

## **The importance of social capital in Colombian rural agro-enterprises<sup>1</sup>**

Nancy L. Johnson, CIAT , Ruth Suarez, CEGA, Mark Lundy, CIAT

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**Abstract**

*This paper analyzes social capital in the context of rural agroenterprises. Qualitative and quantitative methods are combined to characterize and measure the contribution of social capital to the performance of a sample of 50 agroenterprises in Colombia. Social capital is hypothesized to fulfill three functions in firms: provide access information via networks of contacts; reduce transactions costs in contracting via trust; and sustain capacity for collective action. Qualitative analysis documents examples of each of these functions in the context of the 50 businesses. Categorical indices of levels of social capital use are developed, and patterns within and among firms are analyzed. Information networks are the most common function of social capital, however in general use of the three functions of social capital are highly correlated. To estimate social capital's contribution to firm structure and performance, quantitative measures of firm-level demand for social capital are identified based on the number and strength of relationships that a firm maintains. These relationship variables correlate with the functional indicators developed in the qualitative analysis. Econometric analysis finds high returns associated with strength rather than number of relationships. Both quantity and quality of the relationships are important for the firm's bottom line.*

## 1. Introduction

Over the past several decades, the process of agro-industrialization<sup>2</sup> has transformed agriculture and rural communities in many parts of Latin America, more so than in any other part of the world (FAO). As a result of demographic change, increasing regional and global incomes, and structural adjustment and market liberalization programs undertaken in many LAC countries, agro-industrialization has expanded far beyond the traditional agro-export crops (Reardon et al). Today both traditional commodities and new crops are being produced, processed, and marketed both domestically and internationally with the participation of national and multinational agribusiness companies. Promoting agro-industrial development is a policy goal for many governments in both developing and developed countries.

It is widely believed that agro-industrialization can contribute to rural economic and social development. Economic development impacts would stem from the value added by post-harvest activities, and its multiplier effects within rural communities. The social contributions are less well defined but appear to relate both to increased incomes and to the increased integration of individuals and groups both within agro-industrial firms and along the supply chains. Spillovers from this economic activity are expected to “promote social cohesion in rural communities.”(Lafourcade, 2002, p. A ).

The principal hypothesis of this study is that while strengthened social capacity may an outcome of agroindustrialization, social capital is also critical key input into the process. Individuals and groups that cannot work collaboratively or establish and maintain both trust-based relationships and networks of contacts. Agro-enterprise firms compete in complex supply chains that are technically demanding, information intensive and require coordination among different actors and different stages of the process. Where markets fail and transactions costs are high, social capital can make a significant contribution to firm performance by providing access to information and reducing the costs of contracting and coordination. Failure to recognize and explicitly incorporate the concept of social capital as an input into agro-industrialization may limit the effectiveness of programs and projects that promote agro-industrialization as a means to alleviate rural poverty.

The paper is organized as follows. Section 2 briefly summarizes theoretical and empirical evidence on the role of social capital in firm performance. Section 3 describes the context of the study and the data. Section 4 presents the results of the qualitative analysis of the functions that social capital performs in agro-enterprises. In section 5, measures of firm level demand for social capital are identified and analyzed, and the economic returns to social capital are estimated. Section 6 summarizes and concludes with a series of recommendations for policy and further research.

## 2. Social capital and firm performance: theoretical and empirical literature

Coleman formulated the concept of social capital as way to bridge the gap between the sociologists’ explanation of human behavior as determined by social factors—norms and social obligations—and the economists’ assumption of rational self-interest. According to Coleman,

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<sup>2</sup> Agro-industrialization has been defined as a process involving “ (1) growth of agro-processing, distribution, and farm-input activities off-farm; (2) institutional and organizational change in the relation between agri-food firms and farms, such as a marked increase in vertical coordination; (3) concomitant changes in the farm sector, such as changes in product composition, technology, and sectoral and market structures.” (Wilkinson, 1995).

“the function identified by the concept of social capital is the value of these aspects of the social structure to actors as resources that they can use to achieve their interests” (Coleman, 1993, p. s101). While many subsequent studies have focused on community level outcomes and defined social capital as a community level public-good (Putnam; Helliwell and Putnam; Helliwell; Brown and Ashman; Krishna and Uphoff ), the original conception of social capital was as something used by individuals to further their own personal objectives. Coleman’s objective is to explain “just what it is about social relations that can constitute a useful capital resource for individuals” (p. s102). Social capital may be embedded in society rather than in any one individual, but it is given value by individuals and organizations who use it to further their individual or collective interests.

The original conception of social capital made it very clear that social capital may not be evenly distributed within the community, and that while it should generally have positive benefits for those who have access to and use it, the consequences maybe different for society as a whole (Coleman, Sandefur and Laumann; Edwards and Foley). Sandefur and Laumann argue that “a specific form of social capital may vary in the degree to which its benefits generalize to different kinds of goals, and how forms that are valuable for some purposes may be a liability for other purposes” (p. 1043). This suggests that understanding the contribution of social capital to economic and social development will require looking at its role in individual and firm level decisions. Until we have a better understanding of this, we will not be able to address the important policy question of “how social capital can be constructed so as to enhance the quality and sustainability of livelihoods” (Bebbington, p. 2039).

Coleman clearly distinguishes between the specific form that social capital takes and the role that it plays, allowing the concept to be useful in a variety of contexts. According to Coleman, the fact that social capital is defined by its function not its form is useful because it “accounts for different outcomes at the level of individual actors” while at the same time allowing researchers to “make the micro-to-macro transitions without elaborating the social structural details through which this occurs (1988, p. s101). Nevertheless, Coleman identifies three general forms that social capital might take: 1) obligations, expectations and trustworthiness of structures; 2) information channels, and 3) norms and effective sanctions.

