly criticized for their performance indicators since organizations' added value, as well as their capacity to enable innovation are somewhat hard to measure (see Kadiyali et al., 2001). Our model is not immune to this complexity which we overcome using two qualitative indicators. The first is an indicator of the degree of collective action, similar to that developed by Varughese and Ostrom (2001).

⁵ A district is smaller than a region and larger than a community, village or town.

This indicator ranges from zero to two, providing a qualitative assessment of the FBO based on the existence of a collective bank account, constitution or by-laws, official registration with a public institution (MoFA, DEC, District Assembly or Chamber of Commerce), and up to date book-keeping; the frequency of general meetings and attendance level; the amount of collective capital and assets available; as well as the number and effectiveness of the services provided to the members. A value of zero corresponds to negligible collective action, while a value of 2 corresponds to clearly successful collective action. In between cases, taking a value of one are instead associated with indeterminate levels of collective action.

The second qualitative indicator is developed in order to capture the intensity and type of collective action problems. Unlike the previous indicator which is based on evidence obtained through focus group discussions with FBOs representatives (at least 6), this indicator is based on individual responses collected from 3 members, randomly selected from each FBO, at the question: *If you had to pick one problem you would like to solve in your FBO, what would that be?* The resulting indicator varies from 0 to 3.

A value of 3 means that all the respondents indicate internal issues as the number one problem to be solved; a condition that suggests the presence of serious conflicts within an FBO. A value of zero refers instead to an FBO where all three respondents indicate that external problems, associated with limited access to aid, subsidies, credit, training or business partners, are the priority for improvement; a condition that typically reflects severe collective shirking (i.e. passive, defeatist behavior). Finally, values between 1 and 2 correspond to intermediate scenarios.

Finally, Equation (3) is separated into different sub-samples in order to isolate the effect of alternative governance regimes, g : led by either government or civil society; characterized by top-down or bottom-up, bilateral or multilateral approaches (with the mediation of an independent third-party); and based on technical training, leadership training, subsidies or credit.

$$P_i = f(\bar{S}_i, l_i, t_i | g) \quad (4)$$

Both equation (3) and (4) are estimated using Ordered Logistic Regressions since both qualitative indicators capturing organizational performance have discrete and ordered value ranges as described above.

Descriptives.

This section presents some snapshots of the structure, conduct and performance of the 500 Ghanaian FBOs in our sample. With regard to organizational performance, the qualitative information available shows that the average FBO in our sample is characterized by a low degree of collective action, equal to 0.8 (see Figure 3) and it appears to be more prone to problems associated with shirking than conflicts (see Figure 4), since the average value of the indicator of collective action problems is 0.5 (which is much closer to zero than to 3).

However, it is important to note that the indicator of collective action problems might be consistently biased towards zero, since respondents have an incentive to call for

external help, rather than to highlight internal problems, when interviewed by development agencies. Yet this bias is expected to be uniformly distributed across the sample, and although the descriptive figures presented in Figure 6 could be misleading, the empirical results below should not suffer from it.

Figure 3: Break down of collective action levels

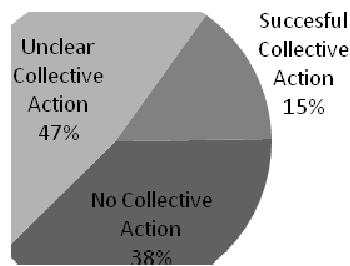


Figure 4: Break down of collective action Problems

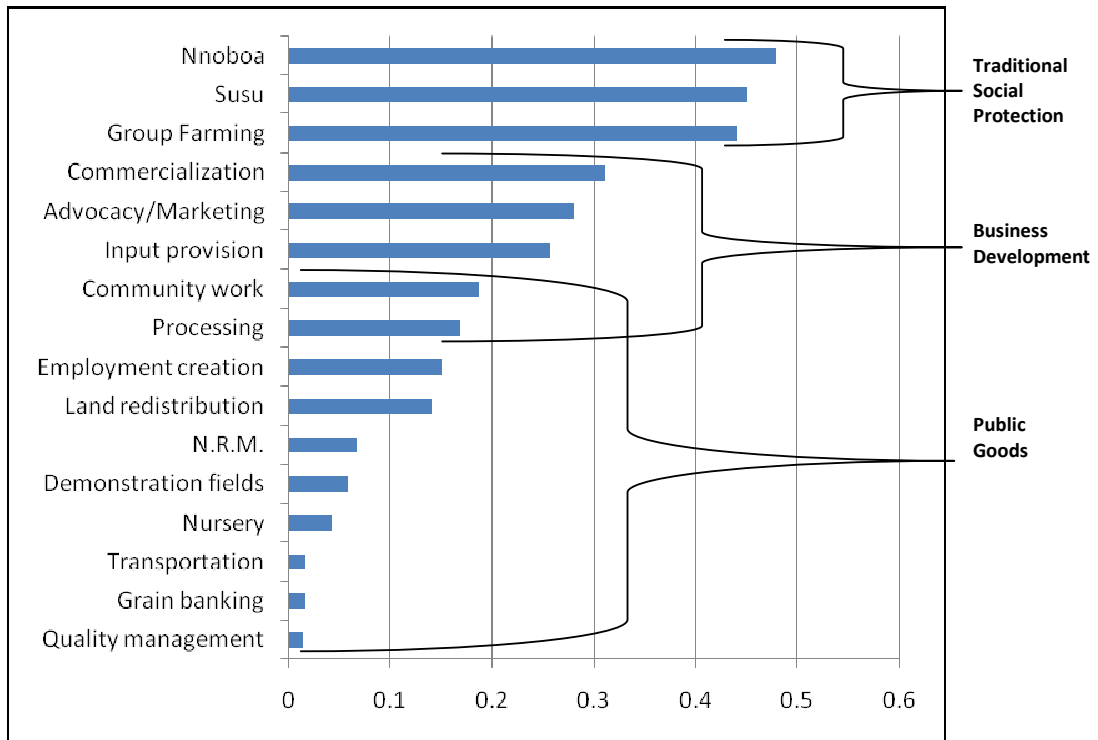


The description of organizational conduct entails more complexity due to difficulties in capturing collective behavior. The conduct of an FBO depends on collective customary behaviors, or institutional arrangements, which can vary significantly across space and time. Nonetheless, the qualitative information gathered through our survey allows us to broadly describe the typology of collective services provided by the FBOs under examinations, as well as the agricultural commodities involved.

The average FBO in our sample provides 3 different services to its members and deals with 2 agricultural commodities. The three most popular collective activities, observed in 40-50% of the FBOs in our sample (see Figure 5) involve mutual labor support for farming, traditionally known as *Nnobo*; collective saving schemes for insurance and

credit purposes, traditionally named *Susu*; and group farming on one plot of land collectively owned or managed. Interestingly, all these are traditional collective activities, commonly observed since pre-colonial times and mainly geared towards food security and social welfare.

Figure 5: Collective Activities undertaken by Ghanaian FBOs



The second most popular set of collective activities, observed in 25-30% of the FBOs (Figure 5) includes instead output commercialization, advocacy and marketing strategies, as well as input provision, which are rather economic responses to market opportunities. Collective processing (manufacturing), although observed in less than 20% of the FBOs, can be also included in this second set of activities.

Community work (building schools, clinics, etc.); employment creation, land redistribution, natural resource management (N.R.M); the set up of demonstration fields (to show case modern agricultural technology); plant nursing (especially for fruit trees); transportation services (for people and goods); grain banks (strategic local reserves of staple crops for smoothening rural consumption and revenues); and quality management and control practices (grades, standards and third party certifications such as Fair Trade, Organic, etc.); can all be pooled into a third set of collective activities, observed in 1-19% of the FBOs (see Figure 5), and aiming to provide public and regulate access to public (open-access) goods.

