CHAPTER 4
SOCIAL CAPITAL AND TECHNOLOGY ADOPTION

In the previous chapter social capital was identified as a variable that intervenes in the technology adoption process. This chapter extends that analysis by explicitly recognizing social capital as a factor that may influence technology adoption through its effect on household resources and access to information about new technologies. An overview of the literature on social capital is given, focusing on the manifestation and definitions of social capital and the conceptual issues surrounding it in the literature. The purpose of this is to develop an appropriate conceptualisation and means of measuring social capital in rural Uganda. A section is also devoted to the determinants of social capital, based on the literature survey.

4.1. Manifestations and definitions of social capital in the literature

The concept of social capital has been used to describe a wide range of phenomena, but different definitions exist. While different definitions enable a wide application of the concept, this has also constituted a limitation on the development of a theory of social capital. Most scholars who have sought to incorporate the concept in economic analysis have done so while acknowledging that it has not yet intellectually matured. Divergent definitions and perspectives have also raised certain questions and criticisms. For example, Bowles (1999) argues that social capital is an inappropriate term for the idea it is supposed to represent, while Arrow (2000) even suggests that the term “social capital” should be abandoned. These concerns are understandable given the conceptual weaknesses in the literature on social capital.

Research on social capital is characterized by ambiguities regarding who owns social capital. Some studies conceptualise it as a community attribute (Narayan, 1997; Putnam, 1993) while others focus on individuals as the “owners” and benefactors of social capital (Coleman, 1988; Portes, 1998). Issues of who owns social capital aside, it is not clear whether the direction of formation runs from the micro (individual) to the macro (community) level or vice versa. Thirdly, social capital is always defined by its functions, thus setting aside its negative aspects and externalities (Arrow, 2000).

Despite the conceptual weaknesses, there is considerable consensus that social capital has some characteristics that qualify it as “capital”. Accumulating and maintaining a stock of social capital, like other forms of capital, takes time and other valuable resources. Similarly, social capital and human capital depreciate if not used, but not with use. A relationship with an individual with whom you never interact may not be reliable in times of need. Collier (1998) presents a detailed argument on how social interactions produce persistent economic effects that qualify social capital as capital.

Social capital also has features that distinguish it from other forms of capital. Social capital is neither lodged in the actors themselves nor in the physical implements of production but is inherent in the structures of relationships among actors (Coleman, 1988). While every other form of capital has a potential impact in a typical Robinson Crusoe economy, social capital does not. Creating and activating social capital requires at least two people. As such, social capital has certain characteristics of public goods, implying that it is not completely internalised and will be under-produced in the economy.

4.1.1. Manifestations of social capital

Social capital manifests in two broad forms: structural and cognitive (Dasgupta, 2000; Uphoff, 2000). In terms of morphological characteristics, the structural form of social capital is extrinsic and observable and is associated with various forms of social organization, such as roles, rules, precedents and procedures, as well as social networks. On the other hand, the cognitive form of social capital exists in people’s minds and is hence unobservable. In its cognitive form it refers to norms such as trust, shared values and beliefs. In terms of its functions, Uphoff (2000) describes the role of the structural form of social capital as concerned with facilitating information sharing and collective action through established roles, social networks and other social structures that lower transaction costs, while the cognitive dimension predisposes people towards cooperation and collective decisions.

From the above discussion, the complementary role of the two forms of social capital is evident. According to Uphoff (2000), the two forms interact to produce a single

stream of benefits. A synthesis of the various definitions of social capital also reveals that there are more similarities than differences between them (Haddad and Maluccio, 2003; Paldam, 2000; Durlauf and Fafchamps, 2004).