In one of the few empirical analyses of social capital in the context of agro-enterprises, Fafchamps and Minten, in a study of agricultural traders, conclude that in a world with transactions costs, the returns to social capital may be as high or higher than the returns to labor or to physical or human capital. Their definition of social capital is essentially social networks. Barr (2000a), in a study of small-scale manufacturing entrepreneurs in Ghana, looks at the contribution of networks of business-related contacts to firm performance in the context of endogenous growth theory. She finds support for her hypothesis that contacts contribute to technical information flows among enterprises, and that these flows not only make a positive contribution to individual firm performance but generate spillovers to other firms as well. Barr’s measure of networks is based on the owner’s personal contacts and no attempt is made to quantify they link to firm structure or behavior.

Barr (2000b) also investigates the possibility that networks of contacts can provide the basis for other types of firm level benefits beyond technical information flows. An analysis of why Ghanaian entrepreneurs valued their networks found that they reduce search and contract enforcement costs through information sharing. Networks can also be the basis of collective action, though this was not common and usually only involved a subset of network members. For this reason she hesitates to call networks groups because they operate in a very decentralized way.

She also finds that there is high variation across entrepreneurs and that the specific environments in which they operate greatly affect the utility of social networks.

In this study, we seek to build on this work by addressing two main questions: 1) how is social capital important? and 2) how important is social capital? The first question is addressed through a primarily qualitative analysis of the functions that social capital performs within individual enterprises. The goal of this analysis is to document the use of social capital by firms, clarify what it means to use social relations for economic purposes, and suggest appropriate quantitative measures for firm-level use of social capital. The second question is tackled with quantitative methods for measuring firm's demand for social capital and estimating economic returns to it. Using multiple methods is important because a limitation of much of the quantitative social capital literature is that while it identifies interesting and statistically significant relationships between variables, the causality and the policy implications are often not clear (Wong Kwok-fu, 2001). By integrating qualitative analysis of the functions of social capital with quantitative analysis of the how social capital affects firms' structure and performance, we can better interpret results and arrive at conclusions with clear development implications.

### **3. Study context and data**

The data for the analysis come from a sample of 50 randomly-selected small and medium agroenterprise firms in five regions of Colombia. The zones were identified because they are all centers of agro-industrial activity, yet differ in their historical/cultural dynamics and institutional contexts. The regions include the Caribbean Coast near the cities of Sincelejo, Sucre and Montería, Córdoba; Eastern Antioquia; Ubaté, Cundinamarca; Velez, Santander; and the region around Manizales, Caldas in the coffee growing region. Some general characteristics of the agro-enterprises are presented in Table 1.

For each firm, in-depth, open-ended interviews were conducted with the owner/manager about firm history, business practices, decision-making and conflict resolution processes, relations with other individuals and organizations, and important influences, challenges and opportunities facing the firm. The purpose of these questions was to get an idea of the specific context of the business, and document examples of how social capital might have been used to further firm objectives.

At the same time, quantitative data on a range of demographic and economic characteristics of firms and their owner/managers were also collected. Detailed social and demographic information about the owner/managers was collected, including education, work experience, participation in different types of groups, and size and diversity of networks of contacts (Table 2). At the firm level, data were collected on labor, capital and value of production (Table 1), as well as the firm's relationships with other individuals and organizations (Table 6). Venn Diagrams were used to identify and rank the relationships according to their strength. Subsequently, a series of questions with coded responses was asked about each specific relationship. Key informants were interviewed about firm performance and impact, and about community social and economic tendencies.

#### 4. How is social capital important? Functions of social capital in rural agroenterprises

This section presents and analyzes examples of how firms were observed to use social relations as an input into production. Social capital was expected to perform three general functions within firms. The first was to obtain information via broad networks of personal contacts maintained by firm owner/managers. The second function of social capital was to reduce uncertainty and monitoring costs by working with trusted individuals and organizations. Finally, we expected that some firms would be able to benefit by engaging in collective action, and that social capital would influence whether collective action emerged and was sustained.

##### 4.1 Information networks

Firms used their information networks for four main purposes, to identify and contact clients, to access market information, to access inputs, and to obtain technical and financial assistance.

###### *Identify and contact potential clients*

In all the regions, the most common use of information networks was to identify and make contact with potential clients. Few firms had never followed up on the reference of a relative or friend of a friend. A quarter of all current clients were initially either friends of friends or acquaintances of the firm owner/manager. In some cases, the use of personal contacts was more systematic. A group of investors in Cartagena that owns a dairy products firm uses its contacts in urban areas for market development while a trusted farm administrator runs the production facility. A public-private firm that processes and markets horticultural products was founded with active support of the leaders of Medellín's business community, including managers of several important supermarket chains. Firms also use friendships to get retail clients. Thanks to the owner's friendship with bus drivers, one cheese factory in Ubaté is a frequent rest stop for long distance buses traveling north from Bogotá.

Personal contacts are particularly important in opening doors, especially at large chain supermarkets. However it appears that they are not sufficient to maintain clients when firms are deficient in terms of quality, volume or price. In several cases clients obtained by personal contacts were later lost because firms did not meet requirements. Sometimes, this appears to be due to the lack of a good relationship between the firm and the client. A good example is a fruit processor in Antioquia that obtained its main client, the well-known fast food chain, through a personal contact. The firm fills the orders on time, however it has made no effort to follow up with the client to see how satisfied they are. Our interview with the client revealed they were about to drop the agro-enterprise for a lower cost competitor. Since the agro-enterprise is not aware of this situation, they can do nothing to avoid it.