Figure 6: Agro-commodities in Ghanaian FBOs

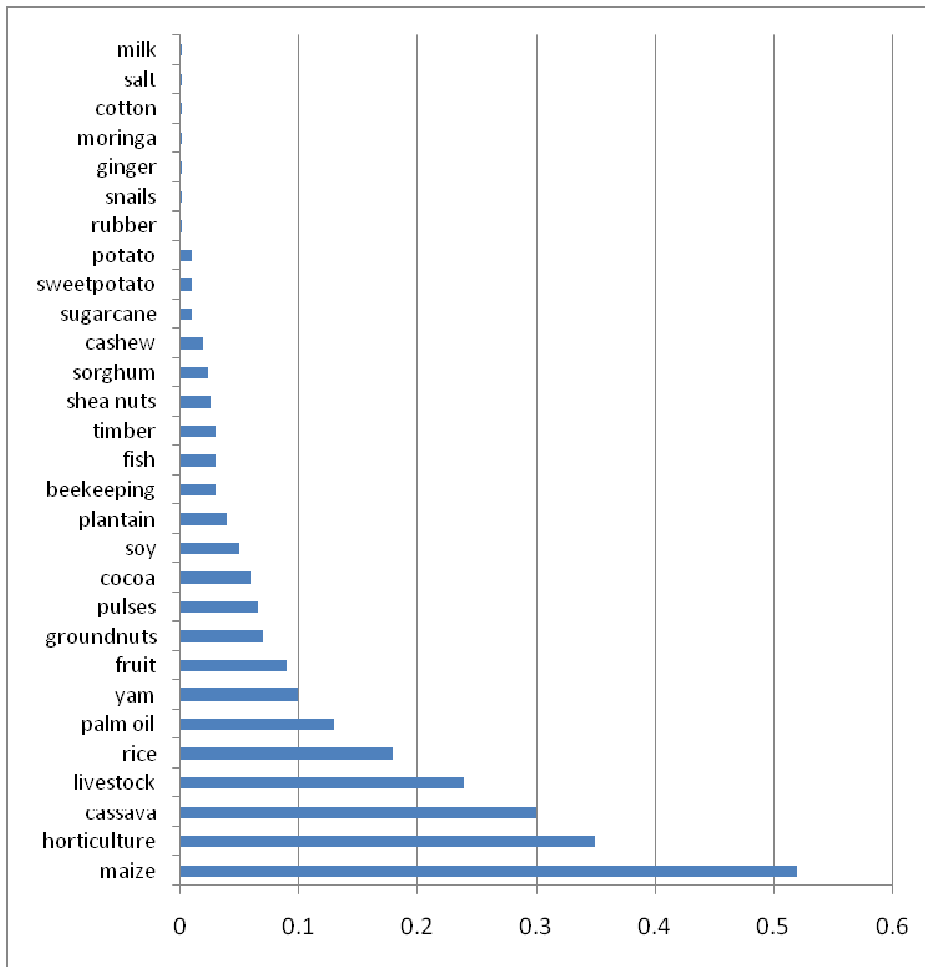


Figure 6 shows instead the type of agricultural commodities produced, processed, bulked or marketed by the FBOs in our sample. It is particularly interesting to note how maize is found in more than 50% of the FBOs, horticulture and cassava in more than one third of the sample, and livestock and rice in approximately one FBO every four.

The quantitative data gathered in our survey (Table 4 in the Appendix) can be instead used to describe organizational structure and some of the most prominent characteristics of the external environment in which Ghanaian FBOs operate. Among many other things, the average FBO in our sample has 36 members and is 7 years old. Membership tend to be rather homogeneous (>0.5) with regard to location, wealth, as well as most socio-cultural aspects, with the only exceptions of education and age (<0.5).

Table 4, shows also that only 34% of the FBOs declared to have the possibility to purchase land, meaning that for 66% of the FBOs land has no price whatsoever (i.e. 0 GHC). Finally, it should also be noted that almost no variability is observed for access to

telephone networks (average value almost 100%) and in the distance between FBOs' headquarters and the closest church/mosque/shrine (average value almost zero).⁶ These findings confirm the widespread perception that Ghana is a country characterized by universal access to wireless ICT and religious institutions (unlike financial market and government institutions).

Simulations.

This section presents the results of the games described above. First of all, we observe that the average risk choice per FBO is equal to 3.7, which appears to be very close to the median risk choice (3.5) for this game, meaning that the average FBO resulted to be risk-neutral. Second, we show in Figure 7 that the distribution of this variance is not normal, but half-normal, with the highest frequency on the left hand side, and the lowest on the right hand side, meaning that FBOs with homogeneous risk preferences are more common than FBOs with heterogeneous preferences.

This finding is in line with the statistics presented in Table 4 in supporting the widespread perception that African FBOs tend to pool similar individuals (see also Francesconi and Heerink, 2010; Bernard et al. 2008b), on the basis of kinship-based institutions (Bernard and Spielman, 2009; Platteau, 2007; Grishow, 2006).

Also the distribution of the outcome of FBOs' equity-efficiency dilemmas is half-normal (Figure 8), with the smallest frequency recorded for FBOs in which all individuals preferred to not share the total pay-off equally (equal to zero), and the highest for FBOs where all participants agreed to share the total pay-off equally (equal to 3). In between we find FBOs in which there was no consensus on how to share the total pay-off: either two individuals wanted to share it equally and one did not (equal to 2), or the other way around (equal to 1).

We can thus conclude that most FBOs seem to prefer equitable over efficient conduct. This finding supports the widespread perception that equity-based institutions tend to prevail in rural African communities (World Bank, 2007), since mutual support is a key social protection mechanism to cope with diffused poverty and food insecurity, while efficiency-based institutions underpinning market-based competition remain incipient.

Table 5 below shows then the effect of the spread in risk preferences on equity-efficiency dilemmas. First of all, it is worth noticing that the outcome of the previous game does influence, to a great extent, the outcome of the second game, justifying the use of first outcome as control variable in the regression. But more importantly, a significant effect, at the 5% level is estimated also for the standard deviation in members' risk choices. In other words, as the heterogeneity in members' risk preferences increases, the probability that an FBO adopts equity-based conduct decreases.

Therefore, our simulations suggest that the pressure for efficient allocation of residual property rights increases with the heterogeneity in members' preferences. On the other hand, equitable allocation of property rights is the obvious choice among individuals

⁶ For this reason these two variables are excluded from the empirical model estimated below.

with homogeneous preferences. Since collective action requires a certain degree of equity to occur, we infer that efficient FBOs are more likely to be affected by shirking problems.

By contrast, internal redistributions of property rights carried out in the name of equity, among individuals with similar preferences, are expected to fuel corruption and discrimination, and therefore conflicts. However, the latter are implications inferred from simulations conducted in a highly controlled and standardized environment. The following empirical analysis is thus necessary in order to test whether the inferred trade-off between homogeneous and heterogeneous organizations does indeed apply to real world situations.

