Revealing intentions to enhance coordination: evidence from collective commercialization in Senegal

Fo Kodjo Dzinyefa Aflagah
University of Maryland

Tanguy Bernard
University of Bordeaux and IFPRI

Angelino Viceisza
Spelman College

Preliminary and incomplete

October 2016

Abstract

We work with a sample of groundnut-producing farmer groups in Senegal to explore whether knowing other members' intentions to sell their production through one's group, impacts one's actual sales through the group during commercialization season. Based on a randomized control trial design, we find that revealing others' intentions (planned behavior) improves collective marketing (coordination) in large groups - where coordination is more difficult to achieve. The effect appears to be mediated by both changes in expectations regarding the group's commercialization success, as well as conformity-related behavior. We also find evidence of positive welfare effect on farmers with smaller land endowment. These results are aligned with those of a neutrally framed lab-in-the field experiment implemented with a subset of these groups in the season preceding the randomized controlled trial. We discuss policy implications to enhance collective action amongst smallholder farmers.

JEL Codes: C92, C93, D7, O12, P32

Keywords: coordination, collective commercialization, intentions, field experiments.

1 Introduction

Ensuring that smallholder farmers have access to more profitable agricultural output markets is an important pre-condition for sustainable agriculture development (see for example de Janvry and Sadoulet, 2000; Taylor et al., 2009; Emran and Hou, 2013). Many rural areas in developing countries are however characterized by poor communication and transport infrastructures, leading to important fixed costs in accessing lucrative markets. Therefore, smallholder farmers are often faced with the choice of selling on thin local markets or to monopsonic traders. Governments and international agencies have long supported farmer groups as a mean to enhance farmers' bargaining power with local traders and reach more remunerative markets, through the bulking of their production (Barrett, 2008; World Bank, 2007). But available evidence suggest that farmer groups are seldom able to sell collectively (see for example Fafchamps and Hill, 2005; Aldana et al., 2007; Hellin et al., 2007; Ragasa and Golan, 2014; Bernard et al., 2008).

This paper explores this puzzle from the angle of a coordination issue in a context of strategic uncertainty. Selling through one's group can yield significant price benefits to a farmer, provided that product aggregation is large enough. At the same time, selling through one's group entails some costs such as delayed payments and limited flexibility in the timing of sales. Upon deciding whether to sale through the group or individually, a farmer must assess his profitability, in part based on the output that the group will effectively aggregate from other group members. Thus, collective commercialization is strategically uncertain and at times, the group will fail to coordinate on the superior equilibrium.

There is suggestive evidence that these issues play a role in explaining the lack of collective commercialization. For example, Bernard et al. (2014) find that among a sample of 204 farmer groups in Senegal, practically all members believe that collective commercialization could alleviate the main constraints they face when selling individually (among which are lack of accurate price information, lack of large quantities to negotiate better prices, and lack of transportation to collection points/processing plants). At the same time, two thirds of the members believe that other members would by-pass sales through the group and sell individually to a trader for a potentially lower, but more certain payoff. Thus, while there may be a variety of factors that impact a group's ability to sell collectively (e.g. Hill and Maruyama, 2014; Casaburi and Macchiavello, 2015a,b), issues of coordination truly seem to contribute to groups failure to organize collective sales.

In this paper, we work with a sample of groundnut-producing farmer groups in Senegal to explore whether knowing other group members' intentions to sell through the group affects one's actual decision to sell through the group during the commercialization season. The intervention is based on results from a previous neutrally framed lab-in-the-field experiment undertaken with members from a subset of these groups, in which we found that pre-play communication yields significant improvements in members' coordination towards higher payoff equilibrium (Aflagah, Bernard and Viceisza, 2015). In the following commercialization season, we implemented a similar – though in real life – intervention where we asked members what they intended to do with their (expected) harvest (thus inferring intended sales through the group). We then revealed this information in a group-level aggregated manner to a random subset of groups, prior to the start of the commercialization season.

Our main results show that knowing the overall aggregate amount of others' intention fosters greater group cooperation (in this case sales), but mostly so in larger groups where coordination is more difficult to start with. This is in line with that of our previous lab-in-the-the field experiment, showing

the potential of using such experiments to inform real life policy interventions. In separate treatment arms we revealed, in addition to the overall aggregate, the anonymous distribution of intentions amongst group members. We find evidence of an additional treatment effect in these groups, suggesting that members also react to others' beliefs about the potential benefits of collective sales.

There are several reasons why such information could improve collective commercialization. First, even though there may be other constraints to collective commercialization, the intentions that are elicited from/revealed to individual members should incorporate expectations about such constraints. For example, a member who feels that there would be no benefits from selling through the group (say, due to lack of leadership or ability to negotiate prices) would report zero intentions to do so. So, members' intentions reveal information about more than just their planned harvest delivery to the group. Second, while group members may already discuss plans in absence of our intervention, anecdotal evidence suggests that such discussions are bilateral and ad hoc. To the extent that this information is aggregated for the whole group, it typically resides only with leadership. So, revealing intentions about and to the whole group could be more informative than the status quo.