###### *Accessing market information*

Many firms also reported using their networks of personal contacts to obtain information about markets, prices, and products. While there are a few cases of purely personal relationships yielding these kinds of benefits, it was more common to see firms getting this information from other actors in the supply chain, demonstrating the multipurpose nature of supply chain relationships. Wholesalers, distributors and even other producers in regional markets were frequently mentioned as good sources of information about prices and market trends. They also

provide firm-specific information. In Antioquia, a regional distributor suggested that a struggling sugar cane processor begin producing a powdered version of its product, which was an instant success. In the case of one fruit-processing firm, a friend who was an employee of a supermarket chain gave the founder the idea to base a firm on a specific fruit. Business or industry associations can also be good sources of information.

### *Access to inputs*

Over half of the agricultural producers who supply firms with raw materials were either friends of friends or acquaintances of the owners at the time they began supplying the firms, as were nearly a third of non-agricultural input suppliers. Several former employees of agribusiness or technical assistance organizations founded businesses built on contacts they had made with producers and other suppliers. Again, these relationships provide information and open doors, but are not sufficient to guarantee good long term working relations. A dairy processor had good contacts with farmers from a previous job as a technician. Nonetheless, until he was able to prove that his firm would be a reliable buyer of milk, producers often failed to deliver product and had to pay price premiums to assure a steady milk supply.

### *Technical and financial support*

Several firms had connections in governmental or non-governmental agencies who facilitated access to financial, technical and management support. Contacts in universities were a good source of technical assistance. A firm owner who is also a politician and community leader was able to use his contacts to find out about opportunities for technical and social assistance both for producers associated with the firm and for their communities in general.

Here again, personal contacts open doors however larger benefits can come with consolidation of the relationships. There are several cases where initial contacts between an institution such as an NGO or a government agency charged with providing support to agro-industries have, over time, become trust-based relationships that permit the firm to get access to a range of benefits beyond the initial services offered by the support institution. A common example is a company that starts by attending some kind of training offered by an institution, and later gains the institution's support in the formulation and even financing of project proposals.

## **4.2 Trust**

Trust is often an essential element in business relationships. If individuals or firms can trust each other, they can spend fewer resources on monitoring and enforcing contracts. Among the firms in the survey, trust plays an important role in facilitating interaction with others actors in the production chain, helping firms to maintain relationships with clients, reduce the cost of assuring producer compliance; manage crises; and obtain credit.

### *Maintaining relationships with clients*

As mentioned above, good relationships can help firms to recognize and respond to the clients needs. They also permit the client to understand and take into consideration the circumstances of the firm. A relationship of mutual trust and respect allowed a medicinal plants cooperative to

retain an important client in spite of the fact that it can't always fulfill the clients stated volume requirements. The owner of a woodworking shop in the Caribbean coast hired employees to do the woodworking so that he could go out and get clients. The reason is that he feels that hired salespeople cannot establish the same strong relationships with clients that the owner can.

### *Reducing the cost of monitoring contract compliance*

Trust based relationships with clients essentially reduce the clients' enforcement costs. Agro-enterprise firms look for the same benefits with their own suppliers. Most firms report that they have strong relationships with agricultural producers who supply their raw materials, even though they don't have written or even verbal contracts with them. Just as cooperatives distinguish between member and non-member producers, some investor-owned firms distinguish between trusted producers and the rest using the terms associated and non-associated producers.

Strong relationships with producers mean that firms can be assured that producers will comply with their promises to supply given quantities and qualities on given dates. Vegetable and dairy firms report that with trusted producers they can reduce or even eliminate quality and residue checks that are required for other producers. This was also important in transportation services, where firms need to be sure that agrochemicals or other substances have not been transported recently in the same containers. It should be pointed out that this trust might only be useful in certain segments of the market. In the coffee zone, where some firms are producing organic products for export, producers must sign legal contracts with firms certifying that their production is organic production.

It is important not to assume that a close personal relationship automatically means confidence. A few firms reported robberies by family members. Similarly, friendships can be used to take advantage of the firm. The ex-manager of the fig cooperative signed a contract with a friend who is a fruit and vegetable distributor in Bogotá. The deal is very favorable to the distributor at the expense of the fig cooperative.

### *Managing crises*

Several firms say they maintain close ties with others in the same business so that they can manage crises such as power outages or transportation failures. These problems can be devastating for firms with highly perishable products, prompting competing firms to establish reciprocal arrangements to share equipment in the event of an emergency.

### *Accessing credit*

Several firms get credit on the basis of trust-based relationships. In many cases, associated producers or coop members agree to receive delayed payments for their products. Several firms reportedly obtained credit from family members because the banks rejected them. One owner got credit from a former boss when the family rejected him. In Antioquia two firms, one non-profit and one for profit, received loans directly from some members or associated producers. In one case, a producer let a private company use his land to secure a loan.



### 4.3 Collective action

In the 50 case study enterprises, collective action contributed to firm performance in eight different ways, more than double the number of functions performed by either networks or trust. The majority of collective action takes place among producers, either in their capacity as members of a cooperative or as associated producers of an agroenterprise. As expected, collective action is more common in cooperatives and associations, however it is also found among private firms.

#### *Collective commercialization*

One common use of collective action is to permit the collective commercialization of products, especially of high-value fruits and vegetables. Some of commercializers perform limited post-harvest activities such as grading and packing, however in general the collective commercialization is main activity of the firm. The advantage of joint selling is to obtain higher prices by reducing intermediation costs and/or delivering greater volume. Most firms that report collective commercialization are cooperatives or associations. In general the higher the degree of product transformation, the less likely the firm is to do collective commercialization on a regular basis. The ability to sustain collective action is important precisely because the better prices are negotiated on the basis of volume. Fluctuating market prices often mean that at times individuals can obtain better prices by violating their commitments to the group and selling outside.