Figure 7: Distribution of FBO risk variance

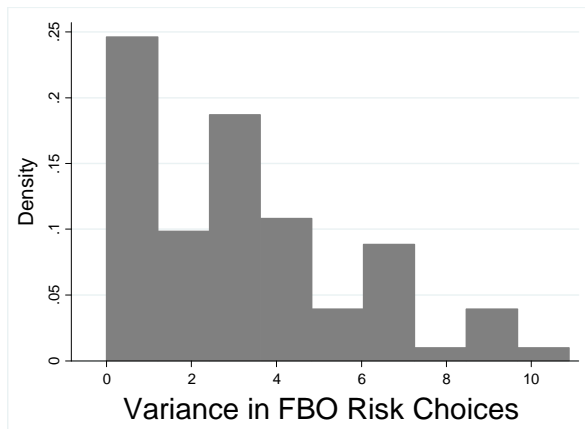


Figure 8: Distribution of FBO Votes

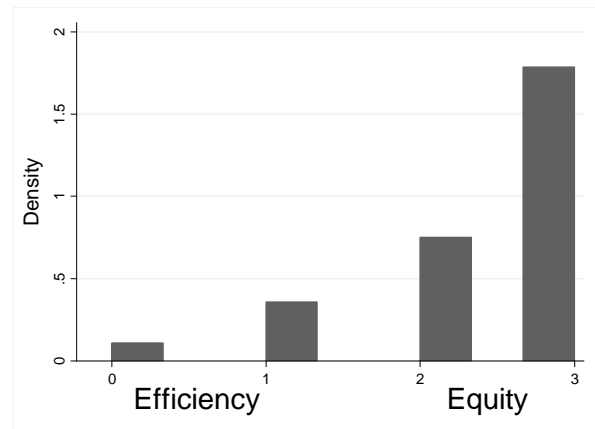


Table 5: Ordered Logistic regression explaining equity-efficiency choice in FBOs

Standard Deviation in FBO Risk Choices	-0.69(0.03)**
FBO Equity-Efficiency outcome from First Game	5.00(1.03)**
<i>Pseudo R-squared</i>	0.18
<i>Number of Observations</i>	84

Standard error in parenthesis

** indicates significance at the 5% level

Empirics.

Table 6 (in the Appendix) summarizes the results of the first analytical step in our empirical analysis. Results suggest that the most significant factor influencing FBO structure is land purchasing price. As the latter increases, membership homogeneity diminishes. Since land price takes a value of zero for 66% of the FBOs, due to non-existent land market at the district level, we assume that higher land price stands for better land titling, *ceteris paribus*.

This assumption is in line with the seminal work on land rights in Africa by Ault and Rutman (1979), explaining that: “As long as transaction costs are positive, Africans have little incentive to exercise their rights as long as the supply of land exceeds demand. Once the demand for resources exceeds supply at zero price, individual rights to land are exercised”. Consequently, our results suggest that as land price increases (due to increasing demand), land ownership gets better defined and protected, and this in turn underpins social mobility (from place to place, and from status to status) and thus heterogeneity within FBOs.

Table 6 also shows that, when an FBO witnesses increasing competition, due to the establishment of new FBOs within the same district, this promotes expansion in organizational scale and scope, and consequently heterogeneity in membership. This finding is in line with the significantly higher incidence of heterogeneous FBOs in the Eastern region of Ghana, which is a region that has been recently witnessing a multiplication in the number of projects promoting the formation of FBOs (see Salifu et al, 2010; and background section above). The heterogeneity enhancing effect of competition is further stressed by a significantly higher incidence of heterogeneous FBOs in proximity of agri-food markets.

Heterogeneity/size increases also when NGOs provide advice/training in order to establish an FBO, advancing the concept that inclusiveness enhanced leadership (see also results from Table 10 discussed below). Interestingly, homogeneity in membership appears instead to increase as the distance between an FBO and the closest police/military station increases. This finding suggests that in the absence of state institutions enforcing law and order, individuals prefer to group with the next of kin. This finding is in line with the negative effect associated with national law enforcement, and the positive effect related to the enforcement of local traditional norms, with regard to FBO establishment, on membership homogeneity.

Table 7 (in the Appendix) presents the results of the second analytical step exploring the determinants of collective action levels and problems. The results of the first regression are in line with the findings of Varughese and Ostrom (2001) suggesting that there is no significant relationship between membership heterogeneity/homogeneity and the degree of collective action. The second regression instead confirms the hypothesis emerging from the game results above, that large and heterogeneous FBOs are more likely to face problems related to internal shirking, while small and homogeneous membership are expected to be affected by internal conflicts.

Results in Table 7 also lend support to the life cycle theory conceptualized by Cook and Chambers (2007) and tested by Francesconi and Ruben (2008). In fact, Table 7 shows that the degree of collective action increases over time up to a threshold, after which it starts to decrease, meaning that collective action describes a concave curve over time. Our results further indicate that FBOs become increasingly affected by internal shirking over time, while internal conflicts are usually faced early on, especially during the establishment process.

As explained by Cook and Chambers (2007), cyclical organizational patterns depend mainly on external factors. FBOs are initially formed to better exploit development opportunities provided by the market, government or donors. However, after an initial

phase of growth and glory, FBOs' competitors (mainly investor-owned firms and state-owned agencies) modify their behavior and re-gain the original comparative advantage.

Following from our previous findings, this implies that membership heterogeneity tend to increase over time. While FBOs usually begin with a small and homogenous membership, internal complexity grows over time. However, since Table 6 does not indicate a clearly negative relationship between FBO age and membership heterogeneity, we conclude that time fuels mainly unobservable heterogeneity in members' preferences rather than in observable members' characteristics.

The last analytical step aims to isolate the effect of broad-based external support on the relationship between organizational structure and performance. This analysis involves 18 ordered logistic regressions nested into three Tables (8, 9 and 10 in the Appendix). In Table 8, the original sample is separated into four regressions depending on the agency involved in providing external support to FBOs. In Table 9, the sample is separated into six regressions depending on the main support strategy/approach. While in the Table 10, the sample is separated into eight regressions on the basis of major support interventions.

According to our data the agencies that are most commonly involved in FBO support come from either the government or the civil society. In particular 316 FBOs declared to have had interactions with government bodies and 178 with NGOs. However, the results in Table 8 do not show any consistent change in the relationship between organizational structure and performance (collective action levels and problems), if compared to Table 7.⁷ This suggest that whether support is predominantly provided by government or civil society it plays no role in promoting collective action.

Table 9 shows that the most common support strategies are: 1) bilateral and top-down strategies (initiated and mainly defined by the external partner), witnessed by 261 FBOs; 2) bilateral but bottom up strategies (FBO-driven) in 163 FBOs; and multilateral strategies (with the mediation of a third-party) in 86 cases. Regressions show that under a predominantly bilateral strategies, no consistent change can be observed between Table 7 and Table 9 in the relationship between organizational structure and performance. However, Table 11 shows also that under predominantly multilateral strategies, the degree of collective action increases with membership homogeneity, while the relation between collective structure and problems is insignificant. This is a consistent change in comparison to the structure-performance pattern highlighted in Table 7.