Haddad and Maluccio (2003) point out three similarities: (1) Most of the definitions agree that individual social interactions are at the core of social capital. (2) Nearly all agree that while social interaction takes place at the individual level, social capital has the potential to generate externalities. (3) Most definitions acknowledge that the mechanisms that drive social capital have to do with information transmission, the establishment of trust, and the development of norms of collaboration. Paldam (2000) classifies the various definitions into three families of social capital concepts: (1) trust (2) ease of cooperation and (3) networks. He observes that while the three families lead to different definitions and measurement methods, they are all related in that they tap the same latent variable. He concludes, "…the choice of the definition is a matter of convenience". Durlauf and Fafchamps (2004) distinguished three main ideas underlying the definitions of social capital, two of which are similar to what Haddad and Maluccio (2003) observed: (1) Social capital generates positive externalities for the members of a group, (2) these externalities are achieved through shared trust, norms and values and their consequent effects on expectations and behaviour, and (3) shared trust, norms and values arise from informal forms of organization based on social networks and associations.

The conceptualisation of social capital in the present study follows the structural dimension of social capital because it is observable and hence easy to measure. Second, its role in information diffusion and other social resources makes the structural component more relevant to this study. Most definitions of social capital that follow the structural dimension are based on social networks or their components, as discussed below.

4.1.2. Social network definition of social capital

Social capital has been defined both at community level and at individual level. At community level, the structural component of social capital has been defined in terms of the density and diversity of associations (hereafter referred to as institutionalised

social networks) within a community (Putnam, 1993; Narayan, 1997). The associational interactions in the community reflect the ability to coordinate, monitor and hence solve a collective dilemma. At the individual level, structural definitions consider social capital as embedded in the network of friends, relatives and acquaintances (hereafter referred to as private social networks[1]) an individual interacts with, based on "norms of reciprocity" (Lin, 1999; Fafchamps and Minten, 1999; Glaeser et al., 2001). Although institutionalised social networks could also be composed of friends or relatives as members, they differ from private social networks in their structure and functioning.

The concept of a private social network, as used in the present study, is a spontaneous free interaction of people organized in dyadic relationships without a defined membership. A dyadic relationship exists between only two people linked to others in a continuous chain. On the other hand, the term "institutionalised social networks" (also referred to as "association") refers to a collection of more than two people who join together to advance a common interest. The common interest may take the form of sharing one or more of the following: production costs, member characteristics or a good characterized by excludable benefits (Cornes and Sandlers, 1986). As compared to a private social network, an association has an organizational form and a defined membership (Collier, 1998), irrespective of degree. Collier (1998) also distinguishes associations from dyadic social relationships by the fact that the latter lack the capacity for group decision-making that characterizes institutional social networks.

The emphasis on the measurement of both the quantity and quality of social interactions is common to most social network definitions. The bridging or bonding nature of social capital (Narayan, 1997; Woolcock and Narayan, 2000) or the valued resources embedded in the private social network (Lin, 1999; Fafchamps and Minten, 1999) is measured along the qualitative dimension. Social capital is described as bonding if relationships facilitate intra-group interactions or intra-community ties, and as bridging where interactions strengthen links between groups (inter-community) and other actors or organizations (Putnam, 1993; Woolcock and Narayan 2000; Svendsen and Svendsen, 2004). In a sense this distinction is more apparent than real. For

[1] Private social networks have also been referred to as informal networks, while associations are referred to as formal social networks (Godquin and Quisumbing, 2005).

example, bonding along ethnic lines can be a bridging mechanism when looked at from an economic point of view. Likewise, a successful bridging relationship can ultimately break down more pronounced distinctions and so become a bonding relationship when examined along a different axis. Hence the classification depends on the focus of the study. The nature of social capital in the present study is investigated along the social and economic dimensions.

Most of the social network definitions of social capital existing in the literature have considered either the institutional social networks (Putnam, 1993; Narayan, 1997; Narayan and Pritchett, 1999) or private social networks (Lin, 1999; Fafchamps and Minten, 1999; Glaeser et al., 2001), but not both. Social networks also have components, and focusing on only one component fails to capture the interactions between them, which could result in biased estimates of the structural social capital in a society. In the present study a social network definition that encompasses both "institutionalised social networks" and "private social networks" is used. Borrowing from the definitions of Narayan (1997) and Lin (1999), social capital is defined as the density and diversity of institutionalised and private social networks based on mutual trust and norms of reciprocity.