Lastly, we find evidence of positive welfare effect, particularly so for farmers with lower production level. This result is to be expected if true that benefits from collective commercialization essentially act through aggregation of output leading to reduced per-unit transaction costs and enhanced bargaining power with traders. In this case, gains from aggregation should be greater for those with smaller output to start with.

The remainder of the paper proceeds as follows. Section 2 discusses the country and value-chain context. Section 3 explains the design of the study. Section 4 covers our main findings. Finally, Section 5 concludes.

2 The context

Groundnut production has long constituted the backbone of the Senegalese economy. At independence, the sector employed 87% of the active population in rural areas and took up half of the cultivated land. Groundnut processing contributed to 42% of all industrial output and groundnuts represented 80% of all export revenues (Caswell, 1984). Over time, however, revenues from the sector have declined due to a combination of external and internal factors such as the abolishment of preferential tariffs to the French market, droughts, and political dynamics at various levels of the value chain. These forces have led to several attempts to reform the sector, which in the late 1990s culminated in the gradual privatization of all segments of the groundnut value chain.

At the producer-level, the most important reform occurred in 2001 when the parastatal, SONACOS, in charge of all input provision and output collection (through a dense network of producer cooperatives) was dismantled. The newly formed and private Suneor became the principal end-buyer of groundnuts, procuring them through a system in which private traders also started receiving a fixed price upon delivery at the processing plant. In 2010, the export-monopoly previously granted to Suneor was abolished, facilitating the entry of international players. This further weakened what remained of the former system.

Partly due to these reforms, the status quo in the market (value chain) can be characterized as follows.

1. Individual farmers seeking to tap into the export-value chain can sell through a cooperative, a private trader (banabana) or onto local spot markets. Given the scale of production and distance to collection points/processing plants, it is infeasible for them to link to the export value chain outside their local spot market, without selling their produce through traders and/or cooperatives.

2. Suneor and international firms in principle compete for this production and set prices at the plant level. However, despite a suggested producer price (to be paid to the farmer) and competition between cooperatives and traders, there is evidence of local price variations. In particular, there are reports that traders may "cheat" farmers by taking too large of a margin. This seems to be due to local monopsonies or weak cooperatives.

3. As cooperatives are no longer the only aggregator, they are facing challenges in ensuring the commitment of members with respect to commercialization. In a 2009 survey of 75 groundnut cooperatives stating that one of their main purpose is collective commercialization, Bernard et al. (2014) find that only 26 percent of these groups had been able to aggregate any of their members' produce in the previous year. At the same time, the vast majority of these groups' members believed that collective commercialization could alleviate the main constraints they face when selling individually (lack of accurate price information, lack of large quantities to negotiate better prices, and lack of transportation to collection points/processing plants). This puzzle is at least partly explained by members reporting on the uncertain behavior of most of their fellow members vis-à-vis their sales through the group.

Overall, coordination issues do seem to contribute to the bserved low-level of product aggregation in these groundnut cooperatives. Of course, the fact that a substantial proportion of farmers believes in the potential of these groups in itself does not imply that these entities will be able to coordinate and improve welfare. Our experiments can thus be seen as a test of (a) how to improve these groups' ability to coordinate and (b) whether this could lead to higher prices for members.

3 The study

3.1 Design

As stated previously, while there are a range of factors that may impact sales through the group, our study tests whether strategic uncertainty is one of them and can be impacted through revelation of others' planned behaviors. Perhaps more importantly, we also test if revealing such intentions can be beneficial at the individual level.

This study is a close follow up of a lablike field experiment (LFE) undertaken with a subset of farmer groups in our current sample. Specifically, from May to June 2013, we randomly selected subsets of farmers who are members of farmer groups to participate in variants of neutrally-framed, high-stakes,

stag-hunt coordination games. The main purpose of this LFE was to compare how various parameters of these games affected farmers' ability to coordinate towards a higher payoff equilibrium. These parameters included the relative effects of coordination threshold level, premium level, premium uncertainty, as well as the possibility to reveal aggregate pre-play intentions. Results suggest that knowing aggregate pre-play intentions, despite these being non-binding, strongly affected coordination capacities, and particularly so in larger groups (Aflagah, Bernard and Viceisza, 2015). So, the games were intended as a test-bed to inform design the current experiment.

79 groundnut-producing farmer groups participated in the present RCT, of which 28 were also involved in the previous LFE. From November to December 2013, two leaders of each farmer group attended a two- day training conducted by two development specialists. Training sessions were constructed such that leaders from groups assigned to different conditions (see below) did not overlap. The training focused on the potential benefits of collective commercialization. Specifically, leaders were taught how to compute and think through the quantity that is typically necessary in order for group aggregation to be beneficial. Leaders were also instructed to conduct a briefing meeting upon return to the village. Such meeting would discuss the gist of what was covered during the training.