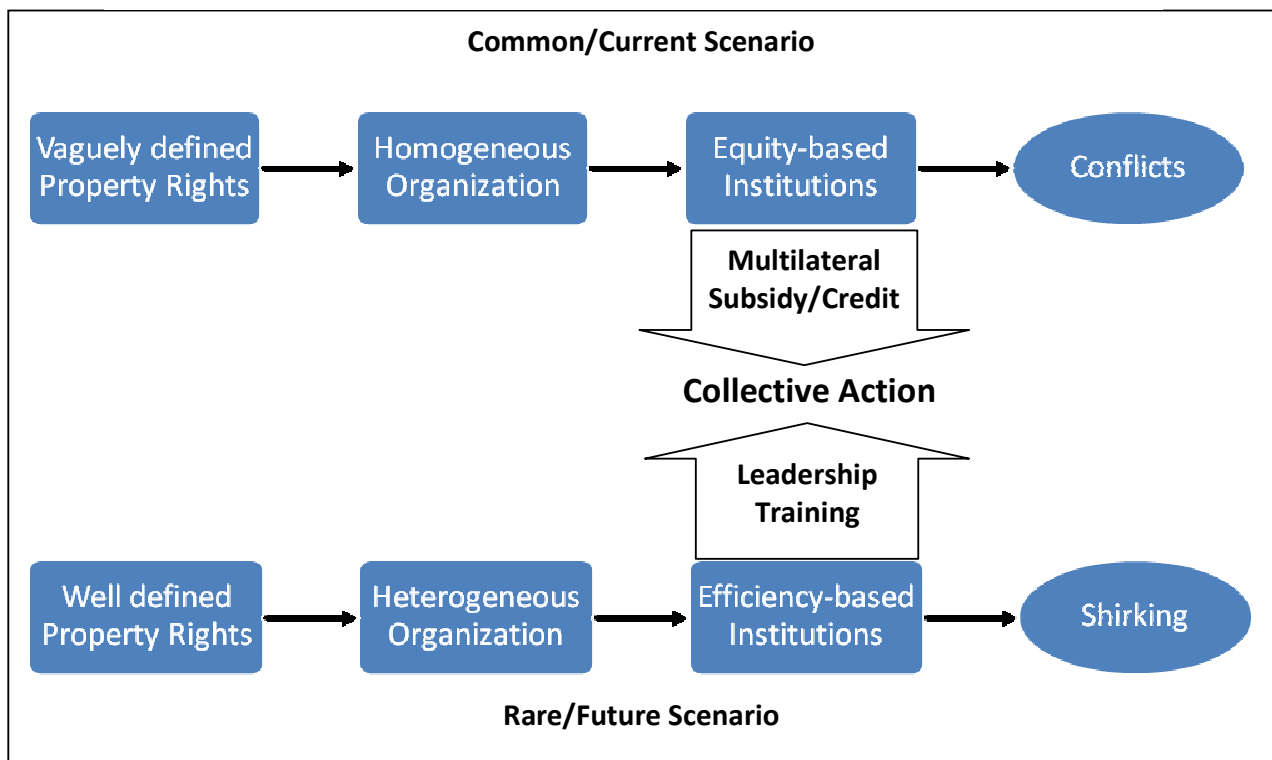
Table 10 points out that the most common interventions targeting FBOs involve the provision of technical (302 FBOs) and/or leadership/managerial (165 FBOs) training, credit (124 FBOs) and/or subsidies (93 FBOs). Table 10 shows that support interventions mainly based on technical training do not alter the relationship between organizational structure and performance in Table 7. By contrast, interventions centred around leadership training, credit or subsidy are associated with relevant changes.

⁷ Please note that even if the sign of the relationship between organizational structure and the incidence of internal conflicts is inverted (index of age homogeneity) in Table 10, compared to Table 9, no other differences are observed between the two. Therefore, we conclude that the results presented in the two Tables are not consistently different.

Collective action appears to increase with heterogeneity in membership, while collective action problems (shirking and conflicts) become insignificant, given that leadership training is provided. Collective action problems seem to disappear also when credit or subsidies are provided. However, when loans or subsidies are available, homogeneous FBOs appear more likely to embark on collective action.

To sum-up, the scenarios that emerge from descriptive, simulation and empirical analyses are depicted in Figure 9 below and described in the next section.

Figure 9: Emerging scenarios



Conclusions and Implications.

Ghana, like many other African countries, has a large and diverse population of FBOs. Through collective action, Ghanaian FBOs have the potential to enhance indigenous institutions defining local property rights, and contribute to improve social welfare, business revenues and access to public goods across rural communities. The large and detailed evidence presented in this paper is consistent in describing two major scenarios in rural Ghana.

The most common scenario is characterized by isolated and traditional rural communities, where property rights are vaguely defined on the basis of traditional kinship institutions. Within these communities, FBOs tend to have small and homogeneous membership and to be ruled in the name of equity. The second scenario,

which is expected to be far less common but to gain importance over time, takes place where land rights are transferrable and expensive (most likely in peri-urban areas). Here, we find larger and heterogenous FBOs, geared toward the efficient distribution of collective property rights.

The scenarios emerging from our simulations recall social positivism theory (Durkheim, 1893), which categorized social networks into two types, those based on “mechanical solidarity” and those based on “organic solidarity.” According to this theory, social networks adopting mechanical solidarity tend to be smaller and more homogeneous as well as simpler and more traditional in their level of organization.

On the other hand, organic solidarity is based on the interdependence that arises from the specialization of work and professional complementarities between different individuals. Organic solidarity underpins the development of large, heterogeneous and modern networks of individuals, where internal order depends on overall incentives to support one another in order to achieve individual objectives (for example, farmers produce the food to feed the factory workers who produce the tractors that allow the farmer to produce the food).

Compared to social positivism, this paper further emphasizes the alternative risks associated with these two scenarios, and identifies reciprocal coping strategies. We argue that corruption, discriminations and thus conflicts arise under the first scenario, unless multilateral governance, underpinning transparency and accountability in the disbursement of subsidies and credit, is in place. On the other hand, shirking and eventually anarchy arise under the second scenario in the absence of strong leadership of the kind that inspires and facilitates efficiency-driven individuals to act for the common good.

This conclusion clashes with classic industrial organization theory (Olson, 1965), which instead states that: “unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational self-interested individuals will not act to achieve their common or group interests”. In particular, the evidence presented in this paper contradicts the argument that only large and heterogeneous organizations need “special devices” to embark on collective action, while small and homogeneous ones do not.

As put by Staatz (1987) Sexton (1988, 1986), collective action can emerge under extreme and opposite scenarios characterized by either highly asymmetric information or highly integrated and concentrated market power (monopoly/monopsony), given that external incentives are in place. In line with Kolavalli and Brewer (1999), we argue further that external incentives are needed to absorb the expected organizational costs of collective action. And these costs can be met through either multilateral support (in case of information asymmetry, i.e. first scenario) or by local elites (in case of highly integrated markets; i.e. second scenario).

As hinted by modern organizational scholars (see Cook and Chambers 2007) and neo-institutional economists (see Varughese and Ostrom, 2001), the role of governance and leadership is to re-align organizational structure and conduct in such a way to overcome collective action problems. Where alignment means to challenge natural collective

degeneration into conflicts or shirking through externalities that respectively sharpen or loosen-up property rights.

In brief, the evidence presented in this paper goes in support of neo-institutional theory (Dorward et al. 2009; Kirsten et al. 2009; Meinzen-Dick, 2009), which claims that the “commons” are not always associated with “tragedy”, as notoriously stated by Hardin (1968), but when the right externalities are in place they can be viable alternatives to exclusive privatization or inefficient public ownership. This perception has recently found fertile ground in the UK, where the new government coalition is pushing to create a climate that empowers local communities in building a “Big Civil Society” in order to take power away from the overly developed state and multinational companies and give it to people.⁸

In the specific case of Ghana and presumably many other African countries, this paper echoes Williamson’s message (1979) about the importance of tackling information asymmetry between rural communities on one side (i.e. the agent), and markets, governments, banks and donors on the other (the agency). While capacity strengthening for rural leadership is more of a long term strategy, the immediate priority is to increase the transparency and accountability of subsidy and credit programs.

As stated by Barak Obama (2006): “Too many poor country are hampered by archaic, even feudal, property and banking laws; in the past, too many foreign aid programs simply engorged local elites...Indeed, for far too long international aid policies have ignored the critical role that the rule of law and principles of transparency play in any nation’s development”. In other words, the punch line is that good governance comes before strong leadership in the development process.

The definition of good governance advanced in this study is tied to the existence of a “third party” that searches and screens potential agents and agencies, arbitrates multilateral negotiations and enforces eventual agreements. Our data suggest that cell-phone networks, which in Ghana have basically reached a nation-wide coverage, could greatly facilitate the role of such a third-party. In an era in which almost every rural smallholder has access to a mobile phone, it should not be difficult to overcome information problems.

In fact, start-ups of so-called “smart ICT systems”, “e-services” or “virtual platforms”, such as *Manobi* in Senegal and *Esoko* in Ghana, are on the rise throughout the African continent, following the examples set by India where similar companies are gradually replacing traditional public extension services. Nonetheless, not all national governments might be so keen as the British one, to welcome private ICT companies intrude in their internal affairs, especially if the ultimate goal is to reduce the role of the state to the advantage of the civil society. It follows that public international and regional bodies are the designated promoters of this wire-less revolution.