This definition is consistent with the idea that social capital that affects the optimising behaviour of economic agents and can increase or (decrease) output is embedded in social relationships that can exist either at the community or the individual level. Therefore, individual social capital can be conceptualised as consisting of two components: (1) the private component that is embedded in friends, relatives and acquaintances, and (2) the public or social component that is embedded in the community and flows from informal community institutions (local associations). Although some associations are designed to solve specific economic problems and have characteristics of excludable club goods (Cornes and Sandlers, 1986), these same associations generate externalities, such as increased information diffusion, that will affect many in the community (whether or not they are members) and hence qualify as a property of the community.

In addition, social capital as defined in the present study is neither good nor bad, contrary to the argument that social networks that generate negative externalities

should be excluded from consideration as social capital (Durlauf and Fafchamps, 2004; Collier, 1998), but consistent with the reality that externalities from social networks are not mutually exclusive (Portes, 1998; Woolcock and Narayan, 2000). Finally, the definition is also consistent with the conclusion of Woolcock and Narayan (2000) that in order to avoid making tautological claims regarding the efficacy of social capital, the measurement of social capital should endeavour to capture its two basic dimensions: bonding and bridging social relationships.

4.2. Social networks and technology adoption

Informal institutions and private social networks play three distinct roles in the adoption of crop technologies (Hogset, 2005). First, they act as conduits for financial transfers that may relax the farmer's credit constraints. Second, they act as conduits for information about the new technology. The information may relate to new methods of farming, new crop varieties or a problem concerning agriculture in the area (Collier, 1998). As demonstrated in Chapter 3, improved banana production management technologies (i.e. mulching, manure application and sanitation practices) fit the description of being knowledge and labour-intensive, which may make social networks important in their adoption.

Thirdly, social networks can facilitate cooperation to overcome a collective action dilemma where the adoption of technologies involves externalities. An example of such collective action is the practice of uprooting and destroying banana mats infested with bacterial wilt to stop the spread of the disease in the community. At the individual level, the benefits from the practice are low or may even be negative if the banana plantation is severely affected by the disease. But at the community level the benefits are high if the disease is controlled and the crop does not become extinct. Because externalities are not internalised by economic decision makers there would be "too little" farm-level adoption of such practices in the absence of external intervention. With such technologies, the adopting unit is the community, involving all members to internalise the benefits of the technology. The success of such collective decision-making depends on the existence of social capital among the community members to act as a lubricant in the process. Since no serious externalities are anticipated in the use of mulching, manure application and sanitation, the

mechanism of collective action is not investigated in the present study. The first two mechanisms through which social capital may influence the use of improved banana production management technologies are discussed below.

4.2.1. Social network and information accumulation

In Chapter 3 it is demonstrated that information plays a key role in the adoption of agricultural technologies. Information is particularly important when technology is complex (in terms of knowledge-intensiveness) and its components are forever changing to adapt to the changing environment (Schultz, 1975). The improved banana production management technology in Uganda has been subjected to adjustments over time to cope with increased biotic and abiotic pressures. Yet the formal education of the majority of farmers is limited (an average 5.8 years of schooling), which makes the mechanisms through which information is disseminated and diffused crucial in understanding the adoption processes in the case of these technologies.

In most developing economies, farmers operate in environments where the high cost of operating programmes curbs the capacity of the government to provide adequate extension services to all farmers. In Sub-Saharan Africa, the structural adjustment programmes implemented from the 1980s onwards further reduced access to agricultural extension educators. Although they have always been regarded as important sources of information about new technologies, farmer experimentation and social learning are now primary.

The role of social learning in technology adoption has been demonstrated (Kislev and Shchori-Bachrach, 1974; Feder and Slade, 1984; Foster and Rosenzweig, 1995). Foster and Rosenzweig (1995) present evidence that farmers with experienced neighbours devote more land to new technologies. Pomp and Berger (1995) found evidence that copying others was an important determinant in the adoption of cocoa in Indonesia. Their study shows that increases in the proportion of adopters in a village improve the likelihood that a potential adopter in that village will adopt. As observed by Isham (2000), the classical studies of social learning did not analyse the variables that intervene in social learning. One would expect social capital to be crucial in regulating information diffusion from adopters to non-adopters. Farmers may actively

seek information from their neighbours or learn passively from others within their social structures during social interactions.

