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CAPRi WORKING PAPER NO. 26

THE IMPORTANCE OF SOCIAL CAPITAL IN COLOMBIAN RURAL AGRO-ENTERPRISES

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NOVEMBER 2002

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ACKNOWLEDGMENTS

This work was supported in part by a grant from the CGIAR's Systemwide Program on Collective Action and Property Rights (CAPRi). The authors recognize the important contributions of staff from Centro de Estudios Ganaderos y Agricolas (CEGA) and the Corporación Colombiana Internacional (CCI) to study design and data collection, especially those of Claudia Maria Correa of CCI and Melania Kowalewska of CEGA. The authors also thank the participants in the CAPRi workshop and an anonymous reviewer for their very helpful comments.

ABSTRACT

This paper characterizes and measures the contribution of social capital to the performance of 50 agroenterprises in Colombia. Using qualitative analysis we document how social capital performs a variety of functions in firms, including providing access information via networks of contacts, reducing transactions costs in contracting via trust, and sustaining capacity for collective action. To estimate social capital's contribution to firm structure and performance, quantitative indicators of firm-level use of social capital are developed based on the number and strength of relationships that firms maintain. Econometric analysis finds that firm-level returns to relationships are high, higher than to physical or human capital. The results suggests that while firms can increase their economic performance by investing in social capital, institutional and technological innovations that ameliorate the effects of the market failures that lead to use of social relationships for business purposes could also improve both equity and efficiency.

Keywords: social capital, collective action, institutions, Colombia, agroenterprises, networks

THE IMPORTANCE OF SOCIAL CAPITAL IN COLOMBIAN RURAL AGRO-ENTERPRISES

Nancy Johnson[1], Ruth Suarez[2] and Mark Lundy[3]

An earlier version of this paper was presented at the CAPRi workshop on Methods for Studying Collective Action, February 25 – March 1, 2002, Nyeri Kenya.

1. INTRODUCTION

Over the past several decades, the process of agro-industrialization[4] has transformed agriculture and rural communities in many parts of Latin America, more so than in any other part of the world (FAO, 1997). 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, 1999). 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 (Barham et al, 1992; Carter et al, 1995; CEPAL/GTZ/FAO, 1998).

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-

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[4] 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." (as cited in Reardon et al. 1999).

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. In Colombia, spillovers from this economic activity are expected to "promote social cohesion in rural communities."(Lafourcade, 2002, sec.A).

The principal hypothesis of this study is that while strengthened social capacity may be an outcome of agroindustrialization, social capital is also likely to be a key input into the process. Individuals and groups who can work collaboratively and establish and maintain both trust-based relationships and networks of contacts will have an advantage over their competitors who cannot. The reason is that 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, quantitative measures of firm level use of social capital are identified and analyzed, and the economic returns to social capital are estimated. Section 6 summarizes and concludes with recommendations for policy and further research.

2. SOCIAL CAPITAL AND FIRM PERFORMANCE: THEORETICAL AND EMPIRICAL LITERATURE

Coleman (1988) 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, "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, 1988, p. s101). While many other studies have focused on community level outcomes and define social capital as a community level public-good (Putnam, 1993a,b; Helliwell and Putnam, 1995; Helliwell, 1996; Krishna and Uphoff, 1998), Coleman conceived of social capital as something used by individuals to further their own personal objectives. His objective was 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 the individuals and organizations that use it to further their individual or collective interests.

Coleman's 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 (Sandefur and Laumann, 1998; Edwards and Foley, 1998). 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, 1999, 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. For example, he notes that groups often play an important role in revolutionary movements, however the specific characteristics of the groups vary widely, from secret study groups in South Korea to workers' cells in Tsarist Russia. 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 (Coleman, 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 (1999), 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 (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 involved only 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 to rural agroenterprises? 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 goals of this analysis are to document the use of social capital by firms, to clarify what it means to use social relations for economic purposes, and to suggest possible quantitative measures for firm-level use of social capital. The second question is tackled using quantitative methods to estimate the economic returns to social capital in terms of firm productivity.

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 firms in five regions of Colombia: the Caribbean Coast near the cities of Sincelejo, Sucre and Montería, Córdoba; Eastern Antioquia; Ubaté, Cundinamarca; Vèlez, Santander; and the region around Manizales, Caldas in the coffee growing region. The zones were identified because they are all centers of agro-industrial activity; yet differ in their historical/cultural dynamics and institutional contexts. In the absence of a business census, firms were identified using information provided by the local chambers of commerce, where all businesses are legally obligated to register, and by other key informants. The sample was selected to represent small and medium-sized enterprises. 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.