Lack of commitment on the part of producers was frequently mentioned by firm owners/managers in the interviews, suggesting that this type of collective action is not easy to maintain. Firms attempted to deal with the collective action problem in a variety of ways. Some, such as public-private vegetable marketing firm, are addressing the problem directly via training programs for members on the importance of solidarity and mutual benefits of collective action. Several cooperatives require training in “cooperativism” as a condition of joining. In the case of the private fruit processor, the owner and founder of the business also led a parallel effort community wide on the importance of values and tolerance. These techniques appeared to be working, especially in cases where the decision to do them was internal, or where leadership was very strong and dynamic.

One exception to the cooperative model of collective marketing of products by many farmers with little value added is when a small group of firms works together to meet the regular demand of a specific client. This was observed among woodworking shops in the Caribbean coast and among fruit processing firms in the Coffee Zone. Woodworkers tended to produce independently while the fruit processors report sharing information, space, equipment and sometimes even workers.

#### *Collective provision of inputs*

Just as selling in large volumes allows firms to negotiate higher output prices, buying in bulk can help them obtain lower input prices. As was the case with collective marketing, collective input purchase was most likely to occur among producers or processors who were members of a cooperative, though in some cases only subgroups of the members participate. The benefits and costs of collective purchasing clearly depend on the product. In Velez, guava processors

affiliated with a guava cooperative purchase sugar collectively from a refinery, however they all buy fruit individually from intermediaries and report problems with unfair competition.

While a benefit in itself, we often found that firms used collective provision of inputs such as technical assistance, machinery, or agrochemicals to strengthen the commitment of individuals to a group whose main activity is something else, such as collective marketing. In these cases, the firms may absorb the transactions costs as a cost of maintaining collective action in their primary activity. Examples include access to a community supermarket, hiring family members in the firm (especially common in cooperatives), or involving family members in health, education and social development programs. Although the provision of non-economic benefits is expected for the non-profits, in some cases for-profit firms were also observed to provide them. Again, these cases tended to be extraordinary in terms of the high levels of leadership and social commitment of their owners/managers.

Another way that firms can collectively access inputs is through exchange among members. In two cases, one association and one cooperative, the members maintain seed exchange networks among themselves so that they can always be assured of a supply of quality seed. In both cases, the products are uncommon—guava (which is usually collected rather than planted) and medicinal plants—so seed supply could be a problem.

### *Collective monitoring and enforcement*

Firms also reported that they relied on collective monitoring and enforcement of norms and standards within the organization. The physical proximity and history that many members of coops, producers associations or processing firms share can reduce the costs of monitoring whether individuals are fulfilling their obligations to the firm. This is especially important in an industry like agriculture where production risk can be high and monitoring costly.

In both cooperatives and individually-owned firms with associated producers, collective decisions were made to either punish or in extreme cases sever ties with individuals for noncompliance. In most cases the decision to act on noncompliance is slow in coming and is usually only taken when things were in very bad shape. In a few cases, however, collective monitoring and enforcement was done proactively, with the goal of enhancing quality. One cooperative started a program in which more experienced members support new ones to make sure they are capable of attaining and maintaining the required quality standards. A private firm hired technicians to visit farmers and provide technical support, something that also allowed them to monitor practices on farm. This firm says that it achieved a reduction in rejection rates, however it acknowledges that it transferred the collective action problem from the producers to the technicians. The firm provides its employees with some collective benefits, such as a cow that they jointly feed on organic waste from the factory, which could be seen as efforts to strengthen the ties among them.

Unlike Barr, we did not find examples of firms using broader networks for collective monitoring and enforcement. Not a single firm reported dealing with non-compliance by involving outsiders or by informing or threatening to inform others about the problem. Over half of the firm owners said that in a case of non-compliance they would quietly terminate the relationship and 36 percent said they would try to work things out themselves. While the hypothetical nature of this question may make it difficult to answer reliably, these responses are consistent with the tense socio-political environment in which firms operate in rural Colombia. In a pre-tested version of the questionnaire firm owners were asked about cases of conflict rather than non-compliance. The

basic response was that they did not have conflicts, with the implication being that they simply could not allow them to happen.

### *Collective production or processing*

Several firms reported engaging in some type of collective production or processing. Most processing firms, including cooperatives and small family firms, have hierarchical organizational structures and strict divisions of labor, however some firms process collectively. One milk processing plant in Ubaté ran into financial difficulties and is now simply pooling family labor resources to keep the firm afloat. In a jam and jelly firm in Antioquia, legally constituted as a collective society, six women do all the fruit processing collectively and share equally in the benefits. The firm does not appear to be very profitable, and has lost over 80 percent of its members over the past few years, in spite of being located in a community with a long history of community social activism.

Several agroenterprises mention collective agricultural production. Members of the a multi-activity cooperative that produces, process and sells medicinal plants generally produce individually however they have planted parcels collectively on several occasions. The first time they reported doing it was because medicinal plants were a new crop to them and they wanted to share the risks. Later, they got involved in a participatory research project where they were trying new varieties and practices. Again, collective production allowed the to pool the risks of the experimentation.

### *Collective financing*

Collective action is also evident in the way many enterprises are financed. In a more systematic example of the delayed producer payments mentioned in the section on trust, the ability of some cooperatives and other firms to survive is based on producers' collective willingness to let other obligations be paid first. In a cassava-drying cooperative in the Caribbean coast, members turn their production over to the cooperative, which then processes and sells it and uses the income to buy product from non-members. With the money from the processing and sale of the non-members cassava, the members are paid.