After the training, during January 2014, enumerators went to the villages in order to elicit commercialization intentions from all farmer group members. Prior to doing so, they made sure that the leaders who had taken part in the training had held the "briefing" meeting. For each farmer group, all members who produced groundnuts for the 2014 commercialization season were asked a short series of questions related to their demographic characteristics, their landholding and expected groundnut harvest, alongside with measures of risk aversion, generosity and time preferences. Farmers were also asked how they intended to use their production. The intended use of the production was then summarized by the enumerators into (1) individual commercialization, (2) collective (group) commercialization, (3) inventories, and (4) other uses. They were told that the purpose of this survey was to better understand their decisions with regard to groundnut production. They were also informed that a subsequent group meeting would be held where a message would be delivered to them. They were thus invited to attend that meeting.

During February 2014, a few weeks prior to the start of the commercialization season, the enumerators held a meeting in collaboration with the farmer group. The content of this meeting varied according to the group's treatment assignment:

1. For groups in category A (control), enumerators announced that another survey would be conducted in a few months.

2. For groups in category B, enumerators announced this as well as the group-level aggregate intentions towards collective commercialization that members previously reported.

3. For groups in category C, enumerators announced what was said in B and they revealed the anonymous distribution of the intentions.

4. For groups in category D, enumerators announced what was said in C and they revealed the anonymous distribution of the intentions by leaders versus simple members.

We worked with two federation of groundnut farmer groups (FEGPAB and CCPA), and included all their member groups in the study. The 79 groups were randomly allocated to either one of the

treatments described above. Because FEGPAB and CCPA are differentially active with respect to supporting their groups' activities, randomization was stratified at the federation level. Table 1 summarizes the distribution of groups into these four categories.

In June 2014, a follow-up survey was administered to 10-20 randomly selected members of each group in order to gauge their actual sales. These individuals compose our sample on which our impact estimates are based.

3.2. Estimation strategy

Our proposed estimation strategy follows directly from our experimental design. Specifically, for our main variables of interest, we estimate the following sequence of equations.

$$y_{ic} = \alpha + \beta T_c + \vartheta_{ic} \qquad (1)$$

Where y_{ic} is our outcome of interest such as the quantity of produce that one decided to sell through the cooperative. T_c is a (set) of treatment dummy, taking value 1 if members of the group have received information about others' intentions. In our base specification, we pull together groups B, C and D to assess the impact of reveling intentions. We then proceed to estimate the separate effects of each treatment. ϑ_{ic} is a generic error term including a group-specific error and an individually one. Group-level errors are dealt with by relying on a cluster sandwich estimator.

We then assess the robustness of the obtained results by introducing a set of individual and group level covariates X_{ci} meant to improve the precision of our estimates by reducing some of the unexplained variance from the above estimation, as well as to control for eventual characteristics that are not balanced across treatment groups. We pay special attention to the effect of the group's size, S_c, whose effect we report separately.

$$y_{ic} = \alpha + \beta T_c + X'_{ci}\gamma + \delta S_c + \vartheta_{ic} \qquad (2)$$

Lastly, we rely on the results obtained in the LFE-based study mentioned above to investigate the differential treatment effects according to group-size, by interacting the group's treatment status with its total membership.

$$y_{ic} = \alpha + \beta T_c + X'_{ci}\gamma + \delta S_c + \tau S_c \times T_c + \vartheta_{ic} \qquad (3)$$

3.3. Internal validity

We report evidence of the internal validity of our experiment in Tables 2, 3 and 4 below. Table 2 assesses difference in means at baseline for characteristics of farmers across all four treatment groups. We find limited evidence of systematic differences across groups, except for higher levels of reported generosity (elicited through a standard questionnaire based dictator game) in the control group, as well as a higher fraction of groups that had participated in the previous LFE. If anything, we believe that generosity is positively related to one's contribution to the group one belongs to, and participation into the LFE likely led individuals to better understand the importance of coordination. Thus we believe that these differences may eventually affect downward later impact estimates. We however control for these baseline characteristics in all subsequent estimates.

In Tables 3 and 4 we report results of falsification tests, where we assess whether being exposed to information on others' intentions predicts one's reported intention. Recall that intentions were collected before the aggregate were revealed such that one should expect treatment to have no predictive power on intentions revealed. Table 3 reports estimates based on Equations 1, 2, 3 above, where the dependent variable is whether the member reported to sell any positive quantity of his crop through the group. We find evidence in Column 2 that farmer from groups in which information on peers intentions were provided were 5.5 more likely to report that they intend to sell a positive quantity of groundnut through their group. This result is not robust however to the introduction of interacted terms in columns 3 and 4. In Table 4, we run similar falsification tests, this time on the quantity that one intended to sell through the group. We do not uncover significant differences across treatment status.

Overall results from this section suggest a reasonably balanced set of individual and group-level characteristics. Because we nevertheless found evidence of systematic differences for a set of individual and group-level characteristics, all estimations below assess the robustness of the obtained results upon controlling for these characteristics.