Yli-Renko et al. (2001) indicates that internal and external social capital contributes to knowledge-based competitive advantage in firms. The analogy to a village is straightforward. Bonding social capital within a village increases information diffusion among farmers within that village, while bridging social capital enables the village to access information from external sources (Woolcock and Narayan, 2000; Isham, 2000). Yet it is also true that such forms of social capital are not uniformly distributed across locations, which could bring about differentials in access to social learning and hence technology adoption.

Collier (1998) identifies two mechanisms through which social interaction can generate information externalities: One-way social interaction (observation of other people's behaviour) and the two-way mechanism (pooling information), which is common in horizontal social networks. In rural settings, where formal information systems are inadequate, social capital may supplement them.

Contrary to Collier's (1998) one-way social interaction, but consistent with the two-way social interaction mechanism, Rogers (1995) views technology diffusion as a process mediated through the two-way process of communication convergence rather than as a one-way linear act, emphasizing the role of face-to-face interpersonal interaction in technology diffusion. He concludes that interpersonal networks are the most important source of information for late adopters, serving two roles: diffusion of information from the early adopters to the potential adopters and persuasion of the latter by the former to adopt the technology. Persuasion arises because individuals are themselves members of a larger group. The information that is held by group members, the choices they make and the outcomes that flow from them can all exert a powerful influence on individual incentives to innovate. Montgomery and Casterline (1998) assert that the power that individuals exercise over each other through authority, respect and social conformity pressures influences the choices they make. Moser and Barrett (2003) find evidence that the pressure to conform to community norms has a significant influence on farmers' technology choices.

Social networks may serve as complements to more formal sources of information and sometimes as substitutes. When new information about technologies is introduced into the community through formal channels (mass media or extension educators), the social networks help to diffuse it. Members of the social system can also introduce new technologies into the social system through their weak social ties (Granovetter, 1973). In this case, social networks can completely substitute for formal channels of communication at a smaller-community (village) level but complement it in a wider community.

The amount and content of information one can get from the social networks in any period depends on the quantitative as well as qualitative properties of the social networks (Isham, 2000; Lin, 1999). Rogers (1995) identifies three qualitative properties of a social structure, e.g. of the social networks that promote information diffusion within a community: the degree of homogeneity, leadership, and social norms. The heterogeneity of village leaders captures the idea that community leaders often act as opinion leaders and that their heterogeneity in terms of education and income makes them a good link between the community and external information sources: e.g. agricultural extension systems, mass media or other farmers in other communities, exploiting the "strength of weak social ties" identified by Granovetter (1973). The strategy adopted by opinion leaders often depends on the prevailing social norms in the community. If the community favours change, then it is in the interest of opinion leaders to adopt new technologies rapidly in order to maintain their social status and position as opinion leaders (Rogers, 1995). Hence social norms can complement the role of opinion leadership in technology adoption.

The effect of social homogeneity on information diffusion and hence technology adoption is twofold. First, it facilitates communication between individuals and hence effective exchange of information. The extent to which any two people who are communicating have similar attributes and beliefs affects information sharing because communication between them is more likely to be effective if they have similar attributes and beliefs (Rogers, 1995; Isham, 2000). Second, social homogeneity increases the level of social interaction (Alesina and La Ferrara, 2000; La Ferrara, 2002) and leads to increased access to social resources such as information (Collier, 1998), informal credit and labour exchange. Alesina and La Ferrara (2000)

hypothesized that individuals prefer to interact with others who are similar to themselves in terms of income, race or ethnicity. Using data from US localities and group membership, they found evidence in support of their proposition that individuals' income inequality and ethnic heterogeneity reduce the propensity to participate in social activities. Isham (2000) found evidence that the ethnic homogeneity of social networks in rural Tanzania significantly increased information diffusion and the adoption of fertilizers. On the other hand, social homogeneity of a social network may imply that members also have similar information so that less is gained from exchanging information.