In the case of cooperatives and other firms with unlimited liability among members, any borrowing that the firm does is done collectively. In theory, this should limit the ability and possible also the incentives for these firms to borrow money. As a result, institutions that support agro-industry often try to make it easier for cooperatives to get access to capital by providing special financing. This may provide perverse incentives, however. Three private firms in Antioquia are considering or are in the process of becoming cooperatives for no other reason than to get access to this credit.

### *Management of common property*

Two businesses made investments that they hold as common property among members. Using a grant from an NGO, a medicinal plant cooperative purchased land that it uses for its experiments. A cattle producers association owns farm machinery, and the members pay special rates to use it.

Where collective action is important is in the design and implementation of norms regarding appropriate use and maintenance.

Purchasing common assets, like collective purchase of inputs, can be a way to build commitment from group members by providing additional benefits to group membership. However some level of group management capacity is required to manage the asset. The medicinal plant cooperative has strong collective capacity, and while the producers association does not, until recently it had a very strong, dynamic, and honest leader who played a major role in deciding how the group would be managed.

### *Collusion*

A few firms reported that they got together with other firms in the same business to set prices that they would pay for agricultural inputs. While this benefits the firms involved, it has negative consequences for society as a whole.

### *Collective action in related services*

In several regions, firms report working with other individuals and organizations to improve local water supplies, transportation facilities, and communications. In areas like the coffee zone, this is likely related to overall high levels of community organization and capacity. In the guava-processing cluster of Velez, current levels of community organization are not high, however infrastructure needs are. Several firms are active in community activities. The firms that are involved in these activities tend to have other connections in the public sphere, for example owners or members who are involved in community organizations or in local politics.

## **4.4 Patterns of social capital use within and across firms**

These examples demonstrate that social relations can perform a variety of economic functions within agro-enterprise firms. To facilitate comparative analysis, we constructed indices of the use of different functions of social capital. Each firm was ranked on a scale of 1 (lowest) to three (highest) according to how frequently it appeared to use each of the three functions. The information and trust functions were moderately important for 40 and 50 percent of firms, respectively (Table 3). Collective action was unimportant in over half of the firms. While trust based relationships were important in almost two thirds of the cases, they were very important only 14 percent, compared to 22 percent for the collective action and information functions. On average, accessing information was the most common function of social capital.

Use of individual functions was highly correlated within firms, which means that firms that used one function of social capital tended also to use others. Pairwise correlation analysis shows significant correlations between the indices. Collective action and trust functions were the mostly highly correlated ( $\text{corr}=.543$ ,  $\text{sig}=.000$ ) while information and trust were the least correlated ( $\text{corr}=.363$ ,  $\text{sig}=.01$ ). These findings are consistent with complementarities (actual or potential) identified in the qualitative analysis.

The results of a cluster analysis confirm the high correlation among use of different functions of social capital. Three of the four clusters reveal a hierarchical order across the three component functions (Table 4). The one exception is a cluster of 4 enterprises that use high levels of

network social capital and low levels of trust and collective action. The high levels of correlation among use of different functions of social capital by the same firm suggest that while distinctions between “bonding” and “bridging” functions may still be useful, the firms either tend to have both or neither. In this way, firms may differ from communities, which may have high levels of one or the other but not both.

There is no systematic relationship between social capital use and either total income or income per worker. Firms whose owners/managers belong to many groups in their personal lives are significantly more likely to use social capital than those who don't (corr .337, sig =.018). Patterns of social capital use varied significantly by zone (Table 5). The coffee zone had highest levels, while in Antioquia firms tended to be either high or low users. Ubaté and Vélez tended to have lowest use of social capital. Use of social capital also varies by industry. Dairy and fruit firms are significantly less likely to use collective action than firms in other industries. Fruit firms are also less likely to rely on trust. Because of the clusters of dairy in Ubaté and guava processing in Vélez, these industry-level differences are likely influenced by regional characteristics as well as industry conditions.

## **5. How important is social capital? Quantitative analysis of impact of social capital on firm structure and income**

The previous section described ways in which firms used social capital to achieve specific objectives. The results of that analysis leave no doubt that social relations can be economically useful to firms. They also suggest a variety of ways in which firms can make better use of social capital. What they do not tell us is how important social capital's contributions are to the firm's bottom line, especially relative to those of other inputs. Until we know this we cannot say whether firms should increase their investments in social capital. The relative returns to an input can be estimated using data on firm-level inputs and outputs, and this section carries out that analysis.

### **5.1 Measuring firm's demand for social capital**

The social capital literature and the examples provided in the previous section suggest that social capital is located in personal relationships. This suggests that an empirical measure of a firm's demand for social capital might be developed based on data about the number of relationships that a firm maintains.

The firms in the sample maintain relationships with a variety of actors. The most basic relationships are those with employees, agricultural producers, non-ag input suppliers and clients. Many firms also report relationships with a variety of other actors such as federal, state and local government agencies, NGOs, banks and other financial institutions, universities, industry organizations, intermediaries, public employees, politicians, and community organizations. The average firm has 12.5 relationships, ranging from four to 23 (Table 6). The total number of relationships varies significantly by region, with firms in the coffee zone having the most and those in Ubaté having the least. With the exception of horticultural processing and marketing firms, which tend to maintain a high number of relationships, there are no significant differences among firms by industry.

Relationships can also vary by quality. Of the 12.5 relations that the average firm maintains, half are considered to be strong (Table 6). Strength of relationships also varies by region. Sixty

percent of the relationships in the coffee zone are considered to be strong, making this a region high not only in total relationships but also in strong relationships. In contrast, on the Caribbean coast only a third of a firm's relationships are strong, making this the region with the fewest strong relationships.