4 Results

We first investigate the effect of knowing others' aggregate intention on one's likelihood to sell through one's group (Table 5), and on the quantity thereof (Table 6). Our results point to a non-linear relationship wherein knowledge about others' intention increases both the likelihood (extensive margin) and the quantities sold (intensive margin) through the group, but only for larger groups (typically above the median size of 24 members). These results are aligned with those of the LFE study that we report in Table 7 for illustrative purpose. In the LFE, the farmers could reveal anonymously their intention to coordinate, and the aggregate intention was revealed. Revealing intentions matters for coordination but only in large groups.

In Tables 8 and 9, we further decompose our main treatment effects between groups B, C and D. Recall that all three groups received information about the aggregate total of group members' intentions. Individuals in group B were only exposed to this information, which could therefore only affect their decision by helping them revise their expectations vis a vis the group's capacity to reach a large enough quantity to sell. In addition to this, groups C and d received information about the distribution of intentions. Farmers could then infer how many of their peers intended to sell through the group, as well as typical amounts that one was willing to sell through the group. This information is more complete as the overall amount could result from either a large number of individuals each intending to sell a small quantity to the group or vice versa. The treatment therefore partly releases information on the distribution of others' beliefs about the potential benefits of collective sales. Lastly in group D, this distribution was reported separately for regular group members' intentions and that of group leaders'. Members may further react to this additional information if they believe for instance that leaders hold better information on the overall potential of collective sales.

Results from Table 8 suggest that individuals' decision to sale any amount of their crop through the cooperative (extensive margin) is mostly driven by information on the overall distribution of intentions (group C). In terms of the extensive margin however, as reported in Table 9, we find that an increase in the amounts sold through the group in all three treatment groups. As before, these results are mostly valid for those groups of larger membership.

In Tables 10 and 11, we further investigate the heterogeneity of treatment effects according to individuals' baseline characteristics. In columns 1 and 2, results point to a negative interaction effect between one's patience (measured through standard time preference assessment) and knowing about others' intentions to sell through the group. We previously argued that that one reason for farmers not to sell through their group relates to delayed payment. This would imply that impatient individuals are the ones who face the highest participation costs to start with. Raising one's expected gains from selling through the cooperative should therefore affect those with the higher participation costs to start with. This is in particular true for the extensive margin (Table 10), though we also find significant effects for the intensive one (Table 11). No such effects are found with respect to risk aversion or generosity. Results point however to a possibly decreasing effect with respect to one's landholding. If true that group sales mostly work through reduced per unit transaction costs which themselves decrease with overall production level, the benefits of group sales must be lower for those with larger production to start with.

These last results seem to translate into welfare impact for the farmers, as shown by the results reported in Table 12. We assess there the effect of the intervention onto farmers' total groundnut revenues. These intent-to-treat estimates suggest an overall positive impact of knowing other's sales intention onto farmers revenues, but the effect decreases with one's landholding, suggesting that poorer farmers have higher benefits from our intervention.

5 Conclusions

In order to alleviate the many constraints faced by smallholders in their search for profitable markets, may development agencies have advocated the benefits of farmers group as a mean to promote the access to such markets, specifically through collective commercialization. Despite such potential, farmer groups fail to do so. In this paper, we have framed the problem as a coordination failure and explore ways to enhance this coordination. We work with a sample of groundnut-producing farmer groups in Senegal where this question has been highlighted by previous studies. First, a lablike field experiment has explored several constraints to coordination failure and the results have motivated a field experiment which results are reported in this paper.

In line with the findings in the lablike experiment, we design the RCT to explore whether others' intentions to sell to one's group impact one's actual sales to the group during commercialization. We find that intentions improve coordination, but only if the group size is large enough. This appears to be because intentions are more informative in larger groups (where the costs to coordination are greater). We also find tentative evidence that intentions improve revenues for smaller-scale farmers. Overall, our current findings suggest that collecting/revealing intentions or supporting the farmers groups with means to do so could be a meaningful policy tool to help farmer groups improve collective action.

In addition to this policy implication, the results in this paper, along with that of the lablike field experiment shed light on the potential to use games in the field to inform and help in the design of policy intervention. Indeed, the results in our field experiments confirm those of the experimental games. In future work related to these experiments, we consider exploring ways in which the different treatments in the games and behavior of the players could have affected their real life behavior.

References

Aflagah, F.K.D., T. Bernard and A. Viceisza, Communication and Coordination: Experimental Evidence from Farmer Groups in Senegal, *IFPRI Discussion Paper No. 1450*

Ajzen, I. (1991). Theories of cognitive self-regulation the theory of planned behavior. *Orga- nizational Behavior and Human Decision Processes 50*(2), 179 – 211.

Aldana, M., J. Ashby, G. Burpee, S. Ferris, G. Heinrich, C. Quiros, T. Remington, and K. Wilson (2007). The organization and development of farmer groups for agroenterprise: Conclusions from a CRS & RII-CIAT study tour in Asia, Africa and Latin America. CRS internal working paper.