The content of information from the social network also depends on the experience and the skills of the network members (in terms of education and/or whether they are adopters of the technology). Second, as already mentioned, networks exert some social pressure on their members besides informational effects. Networks with some members who have adopted the new technology not only provide accurate information to their members but also persuade them to adopt. Bandiera and Rasul (2002) observed an inverted U-shaped relationship between the number of adopters known by the potential adopter and the adoption of sunflowers as a crop in Northern Mozambique. The authors suggest that the inverse U-shaped relationship may imply two opposing effects. First, they suggest that the inverse relationship may imply the presence of strategic delay of adoption by people who know many adopters, which is consistent with the findings of Katz and Shapiro (1986) and Farrel and Saloner (1985). Bandiera and Rasul (2002) also suspect that there could be other benefits, in addition to information-sharing, that are provided by the social network and that could offer an alternative explanation for the inverse U-shaped relationship between the probability of adoption and the number of known adopters. Accordingly, they propose that further research should investigate the presence of other mechanisms. The present study investigates the possibility of increased access to bilateral transfers as an alternative mechanism through which social networks may influence technology adoption in addition to information diffusion.

4.2.2. Social networks, bilateral transfers and technology adoption

Social networks exist everywhere, but for different reasons. In the rural areas of the developing economies, where credit and insurance markets are scarce and income fluctuations are endemic, social networks are an indispensable part of people's livelihood. Households engage in informal mechanisms such as bilateral transfers to share risk and smoothen their consumption (Fafchamps and Lund, 2003). Bilateral transfers in developing economies take two forms: as assistance in kind (gifting giving, labour exchange, borrowing farm implements, borrowing land for farm production) and informal credit. Both forms of exchange depart from standard credit and insurance contracts in two fundamental ways (Fafchamps, 1999). First there is no explicit link between what is given and the obligation to pay, but the assistance is based on the implicit obligation to reciprocate. "If you help me today, I will help you in the future." Second, the zero-interest informal credit is exchanged between individuals who trust each other. Often the time of repayment is not specified at the time of transaction or can be renegotiated. The key feature of both forms of bilateral transfer is that they are based on personal long-standing relationships and an implicit obligation to reciprocate. The desire to preserve long-standing relationships motivates the reciprocity and acts as a self-enforcing mechanism (Posner, 1980).

How can bilateral transfers influence technology adoption? Bilateral transfers may influence technology adoption decisions in two ways. First, having access to a social network that can help in times of crisis reduces risk aversion and may enable individuals to experiment with new technologies. Second, access to assistance, whether in kind or in the form of informal credit, complements the households' resources, which may increase their economic freedom while making production decisions. This means that the more access there is to bilateral transfers, the greater the economic flexibility and willingness to adopt high-yielding but resource-intensive technologies. Improved banana management technology is resource-using, which means that where an expenditure constraint is binding, it might not be adopted. In addition, the peak labour demands in banana production coincide with the peak labour demand for annual crops. A household that receives cash or in-kind transfers from other households may be able to overcome these constraints and hence implement high-yielding but labour-intensive techniques.

The effect of bilateral transfers from social networks can also be negative. As mentioned in the previous paragraphs, interactions in a social network depend on trust and the ability to reciprocate. In a small village where individuals know each other, a person's failure to reciprocate may result in the loss of a link not only to the giver but to the whole of his social network, because the giver may go around speaking ill of the defaulter, despising and rumour mongering being one of the mechanisms used to reduce opportunism. This means that heavy reliance on bilateral transfers may limit investments in activities that are considered risky, which could limit the adoption of new technologies in agriculture.

4.3. Overview of the literature on the determinants of social capital

There are competing explanations for social capital formation. Some researchers have taken a history-centred approach and explain social capital formation on the basis of historical events. For example, Putnam (1993) reports that social capital is the result of a lengthy historical institutional development that is difficult to build externally. Hyden (2001) posits that the types of social capital that will emerge and the extent to which people will engage in any of them is very much determined by the history of previous efforts to form social capital. "It has to grow organically from the social dynamics that characterize society and hence may not be easy to influence externally" (Hyden, 2001 pp162). However, other researchers take an actor-centred approach and argue that organizational social capital may be eroded by economic restructuring (Heying, 1997) and may also be created within a short time through national organizations (Minkoff, 1997) or community face-to-face interactions (Wood, 1997). Fox (1996) also argues that social capital can be co-produced by the state or by local societal actors and external actors in the society. Glaeser et al. (2001) conceptualises social capital as being the result of investment decisions taken by individuals.