Different aspects of the relationships may indicate different functions of social capital. For example, the total number of relationships that a firm maintains may be associated with network functions, while strength of relationships could reflect to trust. A combination of high trust and high number may signify potential for collective action. To test whether these variables reflect social capital use, we can compare them to the results of the indices developed on the basis of the qualitative analysis in section 4.

A firm's total number of relationships is correlated with both its information and collective action indices, but not with its trust index (Table 7). The proportion of a firm's relationships that are strong is correlated with both the trust and collective action indices, but not with the information index. The number of strong relations that a firm maintains is correlated with all social capital functions. Using the results of the cluster analysis, we can see that firms that were observed to use high levels of social capital have more and stronger relationships than firms that were observed to use less social capital (Table 8). These findings are consistent with the expected tradeoffs between breadth and depth in relationships, and support the use of relationship-based variables as measures of social capital demand. However the high correlations between the different forms and functions of social capital may make it difficult to distinguish which functions are most economically important.

## 5.2 Determinants of social capital use by firms

If the number and strength of a firm's relationship reflect its demand for social capital, then in theory, we should be able to include these variables directly in a production or profit function. However theory assumes that markets are perfect and that demand for an input is determined entirely by relative prices and the technology parameters. Almost by definition, use of social capital by firms implies the existence of market imperfections, specifically information problems and transactions costs. Markets for social capital itself do not exist.<sup>3</sup> Since social capital is not a market good, a firm's observed demand for it will likely be a function of factors other than prices and technology.

An analysis of the determinants of the number and strength of a firm's relationships shows that personal characteristics of the owners are significant determinants of number of relationships that a firm maintains, controlling for regional and firm-level characteristics (Table 9). The number of groups that a firm owner belongs to in his/her personal life is significantly and positively correlated with the total number of relationships that his/her firm maintains.<sup>4</sup> This supports the hypothesis that in the presence of market failures, firm owner/managers use their personal relationships to further firm objectives. The owner's education does not influence the total

<sup>3</sup> Markets for some of the services that social capital provides—services such as market information or monitoring and enforcement of contracts—may exist in some economic environments. The emerging field of “business development services” for rural agro-enterprises may be seen as an attempt to replace social capital with a more efficient and/or equitable system of supplying some services.

<sup>4</sup> Other measure of owner's social capital such as the number and diversity of contacts were included, however since they are only available for a subset of the sample, the results were very unstable due to problems of colinearity that resulted from focusing the study in 5 distinct areas. Though results were not reported, it is interesting to note that in some specifications, diversity of contacts was significantly and positively related to total number of relationships but not to number of strong relationships.

number of relationships. As expected, smaller firms have fewer total relationships than larger firms, however the age of the firm was not significant. Cooperatives and associations also have fewer relationships than investor owned firms. Firms in the Caribbean coast and in Ubaté have fewer relationships than in other areas, while those in Antioquia have more.

Similar results were observed for the total number of strong relationships that a firm maintained. Again, group membership is positively associated with the number of relationships that a firm has. One significant difference was that being a cooperative was not associated with number of strong relationships, suggesting that the problem with coops isn't the ability to maintain relationships but rather to form them initially. The only significant determinant of the proportion of relationships that are strong was whether or not the firm was located in the Caribbean coast.

### **5.3 Firm level returns to social capital**

To assess the impact of social capital on firm performance, revenue per employee is estimated as a function of the value of capital equipment, labor, human capital, social capital and industry dummy variables. Because of the high correlation between industry and regional dummies, both could not be included. Due to this high correlation, predicted value of social capital variables were used.

According to the results, both the number and percent of strong relationships that a firm maintains contributed positively and significantly to revenue per employee (Table 10). The total number of relationships does not, which implies that both quality and quantity matter. As expected the value of machinery is positively associated with revenue. Total number of employees is significantly negatively associated with revenue per worker, which suggest diseconomies of scale. Finally, dairy firms appear to have higher revenues than others.

It must be pointed out that these results are not highly robust due mainly to problems of colinearity that results from the concentration of observations in 5 distinct regions. For example, the dairy cluster of Ubaté is excluded from the analysis, dairy firms no longer have higher incomes than other firms and the total number of relationships that a firm maintains is significantly positively associated with revenue per worker. If regional dummy variables are included instead of industry dummies, the only variables significant at conventional levels is whether or not the firm is located in dairy zone of Ubaté.

## **7. Conclusions and recommendations**

This paper documented how rural agro-enterprises use social relationships to further their economic objectives. Three functions of social capital were observed: provide access to information, reduce monitoring costs via trust, and support collective action. The most common use of personal networks was to get access to information, however the use of the different functions of social capital was highly correlated. Firms that used social relationships for one purpose tended also to use them for others.

To estimate economic returns to social capital, firm level measures of social capital demand were developed based on the number of relationships that firms maintained. The number and quality of relationships a firm maintains correlate with "functional" indices of social capital developed on the basis of the qualitative analysis. Both the functional and the structural (# and quality of relationships) measures are correlated with the owners personal relationships, as measured by the

number of groups that he or she belongs to in his/her personal life. This supports the theory that markets for the services of social capital are imperfect, and that as a result firms' endowments of social capital determine their demand for it.

The number and proportion of strong relationships that a firm maintains contribute positively and significantly to the firm's income per employee. The total number of relationships is not significantly associated with income, which suggests that quality as well as quantity matter. This finding extends results of past studies that found positive returns to measures of size of personal networks without addressing issues of quality or specifying the mechanisms by which these relationships affect firm structure.