Ashraf, N., X. Gin, and D. Karlan (2009). Finding missing markets (and a disturbing epilogue): Evidence from an export crop adoption and marketing intervention in Kenya. *American Journal of Agricultural Economics 91*(4), 973–990.

Barrett, C. B. (2008). Smallholder market participation: Concepts and evidence from eastern and southern Africa. *Food Policy 33* (4), 299 – 317.

Barrett, C. B. and E. Mutambatsere (2008). Agricultural markets in developing countries. In S. N. Durlauf and L. E. Blume (Eds.), *The New Palgrave Dictionary of Economics* (Second ed.). Palgrave MacMillan.

Battalio, R., L. Samuelson, and J. Van Huyck (2001). Optimization incentives and coordination failure in laboratory stag hunt games. *Econometrica 69*, 749–764.

Bernard, T., M. Frolich, A. Landmann, P. N. Unte, A. C. G. Viceisza, and F. Wouterse (2015). Building trust in rural producer organizations in Senegal: results from a random- ized controlled trial. Iza discussion paper 9207.

Bernard, T., L. Sene, A. C. G. Viceisza, and F. Wouterse (2014). Leaders needed: Experimental evidence from rural producer organizations in Senegal. Working paper.

Camerer, C. F. (2015). The promise and success of lab-field generalizability in experimental economics: A critical reply to Levitt and List. In G. Frechette and A. Schotter (Eds.), *Handbook of Experimental Economic Methodology*. Oxford University Press.

Casaburi, L. and R. Macchiavello (2015a). Firm and market responses to saving constraints: Evidence from the Kenya dairy industry. Working paper.

Casaburi, L. and R. Macchiavello (2015b). Loyalty, exit, and enforcement: Evidence from a Kenya dairy cooperative. *American Economic Review 105* (5), 286–90.

Caswell, N. (1984). Autopsie de l'ONCAD. *Politique Africaine 14*, 39–73.

Charness, G. and M. Dufwenberg (2006). Promises and partnerships. *Econometrica 74*, 1579–1601.

Chen, Y., N. Kartik, and J. Sobel (2008). Selecting cheap-talk equilibria. *Econometrica 76*, 117–136.

Cooper, R., D. V. DeJong, R. Forsythe, and T. W. Ross (1992). Communication in coordination games. *Quarterly Journal of Economics 107*, 731–771.

Crawford, V. P. (1998). A survey of experiments on communication via cheap talk. *Journal of Economic Theory 78*, 286–298.

de Janvry, A. and E. Sadoulet (2000). Rural poverty in Latin America: Determinants and exit paths. *Food Policy 25*(4), 389 – 409.

Emran, M. S. and Z. Hou (2013). Access to markets and rural poverty: Evidence from household consumption in China. *Review of Economics and Statistics 95*, 682–697.

Fafchamps, M. and R. V. Hill (2005). Selling at the farmgate or traveling to market. *American Journal of Agricultural Economics 87*(3), 717–734.

Farrell, J. (1987). Cheap talk, coordination, and entry. *Rand Journal of Economics 18*, 34–39.

Farrell, J. and M. Rabin (1996). Cheap talk. *Journal of Economic Perspectives 10*.

Heinemann, H., R. Nagel, and P. Ockenfels (2009). Measuring strategic uncertainty in coordination games. *The Review of Economic Studies 76*, 181–221.

Hellin, J., M. Lundy, and M. Meijer (2007). Farmer organization, collective action and market access in Meso-America. CAPRi Working Paper 67.

Key, N., E. Sadoulet, and A. D. Janvry (2000). Transactions costs and agricultural household supply response. *American Journal of Agricultural Economics 82*(2), 245–259.

Macchiavello, R. and A. Morjaria (2015). The value of relationships: Evidence from a supply shock to Kenyan rose exports. *American Economic Review 105*(9), 2911–45.

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.

Ragasa, C. and J. Golan (2014). The role of rural producer organizations for agricultural service provision in fragile states. *Agricultural Economics 45*(5), 537–553.

Taylor, J. E., A. Zezza, and A. Gurkan (2009). Rural poverty and markets. ESA Working Paper 09-05.

Van Huyck, J. B., R. C. Battalio, and R. O. Beil (1990). Tacit coordination games, strategic uncertainty, and coordination failure. *American Economic Review 80*.

Vandercam, F. (2005). Le cas de l'implication de la Fapal dans la filière arachide au Sénégal. *Dynamiques Paysannes 6*.

Wydick, B. (2007). *Games in Economic Development*. Cambridge, UK: Cambridge University Press.

Tables

Table 1: RCT treatment

Treatment	In common	What is revealed?		
$A(N_{FG} = 17)$	Training + Intentions elicited + Survey (S)	–	–	–
$B(N_{FG} = 21)$	Training + Intentions elicited + S	Aggregate intentions	–	–
$C(N_{FG} = 20)$	Training + Intentions elicited + S	Aggregate intentions	Distribution	–
$D(N_{FG} = 21)$	Training + Intentions elicited + S	Aggregate intentions	Distribution	Leader vs. Member

Total number of individuals surveyed across all treatments: 898.