The review of literature in this section is guided by the definition of social capital presented in section 4.1.2. The object is to identify which household and community-level variables should be included in the empirical estimation of determinants of social capital among rural households in Uganda.

As defined in the present study, social capital has two components: institutional social networks (formal) and private (informal) social networks. These components represent stocks of social capital accumulated through individual investment efforts for given household characteristics and a set of exogenous community-level factors. The next section presents a review of the literature on the determinants of participation in institutional social networks (hereafter referred to as associations), followed by a review of the literature on the determinants of participation in private social networks.

4.3.1. Determinants of participation in associations

The existence of associations has been a commonly used indicator for social capital since Putnam's (1993) publication on social capital, though there are many alternative definitions[2]. With the increasing interest in social capital, and specifically in grass-roots associations, shown by many development practitioners the question relevant to policy is what conditions participation. Associations may be formed voluntarily or induced by a third party through coercion. In the present study, the focus is on associations where participation is voluntary and hence the review of literature will be limited to the factors that influence voluntary participation in associations. Both theoretical and empirical factors that influence individual decisions to participate in associations have been proposed.

From the theoretical work, it is indicated that associations will form if a common problem exists and the cost of providing the collective good incurred by each member is lower when provided by a group rather than an individual (Olson, 1965; Cornes and Sanders, 1986). The size and characteristics of the group experiencing a common problem as well as the constraints faced by the individuals interacting are identified as factors that influence the incentives. Olson (1965) argues that since the fraction of the collective good that each individual receives declines as the group's size increases, the incentives should be greater in small groups than in large groups and that this should encourage the formation of smaller-sized associations. In small groups

[2] The fact that the concept of social capital has been defined differently in various disciplines means that the factors that influence its formation will affect the definition of the concept and these factors may differ.

individuals are also able to monitor what others are doing, which is costly in large groups.

The existence of a leader in the group to coordinate its activities, implicitly reducing the cost of monitoring for other members in the group, is also important (Olson, 1965). The author describes this leader as a member of the group with such a large fraction of the total benefit that he would be better off if he/she paid the entire cost alone rather than going without the collective good. From the sociological perspective, Svendsen and Svendsen (2004) also assert that an association will be formed when a leader emerges. Although these authors approached the matter from a different perspective, each recognized the importance of leadership in collective action.

Other theoretical work has identified three factors that intervene in the decision-making process regarding participation in associations. These are trust, cooperation and the direct utility of associations and social networks (Alesina and LaFerrara, 2000; LaFerrara, 2002). "Trust," as described by Dasgupta (2005), is the fundamental problem for people who would like to transact with one another. The type and degree of trust required to facilitate a transaction depend on the personal characteristics of the participants, the institutional environment and the nature of the transaction. When formal institutions are effective in protecting property and contract rights, trust is rapidly established and transactions between people who are less well known to each other are likely (Knack and Keefer, 1997. This type of trust, commonly referred to as "general trust," exists at the community level and facilitates participation in large organizations (LaPorta et al., 2000). General trust arises from general knowledge about the population of agents, the incentives they face and the upbringing they have received (Platteau, 1994; Fox, 1996). On the other hand, when institutions are not effective in protecting contracts and property rights, as is the case among the rural populations of most poor countries, "general trust" takes time and effort to establish, which limits exchanges to people who know each other's reputation. An important implication, which is relevant to the present study, is the fact that associations are likely to be small and formed amongst people who know each other and can easily monitor each other's actions.

In the absence of general trust, personal trust and norms of cooperation act as alternative mechanisms through which exogenous variables may influence participation in associations. Cooperation may prevail among people even at low levels of trust when reputations are known and ample opportunity for future punishment is available (Laporta et al., 2000). In the theory of repeated games, the "folk theorem" establishes that cooperation is sustainable if there is a high probability that interactions will be repeated and players are able to monitor and punish defectors. This implies that people living in a community with low mobility or less probability of moving away from that community will have a greater incentive to cooperate and invest in social capital (Glaeser et al., 2001; DiPasquale and Glaeser, 1999), even when the general level of trust is low. Trust and cooperation are positively correlated but not identical (LaFerrara, 2002).