Yet, broad-based wire-less connectivity is not sufficient to trigger such an e-revolution. Broad-based participation among large and scattered rural populations needs to be ensured as well. As argued by Bruns and Bruns (2004), community-based facilitators can contribute to raise grass-root participation and information sharing. However,

⁸ http://en.wikipedia.org/wiki/Big_Society

facilitators need to be willing to live in rural communities, inspire trust and have the necessary authority, autonomy, independence, initiative and capacity to fulfill such a key role. A combination of attributes that might be found in religious leaders, which according to our data are omnipresent across rural Ghana.

Further research is however necessary to assess whether private e-services can really be the solution to kick start rural development and whether religious institutions can really be the ideal intermediary to maximize participation and information sharing from rural areas.

Acknowledgements.

This study was made possible thanks to the financial, logistic and intellectual support provided by IFPRI's Ghana Strategy Support Program (GSSP) led by Shashidhara Kolavalli and coordinated by Adam Salifu . Field work activities were made possible thanks to a team of 17 bright and motivated MSc students from Accra, Tamale and Kumasi Universities: Alidu Sanatu Mustapha, Stephen Appiah, Emelda Mabel Quainoo, Patrick Koomson, Edem Aklaku Komla, Abdul-Rahaman Issahaku, Kennedy Kobina Donyong, Abdul Wahab Suleman, Akuffo Amankwah, Charles Yaw Okyere, Ebenezer Obeng-Bio, Mark Kwame Offei, Amadu Ibrahim, Tiifu Baba Anambabi, Hillary Mireku Bortey, Abubakari Yahaya Bukari, and Hayford Mensah Ayerakwa. The author is further indebted to Afua Banful, Angelino Viceisza and Fleur Wouterse for their conceptual input.

References.

- AgSSIP (Agricultural Services Sub-sector Investment Project). 2007a. *Farmer-based organizations component. Progress report*, January 2007. Accra, Republic of Ghana: MoFA.
- _____. 2007b. *Implementation completion and results report*. A World Bank document presented to the Republic of Ghana. Washington, D.C.: World Bank.
- _____. 2007c. *Report on evaluation and impact study of the Farmer-based Organizations Development Fund*. Accra, Republic of Ghana: MoFA.
- Ault, D.E. and G.L. Rutman. 1979. The Development of Individual Rights to Property in Tribal Africa. *Journal of Law and Economics*, Vol. 22, No.1: 163-182.
- Bain, J.S. 1951. Relation of Profit Rate to Concentration: American Manufacturing, 1936-1940. *Quarterly Journal of Economics* 65, 293-324.
- Bannock, G., R.E. Baxter, E. Davis. 2003. *The Penguin Dictionary of Economics*. Penguin Books.
- Belden, C. 2010. *Examining Relationships between Customary and State Institutions in Ghana's Decentralized System*. IFPRI Discussion Paper 01030, Washington DC, USA.

- Bernard, T., M.-H. Collion, A. DeJanvry, and P. Rondot. 2008a. Do village organizations make a difference in African rural development? A study for Senegal and Burkina Faso. *World Development* 36 (11): 2188- 2204.
- Bernard, T., and D. J. Spielman. 2009. Reaching the rural poor through rural producer organizations? A study of agricultural marketing cooperatives in Ethiopia. *Food Policy* 34 (1): 60–69.
- Bernard, T., A. S. Taffesse, and E. Z. Gabre-Madhin. 2008b. Impact of cooperatives on smallholders' commercialization behavior: Evidence from Ethiopia. *Agricultural Economics* 39:1–15.
- Binswanger, H. 1980. Attitudes toward Risk: Experimental Measurement in Rural India. *American Journal of Agricultural Economics*, Vol. 62, No. 3, pp. 395-407.
- Bolton, G.E., E. Katok, R. Zwick. 1998. Dictator Game Giving: Rules of Fairness Versus Acts of Kindness. *International Journal of Game Theory*, 27: 269-299.
- Boulding, W., and R. Staelin. 1990. Environment, Market Share, and Market Power. *Management Science* 36 (10), 1160-1177.
- Boulding, W., and R. Staelin. 1993. A look at the Cost Side: Market Share and the Competitive Environment. *Marketing Science* 12 (2), 144-166.
- Bruce, J.W. 2004. *Strengthening Property Rights for the Poor*. In *Collective Action and Property Rights for Sustainable Development*, edited by R. Meinzen-Dick and M. Di Gregorio, Focus 2020, 2020 Vision, CAPRI and IFPRI.
- Bruns, B., and P.C. Bruns. 2004. *Strengthening Collective Action*. In *Collective Action and Property Rights for Sustainable Development*, edited by R. Meinzen-Dick and M. Di Gregorio, Focus 2020, 2020 Vision, CAPRI and IFPRI.
- Cook, M. L., and M. Chambers. 2007. *The role of agricultural cooperatives in global networks*. Working paper presented at the workshop organized by INRA-MOISA and Wageningen University, Montpellier, France, July 2007.
- Develtere, P., I. Pollet, and F. Wanyama. 2008. *Cooperating out of poverty: The renaissance of the African cooperative movement*. Geneva, Switzerland: International Labour Organization.
- Dorward, A. R., J. E. Kirsten, S. W. Omamo, C. Poulton, and N. Vink. 2009. *Institutions and the agricultural development challenge in Africa*. In *Institutional economics perspectives on African agricultural development*, ed. by J. F. Kirsten, A. R. Dorward, C. Poulton, and N. Vink. Washington, D.C.: International Food Policy Research Institute.
- Duflo, E. R. Glennerster, M. Kremer. 2007. *Using Randomization in Development Economics*. In *Handbook of Development Economics*, Vol. 4, 3895-3962, Chapter 61.
- Durkheim, E. 1893. De La Division Du Travail Social. <http://classiques.uqac.ca/classiques/Durkheim_emile/division_du_travail/division_travail_1.pdf>. Accessed: 07/28/09.

- Francesconi, G.N. and N. Heerink (2010). "Ethiopian Agricultural Cooperatives in an Era of Global Commodity Exchange: Does Organizational Form Matter?". *Journal of African Economies*, pp. 1–25 doi:10.1093/jae/ejq036 .
- Francesconi, G. N., and R. Ruben. 2008. The life cycle of agricultural cooperatives: Implications for management and governance in Ethiopia. *Journal of Rural Cooperation* 36 (2): 115–130.
- Gennaioli, N., and I. Rainer. 2006. *Precolonial Centralization and Institutional Quality in Africa*. In *Institutions and Norms in Economic Development*, M. Gradstein and K. Konrad (Eds.) Cambridge, MA: MIT Press.
- Grischow, J.D. 2006. *Shaping Tradition: Civil Society, Community and Development in Colonial Northern Ghana, 1899-1957*. African Social Studies Series Vol. 14, Brill NV, Leiden, The Netherlands.
- Hardin, G. 1968. The Tragedy of the Commons. *Science*, Vol. 162, No. 3859, pp. 1243-1248.
- Herbst, J. 2000. *State and Power in Africa*. Princeton, NJ: Princeton University Press.
- Hoff, K., and J. E. Stiglitz. 1993. Imperfect information and rural credit markets: Puzzles and policy perspectives. In *The economics of rural organization: Theory, practice and policy*, ed. K. Hoff, A. Braverman, and J. E. Stiglitz. Oxford, U.K.: Oxford University Press.
- Karantininis, K., and A. Zago. 2001. Cooperatives and membership commitment: Endogenous membership in mixed duopsonies. *American Journal of Agricultural Economics* 83 (5): 1266–1272.
- Kirsten, J. F., A. S. M. Karaan, and A. R. Dorward. 2009. Introduction to the economics of institutions. In *Institutional economics perspectives on African agricultural development*, ed. J. F. Kirsten, A. R. Dorward, C. Poulton, and N. Vink. Washington, D.C.: International Food Policy Research Institute.
- Kolavalli, S., J.D. Brewer. 1999. Facilitating User Participation in Irrigation Management. *Irrigation and Drainage Systems*, 13:249-273.
- Kugler, T., G. Bornstein, M.G. Kocher, M. Sutter. 2007. Trust between Individuals and Groups: Groups are Less Trusting than Individuals but just Trustworthy. *Journal of Economic Psychology*, 28: 646-657.
- Meinzen-Dick, R. S. 2009. Coordination in natural resource management. In *Institutional economics perspectives on African agricultural development*, ed. J. F. Kirsten, A. R. Dorward, C. Poulton, and N. Vink. Wahington, D.C.: International Food Policy Research Institute.
- Michalopoulos, S., E. Papaioannou. 2010. Divide and Rule or the Rule of the Divided? Evidence from Africa. Solicited for *Econometrica*
- Obama, B. (2006). *The Audacity of Hope: Thoughts on Reclaiming the American Dream*. Canongate Books, UK, p.318.