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

	Caribbean Coast (n=10)	Antioquia (n=10)	Ubaté (n=10)	Vèlez (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
Percent that are member-owned (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

Where averages are reported, standard deviations are in parentheses

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 includes 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). We used Venn diagrams to identify relationships and rank them according to their strength. Subsequently, a series of questions with coded responses was asked about each specific relationship. Key informants provided information about firm performance and impact, and about community social and economic tendencies.

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

	Caribbean Coast	Eastern Antioquia	Ubaté	Vèlez	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 (2000a), 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

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 transacting 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 client.

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 Medellin'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 that obtained its main client, a 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 assess their satisfaction with the firm and its products. 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 prevent 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, provided that their focus is not too broad. One owner of a wood-processing firm commented that he benefited more from associations with other firms in his industry than from a local small-business owners' association.

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 products and had to pay price premiums to assure a steady milk supply. Again, initial contacts open doors, but performance and trust cement relationships.

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 projects.

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 can reduce their 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 commitments 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 certain that the containers carrying their products had not been used recently to transport agrochemicals or other hazardous substances. It should be pointed out that this trust might only be useful in less formal segments of the market. In the coffee zone, where some firms are producing organic products for export, all producers, no matter how trustworthy, must sign legal contracts with firms certifying that their production is organic.

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 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 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 cooperative members agree to receive delayed payments for their products. Several firms reportedly obtained credit from family members because the banks rejected them. One owner received 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 in relations with 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. Sometime it is limited to post-harvest activities such as grading and packing, however in general collective commercialization is a 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 address the problem directly via training programs for members on the importance of solidarity and mutual benefits of collective action. Several cooperatives build commitment by hiring relatives of coop members or involving members and their families 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. In the case of a 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 is 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 small 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, agrochemicals, or in one case, a community supermarket, 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 of purchasing goods collectively as an expense of maintaining collective action in their primary activity.

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 of its vegetables by buyers, 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 of 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 business, a handful of 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 one multi-activity cooperative generally produce individually, however they have planted parcels collectively on several occasions. The first time they reported doing it was because they were introducing a new product 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 them 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.

Since member-owned enterprises such as cooperatives are often disadvantaged in credit markets, public and private institutions that support agro-industry often offer them loans on favorable terms. Three private firms in the sample are considering or are in the process of becoming cooperatives for no other reason than to get access to cheap credit. An appropriate legal structure that reflects a firm's resources and objectives is important to its performance (Gonzalez et al, 2002), and programs that distort incentives with regard to choice of organizational structure can hurt firms in the long run.

Management of common property

Two businesses made investments that they hold as common property among members. Using a grant from an NGO, a cooperative purchased land that it uses for its experiments. A livestock 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.

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 one

(lowest) to three (highest) according to how frequently it appeared to use each of the three functions. Use of trust and information functions of social capital appears to be more common than use of collective action functions (Table 3). The information and trust functions were unimportant in just over a third of the firms while the collective action functions were unimportant in over half of the firms. While trust based relationships were observed in almost two thirds of the cases, only 14 percent of firms showed high incidence of use of trust functions, compared to 22 percent for the collective action and information functions.

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

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

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 (corr=.543, sig=.000) while information and trust were the least correlated (corr =.363, sig= .01). These findings are consistent with the complementarities (actual or potential) among functions of social capital that emerged 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. Narayan (1999) distinguishes between two functions of social capital, within-group "bonding" and between-group "bridging" functions of social capital. Firms in this sample tend to both or neither.

Table 4--Average value of social capital indicator by group, from cluster analysis

	Collective Action	Information	Trust
Group 1 High (n=11)	2.91	2.64	2.64
Group 2 Medium (n=10)	2.10	1.80	1.60
Group 3 Low (n=25)	1.12	1.32	1.52
Group 4 High information (n=4)	1.00	3.00	1.50

Patterns of social capital use varied significantly by zone (Table 5). The coffee zone appears to have the highest levels, which is consistent with the active presence in the region of strong, unifying institutions such as the Coffee Growers Federation. Lowest levels of social capital use were found in Ubaté, a region whose organizations are few and weak. 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.