It must be pointed out that these results are not highly robust, mostly likely due to the way the sample was selected based on five regions. It is very difficult to separate regional impacts from other factors. Further research is warranted to confirm the result, especially with regard to which aspects of social capital firms should invest in. Contribution of social capital to net income should also be assessed since many of the benefits of social capital may be cost reducing rather than income increasing. An planned extension of this research is to look at who firms have relationships with to see whether relationships with different types of actors are more important for firm performance than others.

Several specific obvious policy recommendations arise from these results. Both quantitative and qualitative results suggest that firms can benefit from strengthening their existing relationships with other actors in the supply chain. In the case of clients, improving communication and seeking feedback appears to be one promising avenue. The qualitative analysis also suggests several ways in which firms can strengthen collective action among employees and agricultural producers, including building links to personal lives via training and provision other benefits, absorbing the transaction costs associated with collective input provision, and being more proactive about identifying where collective action is likely to work and where it is not before committing resources to supporting it.



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**Table 1 Selected characteristics of the sample rural agroenterprises, by region (n=50)**

|                                                    | Caribbean Coast (n=10)                           | Antioquia (n=10)                                                                             | Ubaté (n=10)        | Vélez (n=10)    | Coffee Zone (n=10)                                                                    |
|----------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------|-----------------|---------------------------------------------------------------------------------------|
| Economic activities (# of firms)                   | Cassava (4), dairy (3), wood (2), sugar cane (1) | Fruits (4), vegetables (2), dairy (1), sugar cane (1), animal feed (1), medicinal plants (1) | Dairy (10)          | Fruit (10)      | Fruits (5), Sugar cane (1), agro-tourism (1), plantains (1), vegetables (1), wood (1) |
| Percent that are non-profits (coops, associations) | 40                                               | 30                                                                                           | 0                   | 0               | 10                                                                                    |
| Average number of employees                        | 12.2 (7.1)                                       | 18.2 (9.1)                                                                                   | 6.7 (12.7)          | 6.5 (4.5)       | 25.2 (22)                                                                             |
| Average number of skilled workers                  | 4.8 (6.1)                                        | 4.0 (4.4)                                                                                    | .3 (.67)            | .3 (.67)        | 5.7 (7.8)                                                                             |
| Average age of firm (years)                        | 10 (5.7)                                         | 8.3(3.2)                                                                                     | 21.3 (14.5)         | 23.6 (16.6)     | 8.5 (5.8)                                                                             |
| Average annual value of production (USD)           | 41,489 (25,285)                                  | 237, 144 (314,525)                                                                           | 473,245 (1,242,254) | 63,200 (64,211) | 459,111 (546,827)                                                                     |
| Average value of capital equipment                 | 86,435 (163,138)                                 | 64,115 (79,017)                                                                              | 74,720 (147,635)    | 14,124 (9,770)  | 145,200 (229,996)                                                                     |
| Percent with negative environmental impact         | 50                                               | 0                                                                                            | 0                   | 0               | 30                                                                                    |

Table 2 Social and demographic characteristics of firm owner/managers (n=50)

|                                               | Caribbean Coast | Eastern Antioquia | Ubaté    | Vélez     | Coffee Zone |
|-----------------------------------------------|-----------------|-------------------|----------|-----------|-------------|
| Education Index (from 1 (low) to 5 (highest)) | 1.5             | 2.9               | 2.6      | 1.6       | 4.0         |
| Years in current position                     | 9.1             | 5.7               | 18       | 18.9      | 5.6         |
| % with experience outside the region          | 78              | 78                | 60       | 70        | 50          |
| % with prior experience in industry           | 90              | 55                | 70       | 100       | 50          |
| Index of total number of personal contacts*   | 11.5            | Na                | 19.9     | 19.8      | 20.9        |
| Index of diversity of personal contacts*      | 7.6             | Na                | 10.4     | 9.9       | 10.2        |
| # of groups**                                 | 2.6 (3.2)       | 1.9 (2.5)         | .3 (.48) | 1.4 (1.6) | 2.5 (.97)   |

\* Following Barr, respondents were asked how many people they knew in a range of categories including farmers, intermediaries, business people in came business, business people in larger businesses, politicians, public employees, technical assistance providers. Responses were coded using 4 categories, very many, many, a few and very few. The variable “index of total number of personal contacts” is the sum of the coded responses for all types of contacts. The variable “index of diversity of contacts” is the number of types of contacts that the firm has.

\*\* number of groups include owner’s membership in religious, social, political, financial, and industry groups

Table 3 Importance of different forms of social capital among firms (% de firms) n=50

|                                  | Information | Trust      | Collective action |
|----------------------------------|-------------|------------|-------------------|
| Low incidence<br>(rank = 1)      | 38          | 36         | 52                |
| Medium<br>incidence<br>(rank= 2) | 40          | 50         | 26                |
| High incidence<br>(rank= 3)      | 22          | 14         | 22                |
| Average (s.d.)                   | 1.84 (.77)  | 1.78 (.69) | 1.7 (.81)         |

Table 4 Results of cluster analysis showing patterns of social capital use among firms

|                        | Collective Action | Information | Trust |
|------------------------|-------------------|-------------|-------|
| High (n=11)            | 2.91              | 2.64        | 2.64  |
| Medium (n=10)          | 2.10              | 1.80        | 1.60  |
| Low (n=25)             | 1.12              | 1.32        | 1.52  |
| High information (n=4) | 1.00              | 3.00        | 1.50  |