- Olson, M. 1965. *The logic of collection action: Public goods and the theory of groups*. Cambridge, Mass., U.S.A.: Harvard University Press.
- Ostrom, E. 2004. *Understanding Collective Action*. In *Collective Action and Property Rights*, edited by R. Meinzen-Dick and M. Di Gregorio, Focus 2020, 2020 Vision, CAPRI and IFPRI.
- Platteau, J.P. (2004) Monitoring Elite Capture in Community-Driven Development. *Development and Change* 35(2):223-246.
- Platteau, J.P., (2007) *Is Culture an Obstacle to African Economic Development?* Paper prepared for the first IERC conference: The Economic Performance of Civilization: Roles of Cultures, Religion and the Law. Los Angeles: University of Southern California.
- Prescott, J.E., A.K. Kohli, N. Venkatraman. 1986. The Market-share Profitability Relationship: An Empirical Assessment of major Assertions and Contradictions. *Strategic management Journal*, 7: 377-394.
- Rondot, P., and M. H. Collion. 2001. *Agricultural Producer Organizations: Their Contribution to Rural Capacity Building and Poverty Reduction*. Workshop report. Washington, D.C.: World Bank.
- Salifu, A., G.N. Francesconi, S. Kolavalli. 2010. *A Review of Collective Action in Rural Ghana*. IFPRI Discussion Paper 00998, Washington DC.
- Sexton, R., and J. Iskow. 1988. *Factors Critical to the Success or Failure of Emerging Agricultural Cooperatives*. Giannini Foundation Information Series 88-3. Davis, Calif., USA: University of California.
- Sexton, R.J. 1986. The Formation of Cooperatives: A game Theoretic Approach with Implications for Coopertaive Finance, Decision making, and stability. *American journal of Agricultural Economics*, 68 (2): 214-225.
- Schmid, A.A. 2000. Is there any theory in Institutional Economics?
<http://www.msu.edu/user/schmid/commons.htm>
- Shiferaw, B., G. Obare, and G. Muricho. 2006. *Rural institutions and producer organizations in imperfect markets: Experiences from producer marketing groups in semi-arid eastern Kenya*. Collective Action and Property Rights (CAPRI) Working Paper 60. Washington, D.C.: International Food Policy Research Institute.
- Staatz, J. M. 1987. Farmers incentives to take collective action via cooperatives: Transaction costs approach. In *Cooperative theory: New approaches*, ed. J. Royer. USDA-ACS Service Report 18. Washington, D.C.: USDA-ACS.
- _____. 1987b. The structural characteristics of farmer cooperatives and their behavioral consequences. In *Cooperative theory: New approaches*, ed. J. Royer. USDA-ACS Service Report 18. Washington, D.C.: USDA-ACS.
- Varughese, G., and E. Ostrom. 2001. The contested role of heterogeneity in collective action: Some evidence from community forestry in Nepal. *World Development* 29 (5): 747–765.

Williamson, O.E. 1979. Transaction Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics*, 22: 233-261.

World Bank. 2007. *World development report 2008: Agriculture for development*. Washington, D.C.: World Bank.

Appendix.

Figure 1: Map of study areas

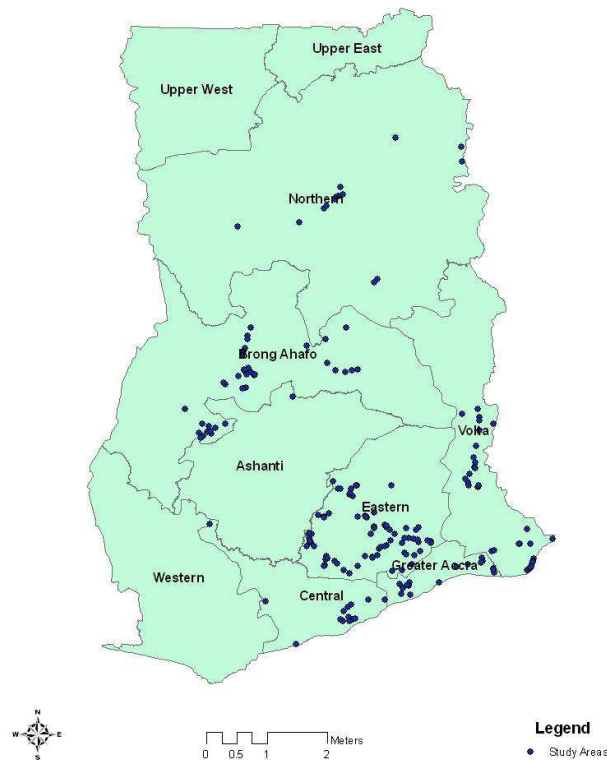
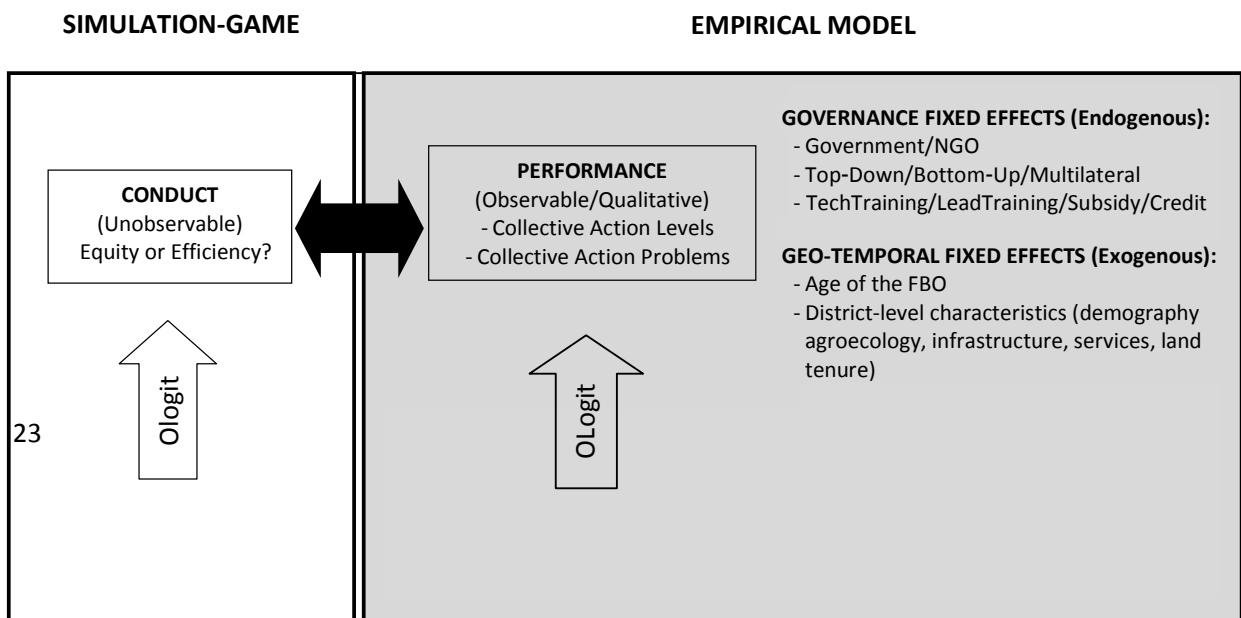