Table 2: Balance tests across treatments in RCTs (individual level)

Variables	N_i	All	A	B	C	D	p-val diff
Age	898	46.24	45.70	46.93	48.04	44.38	0.02**
Sex (1=male; 0=female)	889	0.67	0.70	0.64	0.70	0.65	0.36
Leader (1=yes, 0=no)	889	0.19	0.22	0.19	0.18	0.18	0.70
Size of land (ha)	889	4.29	4.01	5.54	3.70	3.76	0.45
Risk (1 to 5)	889	2.80	2.80	2.71	2.85	2.84	0.74
Generosity (1 to 7)	889	2.91	3.18	2.88	2.65	2.99	0.00***
Patience (1 to 5)	889	2.52	2.54	2.52	2.72	2.31	0.12
Federation (1=CCPA, 0=FEGPAB)	889	0.53	0.48	0.54	0.56	0.54	0.50
PO exposed to lablike exp.: 1=yes; 0=no	898	0.33	0.42	0.29	0.28	0.33	0.01**
2013 harvest (kg)	889	1719.05	1967.40	1433.07	1864.13	1665.89	0.25
Expected 2014 harvest (kg)	889	1697.33	1773.30	1808.53	1704.92	1498.28	0.73
Intended to coll. com. : 1=yes, 0=no	889	0.84	0.81	0.87	0.84	0.85	0.36
Intentions coll. com. (kg)	889	1014.91	956.04	992.51	1111.32	994.33	0.85
Intentions indiv. com. (kg)	889	154.94	222.15	213.92	120.28	64.65	0.17
Farmed other crops : 1=yes, 0=no	889	0.58	0.60	0.62	0.56	0.53	0.26
Attended int. revelation meeting: 1=yes; 0=no	898	0.59	0.57	0.57	0.61	0.61	0.71

The last column is obtained by running a one-way ANOVA test, with standard errors clustered at the FG/PO level.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Similar results hold if we compare A against $B \cup C \cup D$.

Table 3 : Falsification test - predicting the intention to sell through the PO

	1	2	3	4
PO received some info	0.047	0.055	0.029	0.044
	(0.036)	(0.028)*	(0.068)	(0.073)
Size of PO		0.000	0.002	0.000
		(0.001)	(0.001)	(0.002)
Info X Size			0.000	0.000
			(0.002)	(0.002)
Constant	0.808	0.565	0.751	0.575
	(0.030)***	(0.067)***	(0.058)***	(0.091)***
R^2	0.00	0.10	0.02	0.10
N	889	889	889	889
Controls	No	Yes	No	Yes

Standard errors are clustered at the producer organization (PO) level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Controls include whether the PO was in the 2013 games, age, sex, land size, 2013 harvest, generosity, risk measures and time preferences elicited through hypothetical questions, dummies for the federation, for whether individual is a leader and whether they had other crops apart from peanut, all measured pre-intervention.

Table 4 : Falsification test - predicting the quantity intended to be sold through the PO

	1	2	3	4
PO received some info	75.735	180.654	321.321	230.791
	(297.278)	(119.042)	(690.615)	(423.288)
Size of PO		-6.620	14.277	-4.999
		(3.420)*	(15.828)	(10.056)
Info X Size			-9.356	-1.801
			(17.153)	(11.303)
Constant	956.040	-1,189.354	564.371	-1,234.585
	(263.234)***	(282.719)***	(630.506)	(509.144)**
R^2	0.00	0.44	0.00	0.44
N	889	889	889	889
Controls	No	Yes	No	Yes

Standard errors are clustered at the producer organization (PO) level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Controls include whether the PO was in the 2013 games, age, sex, land size, 2013 harvest, generosity, risk measures and time preferences elicited through hypothetical questions, dummies for the federation, for whether individual is a leader and whether they had other crops apart from peanut, all measured pre-intervention.

Table 5 : Impact of providing intentions on the probability of selling through the PO.

	1	2	3	4
PO received some info	0.050	0.071	-0.191	-0.089
	(0.063)	(0.057)	(0.115)	(0.103)
Size of PO		0.007	-0.001	0.002
		(0.002)***	(0.003)	(0.003)
Info X Size			0.008	0.006
			(0.004)**	(0.003)*
Constant	0.152	-0.092	0.171	0.053
	(0.051)***	(0.083)	(0.097)*	(0.097)
R^2	0.00	0.17	0.10	0.17
N	898	889	889	889
Controls	No	Yes	No	Yes

Standard errors are clustered at the producer organization (PO) level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Controls include whether the PO was in the 2013 games, age, sex, land size, 2013 harvest, generosity, risk measures and time preferences elicited through hypothetical questions, dummies for the federation, for whether individual is a leader and whether they had other crops apart from peanut, all measured pre-intervention. Controls also include whether the individual indicated positive intentions to sell through the group.

Group size: range 5-91; mean=28; median=24; sd=17.66

Mean of dependent variable in control group: .15

Table 6 : Impact of providing intentions on the quantity sold through the PO.