Table 5--Distribution of social capital groups, by zone

	Group 1 High	GR2 Medium	Group 3 Low	Group 4 High Info 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

X2 =27.3 df 12 sig =.007

However because of the clusters of dairy in Ubaté and guava processing in Vèlez, these industry-level differences probably reflect regional characteristics as well as industry conditions. 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).

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 their 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 can benefit by increasing their investments in social capital.

5.1 MEASURING FIRM'S USE OF 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 use of social capital might be developed based on data about the 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-agricultural 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 Vèlez and 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.

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	10	3.3	33.7
(n=10	(2.8)	(1.3)	(13.2)
Eastern	13	7	53.5
Antioquia (n=10)	(5)	(4)	(20.8)
Ubaté	8.2	3.4	42.7
(n=10)	(2.5)	(1.2)	(12.9)
Vèlez (n=10)	15.6	7.9	51.5
	(1.5)	(1.9)	(4.7)
Coffee Zone	15.7	9.2	59.5
(n=10)	(4.3)	(2.4)	(8.3)
Total (n=50)	12.5	6.2	48.2
	(5)	(3.3)	(15.6)

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

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 trust. A combination of high trust and high number of relationships may signify potential for collective action. To test whether these variables reflect social capital use, we 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).

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

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 that firms that were observed to use less social capital (Table 8).

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

These findings 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 will make it impossible to distinguish which functions are economically most important.

5.2 DETERMINANTS OF SOCIAL CAPITAL USE BY FIRMS

If the number and strength of a firm's relationships reflect its use of social capital, then in theory, we should be able to include these variables directly in a production or profit function. However theory underlying this econometric analysis assumes that markets are perfect and that demand for an input is determined entirely by relative prices and the technology parameters. In this paper, we have hypothesized that use of social capital by firms implies the existence of market imperfections, specifically information problems and transactions costs in contracting. Therefore we cannot expect the demand for social capital to be independent of supply.

As a measure of the firm's supply of social capital, we use the number of groups to which the owner/manager belongs in his or her personal life. We would not expect such group membership to influence firm productivity directly, but it could be expected to do so indirectly via facilitating social contacts. An analysis of the determinants of the number and strength of a firm's relationships shows that the number of groups that a firm owner belongs to in his or her personal life is significantly and positively associated with the total number of relationships that his/her firm maintains, controlling for regional and firm-level characteristics (Table 9).

Table 9--Results of analysis of determinants of use of social capital (n=47) (coefficients are standardized with intercept 0)

	# Relationships (OLS)	# Strong relationships (OLS)	% relationships strong (logistic regression)
		Standardized coefficients	
Constant	***	***	
Owner's Education	.288**	.107	.033
# Groups	.451***	.429***	.103
Coop dummy	-.231*	-.159	.114
# employees	.177	.159	.065
Dummy for experience outside the community	-.035	-.040	-.010
Caribbean coast dummy	-.451***	-.587***	-.536***
Ubate dummy	-.594***	-.506***	-.188
Antioquia dummy	-.303**	-.117	.096
Coffee Zone dummy	-.332*	-.427	.122
R2	.510	.651	.274
Durbin Watson	2.006	1.957	1.724

***= sig <.01 ** = sig <=.05 * = sig <=.10

This result supports the hypothesis that social capital markets are not perfect and that firm's endowments of social capital determine, in part, their demand for it.

The results also show that the owner's education increases the total number of relationships, but not the number of strong relationships. Cooperatives and associations have fewer total relationships than investor owned firms, however there is no difference in number of strong relationships. The size of a firm does not affect the number of relationships, however its geographical location does.[5] Firms in Velez (excluded dummy in the analysis) tend to have higher numbers of relationships than firms in other areas, ceteris paribus.

[5] The analysis was also done using industry dummies (milk, fruit, vegetables, sugar and wood) instead of regional dummies. The results show that dairy firms have relatively fewer relationships and fruit firms have relatively more. However since Ubaté has a high concentration of dairy firms and Velez has a high concentration of fruit firms, these results may reflect regional rather than industry characteristics. The high correlation between industry and region makes it impossible to include both. Results in terms of the other variables do not change significantly.

Neither personal nor firm level variables were significant determinants of the proportion of strong relationships that a firm maintains. The only significant results from that regression is that firms on the Caribbean Coast have a lower proportion of strong relationships than firms in other regions.