Figure 2: Analytical framework



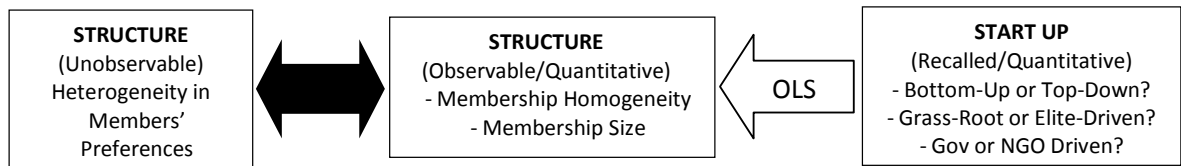


Table 2: Hypothetical results of from the first game.

Player	Risk choice (0-7)	Toss Outcome Head/tail (H/T)	Individual Payoff GHC	TOTAL Payoff GHC	Decision-making: Share the amount equally (1), or keep what you won (0)	Final Share GHC
1	2	H	0.4	1.9	0	0.4
2	2	T	1.2		0	1.2
3	4	H	0.3		1	0.3

Table 3: Hypothetical results from the second game

Player	Risk choice (0-7)	Toss Outcome head/tail (H/T)	Individual Payoff GHC	TOTAL Payoff GHC	Decision-making: Share the amount equally (1), or keep what you won (0)	Final share GHC
1	1	T	4.75	11	1	3.7
2	3	T	6.25		1	3.7
3	7	H	0		0	3.7

Table 4: Quantitative data

Reference to Model	Variables (499 obs.)	Mean	Std. Dev.	Min	Max
--------------------	----------------------	------	-----------	-----	-----

(s)	Membership Size	36.48	37.53	5	500
	Degree of membership homogeneity in Location	0.82	0.28	0	1
	Degree of membership homogeneity in Gender	0.65	0.16	0.5	1
	Degree of membership homogeneity in Age	0.44	0.13	0.26	1
	Degree of membership homogeneity in Religion	0.85	0.18	0	1
	Degree of membership homogeneity in Ethnicity	0.78	0.30	0	1
	Degree of membership homogeneity in Education	0.31	.24	0	1
(t)	Degree of membership homogeneity in Land-holding	0.64	0.23	0.26	1
(j)	Age of the FBO	6.79	5.37	0	50
	Population density index (district level)	12288.2	57907.8	0	700000
	Access to tap water (district level)	0.86	0.35	0	1
	Access to public electricity grid (district level)	.80	.40	0	1
	Access to telephone network, fixed or mobile (district level)	0.98	0.14	0	1
	FBO Distance to closest hospital/clinic (miles)	1.81	3.30	0	23
	FBO Distance to closest School (miles)	0.15	0.63	0	6
	FBO Distance to closest Police/Military station (miles)	4.25	6.40	0	80
	FBO Distance to closest Mosque/Church/Shrine (miles)	0.04	0.48	0	10
	FBO Distance to closest Bank/Finance institute (miles)	6.07	8.42	0	75
	FBO Distance to closest Post-Office (miles)	5.58	7.63	0	60
	FBO Distance to closest Agri-Food Market-place (miles)	3.47	7.30	0	80
	FBO Distance to closest District Assembly (miles)	11.73	14.42	0	200
	Number of other FBO in the district	30.15	58.44	0	350
	Possibility to purchase land in the district	0.34	0.47	0	1
	Average price to purchase 1 acre of land in the district	748.37	4339.33	0	80000
	(k)	Scarce or depleting natural resources (district level)	0.84	0.37	0
Recurrent natural disasters (district level)		0.61	0.49	0	1
Recurrent conflicts/wars (district level)		0.08	0.27	0	1
Recurrent food shortage (district level)		0.28	0.45	0	1
Re-established FBO?		0.18	0.38	0	1
(b)	Number of pre-existing FBOs in the district	13.77	42.19	0	450
	FBO Start-up idea was bottom-up	0.70	0.46	0	1
	FBO Start-up idea came from rural elite	0.34	0.47	0	1
	FBO Start-up idea came from NGO	0.05	0.21	0	1
	Identification of initial members was grass-root	0.96	0.21	0	1
	Identification of initial members was driven by rural elite	0.38	9.49	0	1
	Identification of initial members was driven by NGO	0.01	0.10	0	1
	Members received start-up training?	0.62	0.48	0	1
	Start-up training was provided by NGO	0.14	0.35	0	1
	External start-up incentives were provided?	0.45	0.50	0	1
	Start-up incentives came from NGO	0.18	0.38	0	1
	Start-up incentives came from banks	0.06	0.24	0	1
	External permission to start up was needed	0.17	0.38	0	1
	Permission came from local leaders	0.12	0.33	0	1
	Compliance with existing laws was needed for FBO start up	0.24	0.43	0	1
Compliance was needed with traditional laws	0.12	0.33	0	1	
Compliance was difficult and time-consuming	0.03	0.17	0	1	

The most significant results are highlighted in grey.

Table 6: OLS regressions explaining membership heterogeneity by re-call variables and fixed effects.

	Variables	Size	Herfindahl concentration indices						
			Location	Gender	Age	Religion	Ethnicity	Education	Land
(t)	FBO age (years)		-	++	+				
	FBO age ² (years)	++	+	--	-	--			
(l)	Brong region (dummy)				++	--			-
	Central region (dummy)			--			+		--
	Eastern region (dummy)						--		--
	Northern region (dummy)					++		--	-
	Volta region (dummy)				-		++	+	-
	No. of people in district						--		
	Tap water (dummy)		--		+				
	Electricity grid (dummy)	++							++
	Distance to closest clinic (miles)				++				
	Dist. to closest school (miles)				-				
	Dist. to closest police (miles)				+		+	++	
	Distance to closest bank (miles)				--				
	Distance to closest post (miles)								
	Dist. to closest market (miles)			++	++				
	Dist. to closest district (miles)				-		++	++	
	Number of FBOs in district				--	--			-
	Land purchase price (GHC)			--	-	--	--		-
	Depleting/scarce natural resources (dummy)							+	
	Recurrent natural disasters (dummy)			--					
	Recurrent/chronic warfare (dummy)								
Recurrent/chronic food shortages (dummy)	--			+	--				
(b)	Re-established FBO (dummy)								
	Number of pre-existing FBOs in district	-		+			+		
	Bottom-up initiative (dummy)								
	Elite initiative (dummy)	+			--			+	
	NGO initiative (dummy)								
	Bottom-up members search (dummy)	++							
	Elite members search (dummy)				-				
	NGO members search (dummy)								
	Start-up training (dummy)	--	++			--			
	NGO training (dummy)	++	--						--
	External incentives (dummy)					++			
	NGO incentives (dummy)								
	Bank incentives (dummy)					-			
	External permission (dummy)						--		
	Local leader permission (dummy)						++		
	Law compliance (dummy)	+			--				
Traditional law (dummy)	-			++					
Binding law (dummy)									
No. of Observations		498	498	498	498	498	498	498	496
R-squared		0.17	0.15	0.15	0.13	0.13	0.29	0.20	0.14

+ indicates positive relation at 10% significance level.

++ indicates positive relation at 5% significance level.

- indicates negative relation at 10% significance level.

-- Indicates negative relation at 5% significance level.

The most significant results are highlighted in grey.