	1	2	3	4
PO received some info	81.533	107.155	-359.271	-213.355
	(110.988)	(94.673)	(172.234)**	(158.047)
Size of PO		10.140	-1.278	-0.221
		(3.853)**	(2.872)	(3.153)
Info X Size			15.042	11.514
			(4.615)***	(4.568)**
Constant	136.657	-279.688	171.714	9.456
	(97.921)	(166.124)*	(149.741)	(169.129)
R^2	0.00	0.16	0.11	0.17
N	898	889	889	889
Controls	No	Yes	No	Yes

Standard errors are clustered at the producer organization (PO) level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Controls include whether the PO was in the 2013 games, age, sex, land size, 2013 harvest, generosity, risk measures and time preferences elicited through hypothetical questions, dummies for the federation, for whether individual is a leader and whether they had other crops apart from peanut, all measured pre-intervention. Controls also include whether the individual indicated positive intentions to sell through the group.

Group size: range 5-91; mean=28; median=24; sd=17.66.

Mean of dependent variable in control group: 136.65

Table 7 : LFEs: Impact of intentions & group size on chips sent to group

	1	2
Intentions	0.428	-0.007
	(0.175)**	(0.295)
Group size = 20	-0.059	-0.395
	(0.213)	(0.260)
Intentions x Size		0.663
		(0.350)*
R^2	0.12	0.12
N	3,312	3,312
Controls	Yes	Yes

Standard errors are clustered at the producer organization (PO) level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Standard errors clustered at game session level. Controls: gender, age, educ, land size, trust, risk, time, altruism.

Table 8: Impact of providing intentions by treatment group on the probability of selling through the PO.

	1	2	3	4
B	0.044	0.047	-0.151	-0.136
	(0.084)	(0.076)	(0.206)	(0.187)
C	0.044	0.075	-0.320	-0.193
	(0.087)	(0.063)	(0.105)***	(0.100)*
D	0.070	0.072	-0.079	0.049
	(0.073)	(0.066)	(0.124)	(0.118)
Size of PO		0.007	-0.001	0.002
		(0.002)***	(0.003)	(0.003)
Category = B X Size			0.006	0.006
			(0.006)	(0.006)
Category = C X Size			0.013	0.010
			(0.003)***	(0.003)***
Category = D X Size			0.005	0.001
			(0.003)	(0.004)
Constant	0.152	-0.167	0.171	-0.054
	(0.051)***	(0.079)**	(0.097)*	(0.092)
R^2	0.00	0.18	0.13	0.21
N	889	889	889	889
Controls	No	Yes	No	Yes

Standard errors are clustered at the producer organization (PO) level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Controls include whether the PO was in the 2013 games, age, sex, land size, 2013 harvest, generosity, risk measures and time preferences elicited through hypothetical questions, dummies for the federation, for whether individual is a leader and whether they had other crops apart from peanut, all measured pre-intervention. Controls also include whether the individual indicated positive intentions to sell through the group.

Group size: range 5-91; mean=28; median=24; sd=17.66.

Mean of dependent variable in control group: 0.15

Table 9: Impact of intentions by treatment groups on the quantity sold through the PO.

	1	2	3	4
B	48.282	58.437	-363.270	-306.497
	(122.216)	(97.122)	(200.919)*	(198.476)
C	147.081	188.994	-508.278	-330.423
	(163.204)	(128.289)	(170.694)***	(161.272)**
D	60.547	67.034	-200.649	-11.625
	(111.456)	(101.057)	(160.053)	(150.224)
Size of PO		10.349	-1.278	0.623
		(3.711)***	(2.878)	(3.088)
Category = B X Size			13.391	12.838
			(5.996)**	(6.182)**
Category = C X Size			23.552	18.717
			(5.195)***	(5.212)***
Category = D X Size			8.814	3.495
			(3.304)***	(3.814)
Constant	136.657	-318.741	171.714	-80.898
	(98.040)	(160.575)*	(150.081)	(160.739)
R^2	0.01	0.17	0.14	0.20
N	889	889	889	889
Controls	No	Yes	No	Yes

Standard errors are clustered at the producer organization (PO) level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Controls include whether the PO was in the 2013 games, age, sex, land size, 2013 harvest, generosity, risk measures and time preferences elicited through hypothetical questions, dummies for the federation, for whether individual is a leader and whether they had other crops apart from peanut, all measured pre-intervention. Controls also include whether the individual indicated positive intentions to sell through the group.

Group size: range 5-91; mean=28; median=24; sd=17.66.

Mean of dependent variable in control group: 136.65

Table 10 : Heteregenous impact on the porbability to sell through the PO.