Table 5 Social capital functional clusters, by zone

|                 | High | Medium | Low | High trust<br>only |
|-----------------|------|--------|-----|--------------------|
| Caribbean Coast | 1    | 3      | 4   | 2                  |
| Antioquia       | 4    | 1      | 5   | 0                  |
| Ubate           | 0    | 0      | 8   | 2                  |
| Velez           | 0    | 3      | 7   | 0                  |
| Coffee Zone     | 5    | 3      | 1   | 0                  |

$\chi^2 = 27.3$  df 12 sig = .007

**Table 6 Number and Strength of Firm Relationships (se in parentheses)**

|                             | Total # of relationships** | Total # of strong relationships** | % of relationships that are strong++ |
|-----------------------------|----------------------------|-----------------------------------|--------------------------------------|
| Caribbean Coast<br>n=10     | 10<br>(2.8)                | 3.3<br>(1.3)                      | 33.7<br>(13.2)                       |
| Eastern Antioquia<br>(n=10) | 13<br>(5)                  | 7<br>(4)                          | 53.5<br>(20.8)                       |
| Ubaté<br>(n=10)             | 8.2<br>(2.5)               | 3.4<br>(1.2)                      | 42.7<br>(12.9)                       |
| Vélez (n=10)                | 15.6<br>(1.5)              | 7.9<br>(1.9)                      | 51.5<br>(4.7)                        |
| Coffee Zone<br>(n=10)       | 15.7<br>(4.3)              | 9.2<br>(2.4)                      | 59.5<br>(8.3)                        |
| Total (n=50)                | 12.5<br>(5)                | 6.2<br>(3.3)                      | 48.2<br>(15.6)                       |

\*\* ANOVA significant differences between zones with  $p < .01$

++ Transformed ANOVA shows significant differences between zones at level  $p < .01$

**Table 7 Correlation between structural and functional indices (n=40)**

|                   | Total number of relationships | Number of strong relationships | Percent of strong relations |
|-------------------|-------------------------------|--------------------------------|-----------------------------|
| Information       | .452**                        | .323*                          | .018                        |
| Trust             | .171                          | .317*                          | .348**                      |
| Collective Action | .301**                        | .422**                         | .281*                       |

\*\*= sig < .01 \* = sig <= .05

**Table 8 Firm relationships by social capital clusters (n=49)**

|                        | Total # of relationships* | Total # of strong relationships** | % of relationships that are strong |
|------------------------|---------------------------|-----------------------------------|------------------------------------|
| High (n=10)            | 15.9                      | 8.7                               | .55                                |
| Medium (n=10)          | 13.4                      | 7.0                               | .49                                |
| Low (n=25)             | 11.1                      | 5.2                               | .46                                |
| High information (n=4) | 11.5                      | 4.0                               | .35                                |

\*\*= sig < .01 \* = sig <= .05

**Table 9 Results of analysis of determinants of Total Number of relationships and percent of relationships that are strong (n=46) (coefficients are standardized with intercept 0)**

|                          | # Relationships<br>(OLS)  | # Strong relationships<br>(OLS) | % relationships strong<br>(logistic regression) |
|--------------------------|---------------------------|---------------------------------|-------------------------------------------------|
|                          | Standardized coefficients |                                 |                                                 |
| Constant                 | ***                       | ***                             |                                                 |
| Education                | .176                      | .100                            | .171                                            |
| # groups                 | .487***                   | .410***                         | .118                                            |
| Coop dummy               | -.234**                   | -.116                           | .097                                            |
| # employees              | .306*                     | .190*                           | .073                                            |
| Age of firm              | .557                      | .026                            | .000                                            |
| Caribbean coast<br>dummy | -.456***                  | -.610***                        | -.590***                                        |
| Ubate dummy              | -.561****                 | -.482***                        | -.200                                           |
| Antioquia dummy          | -.385***                  | -.201                           | .015                                            |
| Coffee Zone dummy        | -.251                     | -.066                           | .012                                            |
|                          |                           |                                 |                                                 |
| R2                       | .593                      | .627                            | .288                                            |
| Durbin Watson            | 1.971                     | 2.065                           | 2.197                                           |



**Table 10 Determinants of firm revenues (n=46)**

|                                                      | Log Annual Revenue per worker<br>(Col pesos) |                  |                   |
|------------------------------------------------------|----------------------------------------------|------------------|-------------------|
|                                                      | ***                                          | ***              | ***               |
| Constant                                             |                                              |                  |                   |
| Log Number of employees                              | -.395*<br>(.070)                             | -.406*<br>(.056) | -2.026*<br>(.050) |
| Log Value of Machinery                               | .363*<br>(.090)                              | .376*<br>(.060)  | .437**<br>(.025)  |
| Log Number of relationships (predicted value)        | .331<br>(.200)                               |                  |                   |
| Log Number of strong relationships (predicted value) |                                              | .423*<br>(.059)  |                   |
| Percent of predicted relationships that are strong   |                                              |                  | .397**<br>(.035)  |
| Education index                                      | .075<br>(.505)                               | .004<br>(.977)   | -.056<br>(.727)   |
| Cooperative dummy                                    | -.054<br>(.806)                              | -.031<br>(.877)  | -.098<br>(.597)   |
| Dairy dummy                                          | .415<br>(.122)                               | .458*<br>(.067)  | .420*<br>(.072)   |
| Fruit dummy                                          | -.017<br>(.937)                              | -.023<br>(.912)  | .013<br>(.950)    |
| Vegetable dummy                                      | .009<br>(.959)                               | .016<br>(.922)   | .013<br>(.937)    |
| Woodworking dummy                                    | -.087<br>(.588)                              | -.036<br>(.821)  | -.027<br>(.867)   |
|                                                      |                                              |                  |                   |
| R2                                                   | .239                                         | .28              | .298              |
| Durbin Watson                                        | 1.839                                        | 1.861            | 1.831             |