Table 7: Ordered Logistic Regressions explaining collective action on the basis of predicted organizational structure and fixed effects.

Theoretical Model	Empirical Model	Degree of Collective Action (0-2)	Conflicts vs Shirking Problems (0-3)
(t) Temporal Fixed Effects	FBO age (years)	++	
	FBO age ² (years)	--	--
Spatial Fixed Effects (l)	Brong region (dummy)	--	
	Central region (dummy)		
	Eastern region (dummy)		
	Northern region (dummy)		
	Volta region (dummy)		
	No. of people in community		
	Tap water (dummy)		
	Electricity grid (dummy)		-
	Distance to closest clinic (miles)		
	Dist. to closest school (miles)		
	Dist. to closest police (miles)		
	Distance to closest bank (miles)		+
	Distance to closest post (miles)		
	Dist. to closest market (miles)		
	Dist. to closest district (miles)		--
	Number of FBOs in district		++
	Land market (dummy)		
	Land purchase price (GHC)		
Depleting/scarce natural resources (dummy)			
Recurrent natural disasters (dummy)			
Recurrent/chronic warfare (dummy)			
Recurrent/chronic food shortages (dummy)	--	+	
Predicted Organizational Structure (S)	Predicted Membership Size		++
	Predicted Locational heterogeneity		++
	Predicted Gender heterogeneity		
	Predicted Age heterogeneity		
	Predicted Religion Heterogeneity		++
	Predicted Ethnicity heterogeneity		++
	Predicted Education heterogeneity		
Predicted Land heterogeneity			
Model Characteristics	No. of Observations	498	498
	Pseudo R-squared	0.06	0.08

+ indicates positive relation at 10% significance level.

++ indicates positive relation at 5% significance level.

- indicates negative relation at 10% significance level.

-- Indicates negative relation at 5% significance level.

The most significant results are highlighted in grey.

Table 8: Ordered Logistic Regressions depending on the agency involved in FBO governance.

		Government		NGO	
		Degree of Collective Action (0-2)	Conflicts/Shirking Problems (0-3)	Degree of Collective Action (0-2)	Conflicts/Shirking Problems (0-3)
(t)	FBO age (years)	++	--	-	
	FBO age ² (years)				
(l)	Brong region (dummy)			-	
	Central region (dummy)				
	Eastern region (dummy)				
	Northern region (dummy)				
	Volta region (dummy)	--			
	No. of people in community				
	Tap water (dummy)		++		
	Electricity grid (dummy)		-		
	Distance to closest clinic (miles)				
	Dist. to closest school (miles)				
	Dist. to closest police (miles)				
	Distance to closest bank (miles)				
	Distance to closest post (miles)				
	Dist. to closest market (miles)				++
	Dist. to closest district (miles)				-
	Number of FBOs in district				
	Land purchase price (GHC)				
	Depleting/scarce natural resources (dummy)				-
	Recurrent natural disasters (dummy)				
	Recurrent/chronic warfare (dummy)				
	Recurrent/chronic food shortages (dummy)		++		++
(s)	Predicted Membership Size				
	Predicted Locational heterogeneity				
	Predicted Gender heterogeneity				
	Predicted Age heterogeneity		--		
	Predicted Religion Heterogeneity				
	Predicted Ethnicity heterogeneity				++
	Predicted Education heterogeneity				
	Predicted Land heterogeneity				
No. of Observations		316	316	178	178
Pseudo R-squared		0.08	0.09	0.06	0.14

+ indicates positive relation at 10% significance level.
 ++ indicates positive relation at 5% significance level.
 - indicates negative relation at 10% significance level.
 -- Indicates negative relation at 5% significance level.
 The most significant results are highlighted in grey.

Table 9: Ordered Logistic Regressions depending on governance strategy/approach.

		Bilateral, Top-down		Bilateral, Bottom-up		Multilateral	
		Degree of Collective Action (0-2)	Conflicts/Shirking Problems (0-3)	Degree of Collective Action (0-2)	Conflicts/Shirking Problems (0-3)	Degree of Collective Action (0-2)	Conflicts/Shirking Problems (0-3)
(t)	FBO age (years)	++		++		++	
	FBO age ² (years)	-	--	--		--	
(l)	Brong region (dummy)	-					
	Central region (dummy)						
	Eastern region (dummy)						-
	Northern region (dummy)						
	Volta region (dummy)						-
	No. of people in community				++	++	
	Tap water (dummy)			++	++		
	Electricity grid (dummy)					--	
	Distance to closest clinic (miles)						
	Dist. to closest school (miles)						
	Dist. to closest police (miles)						
	Distance to closest bank (miles)						
	Distance to closest post (miles)						
	Dist. to closest market (miles)						
	Dist. to closest district (miles)						
	Number of FBOs in district					++	
	Land purchase price (GHC)						--
	Depleting/scarce natural resources (dummy)						
	Recurrent natural disasters (dummy)						
	Recurrent/chronic warfare (dummy)						
Recurrent/chronic food shortages (dummy)	--				++	+	--
(u)	Predicted Membership Size		+				
	Predicted Locational heterogeneity					++	
	Predicted Gender heterogeneity						
	Predicted Age heterogeneity						
	Predicted Religion Heterogeneity						
	Predicted Ethnicity heterogeneity						
	Predicted Education heterogeneity						
	Predicted Land heterogeneity						
No. of Observations		261	261	162	162	86	
Pseudo R-squared		0.09	0.07	0.14	0.20	0.31	

+ indicates positive relation at 10% significance level

++ indicates positive relation at 5% significance level

- indicates negative relation at 10% significance level

-- Indicates negative relation at 5% significance level

The most significant results are highlighted in greys.

Table 10: Ordered Logistic Regressions depending on governance interventions.

		Technical Training		Leadership Training		Credit		Subsidy	
		Degree of Collective Action (0-2)	Conflicts/Shirking Problems (0-3)	Degree of Collective Action (0-2)	Conflicts/Shirking Problems (0-3)	Degree of Collective Action (0-2)	Conflicts/Shirking Problems (0-3)	Degree of Collective Action (0-2)	Conflicts/Shirking Problems (0-3)
(t)	FBO age (years)	++						++	
	FBO age ² (years)	-						--	
(l)	Brong region (dummy)			-			-		
	Central region (dummy)		++					++	
	Eastern region (dummy)					--			
	Northern region (dummy)						--		
	Volta region (dummy)								
	No. of people in community			-					
	Tap water (dummy)					+			
	Electricity grid (dummy)		--		-			--	
	Distance to closest clinic (miles)		--					--	
	Dist. to closest school (miles)								
	Dist. to closest police (miles)								
	Distance to closest bank (miles)								
	Distance to closest post (miles)								
	Dist. to closest market (miles)		++		++				
	Dist. to closest district (miles)			+	--	--		-	
	Number of FBOs in district							+	
	Land purchase price (GHC)								
	Depleting/scarce natural resources (dummy)								
	Recurrent natural disasters (dummy)		--					-	
	Recurrent/chronic warfare (dummy)					++	++	++	-
Recurrent/chronic food shortages (dummy)	--	+	--	++					
(s)	Predicted Membership Size							++	
	Predicted Locational heterogeneity					++			
	Predicted Gender heterogeneity				--	--		-	
	Predicted Age heterogeneity							++	
	Predicted Religion Heterogeneity			--	++	++			
	Predicted Ethnicity heterogeneity								
	Predicted Education heterogeneity								
	Predicted Land heterogeneity							+	
No. of Observations	302	302	165	165	124	124	93	93	
Pseudo R-squared	0.09	0.08	0.10	0.11	0.16	0.12	0.25	0.20	

+ indicates positive relation at 10% significance level
 ++ indicates positive relation at 5% significance level
 - indicates negative relation at 10% significance level
 -- Indicates negative relation at 5% significance level
 The most significant results are highlighted in greys.