	1	2	3	4	5	6	7	8
PO received some info	0.192	0.187	0.134	0.103	0.069	0.079	0.056	0.064
	(0.066)***	(0.063)***	(0.095)	(0.087)	(0.078)	(0.073)	(0.066)	(0.062)
Patience (1 to 5)	0.036	0.034						
	(0.014)**	(0.013)**						
Info * Patience	-0.055	-0.044						
	(0.018)***	(0.016)***						
Generosity (1 to 7)			0.035	0.013				
			(0.025)	(0.021)				
Info * Generosity			-0.025	-0.009				
			(0.030)	(0.026)				
Risk (1 to 5)					0.000	-0.009		
					(0.017)	(0.016)		
Info * Risk					-0.006	-0.001		
					(0.020)	(0.019)		
Size of land (ha)							0.000	-0.003
							(0.006)	(0.006)
Info * Land size (ha)							-0.001	0.003
							(0.006)	(0.006)
Constant	0.060	-0.097	0.040	-0.039	0.151	-0.021	0.150	-0.012
	(0.043)	(0.070)	(0.080)	(0.086)	(0.058)**	(0.078)	(0.054)***	(0.072)
R^2	0.01	0.12	0.01	0.12	0.00	0.12	0.00	0.12
N	889	889	889	889	889	889	889	889
Controls	No	Yes	No	Yes	No	Yes	No	Yes

Standard errors are clustered at the producer organization (PO) level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The dependent variable is patience in 1 and 2 (time preferences), generosity (dicator game) in 3 and 4 , and risk in 5 and 7. Controls include whether the PO was in the 2013 games, age, sex, land size, 2013 harvest, generosity, risk measures and time preferences elicited through hypothetical questions, dummies for the federation, for whether individual is a leader and whether they had other crops apart from peanut, all measured pre-intervention. Controls also include whether the individual indicated positive intentions to sell through the group.

Table : Heteregenous impact on the quantity sold by charateristics related to strategic uncertainty.

	1	2	3	4	5	6	5	6
PO received some info	249.060	247.013	-36.566	-87.996	49.693	91.238	205.189	182.703
	(68.926)***	(73.999)***	(242.388)	(199.649)	(178.047)	(164.574)	(63.763)***	(70.925)**
Patience (1 to 5)	41.935	42.168						
	(32.760)	(32.879)						
Info * Patience	-65.113	-50.241						
	(34.819)*	(30.952)						
Generosity (1 to 7)			-23.459	-54.453				
			(44.786)	(42.043)				
Info * Generosity			39.807	67.155				
			(47.946)	(43.923)				
Risk (1 to 5)					-20.108	-24.818		
					(23.781)	(29.061)		
Info * Risk					12.394	10.217		
					(28.949)	(32.117)		
Size of land (ha)							30.055	15.080
							(31.529)	(27.683)
Info * Land size (ha)							-30.097	-15.830
							(31.536)	(27.881)
Constant	30.336	-194.998	211.180	46.819	192.919	-84.076	16.026	-142.424
	(19.658)	(102.122)*	(235.103)	(179.207)	(161.576)	(157.258)	(35.579)	(95.815)
R^2	0.01	0.12	0.00	0.12	0.00	0.12	0.01	0.12
N	889	889	889	889	889	889	889	889
Controls	No	Yes	No	Yes	No	Yes		

Standard errors are clustered at the producer organization (PO) level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The dependent variable is patience in 1 and 2 (time preferences), generosity (dicator game) in 3 and 4 , and risk in 5 and 7. Controls include whether the PO was in the 2013 games, age, sex, land size, 2013 harvest, generosity, risk measures and time preferences elicited through hypothetical questions, dummies for the federation, for whether individual is a leader and whether they had other crops apart from peanut, all measured pre-intervention. Controls also include whether the individual indicated positive intentions to sell through the group.

Table 12 : Impact of intentions on the total revenue from groundnut sales.

	1	2	3	4	5	6
PO received some info	4.143	4.678	274.360	220.888	188.605	271.112
	(77.827)	(51.000)	(185.009)	(140.307)	(57.810)***	(161.664)*
Size of PO		1.287	12.890	8.275	3.687	7.949
		(1.641)	(6.188)**	(5.498)	(1.517)**	(4.837)
Info X Size			-9.982	-7.767		-7.409
			(6.375)	(5.423)		(4.762)
Size of land (ha)					49.762	15.698
					(19.417)**	(13.854)
Info * Land size (ha)					-47.386	-15.125
					(19.603)**	(13.956)
Constant	255.004	-144.740	-98.587	-339.769	-46.363	-365.624
	(69.713)***	(99.516)	(172.240)	(144.827)**	(69.192)	(147.402)**
R^2	0.00	0.35	0.03	0.36	0.09	0.36
N	893	884	884	884	884	884
Controls	No	Yes	No	Yes	No	Yes

Standard errors are clustered at the producer organization (PO) level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Controls include whether the PO was in the 2013 games, age, sex, land size, 2013 harvest, generosity, risk measures and time preferences elicited through hypothetical questions, dummies for the federation, for whether individual is a leader and whether they had other crops apart from peanut, all measured pre-intervention. Controls also include whether the individual indicated positive intentions to sell through the group.

Group size: range 5-91; mean=28; median=24; sd=17.66.

Mean of dep. var. in control group: 255