5.3 FIRM LEVEL RETURNS TO SOCIAL CAPITAL

To assess the contribution of social capital to firm performance, we estimate a productivity equation in which revenue per employee is estimated as a function of labor, physical, human and social capital, firm-level characteristics and regional dummy variables. Because, as shown above, some of these same predictors also influence social capital, a two-stage estimation procedure is required. In the first stage, the endogenous social capital variable (number of relationships or number of strong relationships) is regressed on the independent variables plus the number of groups to which the owner belongs. In the second stage, the predicted values of social capital are used to estimate the productivity equation.

According to the results, the total number of relationships and the number of strong relationships that a firm maintains contribute positively and significantly to revenue per employee (Table 10). The percent of relationships that are strong does not. The elasticity of social capital is higher than that of physical capital, meaning that an increase in number of relationships has a higher impact on revenue/worker than a proportional increase in machinery. The difference is even greater when the increase is in strong relationships.

Table 10-- Results of estimation of returns to social capital using 2 stage least squares (n=45)

	Log Annual Revenue per Worker (Col pesos)	
Constant	**	***
Log Number of employees	-.348*	-.360*
Log Value of Machinery	.412**	.420**
Log Number of relationships+	.512*	
Log Number of strong relationships+		.705*
Percent of relationships that are strong	.222	-.209
Education index	.178	.177
Experience outside the community dummy	-.518***	-.561***
Coop dummy	-.087	-.124
Caribbean Coast dummy	.210	.254
Antioquia dummy	.236	.281.
Ubaté dummy	.731***	.726***
Velez dummy	.191	.172
R2	.480	.474

***= sig <.01 ** = sig <=.05 * = sig <=.10
+ = predicted values from first stage used in second stage estimation

Returns to labor were negative, meaning that labor productivity is higher in smaller firms. Human capital, as measured by the owner/manager's education level, does not appear to influence firm productivity directly, but rather indirectly through its influence on social capital.

In terms of regional differences, firms in Ubaté appear to have significantly higher revenue/worker than firms in other regions. When industry rather than regional dummies are used, dairy firms appear to have the highest returns, however this likely reflects the cluster of dairy firms in Ubaté.

An unexpected result of this analysis is the large negative impact that experience outside the community has on productivity. Outside experience was expected to be positive, because it represents an opportunity to gain knowledge, experience and make contacts. One explanation

for this finding could be related to the fact that many people who reported changing communities did so to escape political violence and may be having trouble integrating into their new communities.

6. CONCLUSIONS AND DISCUSSION

This paper documented how rural agro-enterprises use social relationships to further their economic objectives. Three functions of social capital were observed: providing access to information, reducing monitoring costs via trust, and supporting collective action. 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, quantitative measures of social capital use 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. Unfortunately, the correlation among use of different functions of social capital was also reflected in the structural indicators. This means that while we could estimate returns to social capital in general we could not distinguish between returns to the different functions performed by social capital.

Social capital, as measured by the number of relationships, and especially strong relationships, that a firm maintains, contributes positively and significantly to its economic performance, as measured by revenue per worker. Investment in social capital yields higher returns than in physical capital or labor. Human capital, as measured by owner/managers education, did not affect productivity directly, but rather indirectly via its positive contribution to social capital.

Several policy implications arise from these results. According to the econometric results, firms can benefit from broadening their networks and by strengthening their existing relationships with other actors in the supply chain. The qualitative analysis cites many examples of how this might be done, for example by improving communication and seeking feedback from clients, by participating in industry or business associations, or by absorbing transactions costs in maintaining collective action among employees, cooperative members, or agricultural producers.

While building and strengthening firm-level relationships can improve individual firm performance, the fact that firms are using personal relationships for professional objectives is a sign of market failure. In theory, social welfare could be improved by ameliorating these failures so that firms can compete on the basis of productivity rather than social relationships. In reality, personal relationships will always play a role in economic activity, because information is never perfect, contracts are never complete and transactions costs are never zero. However to the extent that technological or institutional innovations can decrease reliance on personal relationships and promote the emergence of alternative suppliers and markets for the services that are currently provided by social capital, both efficiency and equity are likely to increase. The results of this study suggest that careful analysis of which types of business development services are currently being provided by which types of relationships and why, would be a good place to start an effort to design or implement alternative service provision scheme.

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