When the formal institutional environment does not favour the evolution of general trust, the role played by personal trust or norms of cooperation in the formation of associations depends on the nature of the transactions in the associations. Haddad and Maluccio (2003) analysed membership in sensitive (financial) groups and non-sensitive (non-financial) groups in South African communities. They found that trust in neighbours and extended family has a significant impact on membership in the case of financial groups but not necessarily in the case of groups in which exchange interactions are not sensitive (e.g. non-financial). Instead, household-level factors, such as the level of education of the household head, and demographic factors influence participation in non-sensitive groups.

From empirical studies it merges that trust and norms of civic cooperation depend on individual-level characteristics such as education, age and wealth (Haddad and Maluccio, 2003), as well as community-level factors. Among the more important community-level factors are social and economic heterogeneity (Alesina and LaFerrara, 2000; Alesina and LaFerrara, 2002; McCarthy et al., 2004; LaFerrara, 2002), population density (McCarthy et al., 2004) and communication infrastructure. Knack and Keefer (1997) find that trust and norms of civic cooperation are stronger in countries that are less polarized along lines of class or ethnicity. Alesina and La Ferrara (2002) report that individuals in racially mixed communities in the United States have less trust.

Heterogeneity in social norms and preferences may make agreements difficult to achieve (McCarthy et al., 2004), reduce trust among members (Alesina and LaFerrara, 2002) or lower the direct utility of participation (Alesina and LaFerrara, 2000), resulting in low cooperation. Similarly, differences in economic activities give rise to asymmetry in benefits and contributions among different members (La Ferrara, 2002). Each individual puts a different value on the group good, making it difficult to find an association that will satisfy all the various needs or preferences (Olson, 1965). This could limit the rate of participation when only one group is considered (La Ferrara, 2002) or increase the aggregate participation if the population can be stratified into homogenous groups (Cornes and Sandler, 1986).

LaFerrara (2002) argues that membership in a group that provides a shared economic benefit depends on income distribution and the types of access rules involved. Under an open-access rule (i.e. everyone is free to join as long as he/she pays dues), the wealthier households will drop out of the group when inequality increases because their incentive for participation will be lower when the cost of provision is a proportion of individual income. On the other hand, the group composition will be relatively unbalanced in favour of the relatively rich households under restricted-access rules.

Population density is the other community-level variable that has been reported in the literature to be important in regard to cooperation (Alesina and La Ferrara, 2002; La Ferrara, 2002). In this literature, it is argued that the fixed costs of cooperation are high at low population densities. On the other hand, the variable costs of communication and monitoring increase with the population (McCarthy et al., 2004; Olson, 1965). In some cases a high population may give rise to subgroups as a strategy to reduce the costs of monitoring (McCarthy et al., 2004), which may ultimately increase the rate of social participation (La Ferrara, 2002).

The role personal and household characteristics play in social capital formation has also been examined (Haddad and Maluccio, 2003; La Ferrara, 2002; Gleaser et al., 2001). Education is linked to information acquisition, trust formation and the general productivity of social capital. Aside from incentives, participation can also be

influenced by time and budget constraints. Participation in associations requires time and sometimes membership fees that may be beyond the means of the households that control fewer resources. In particular, poorer households may have such barriers to participation in associations (Godquin and Quisumbing, 2005).

4.3.2. Determinants of private social networks

Households not only invest in institutional social capital but also in private social networks (dyadic social relationships). In the social capital research undertaken by economists an individual social network is viewed as partly the result of an individual's own efforts and partly a consequence of the social environment (Glaeser et al., 2001; Fafchamps and Minten, 1999). The social environment determines the constraints and opportunities available to the individual, but the decision to join a social network is voluntary and therefore rests with each individual. One's environment influences the action-outcome chosen. In other words, the environment will influence the probability of success, which in turn influences the expected utility from a set of actions available to the individual. Coleman (1988), in his introduction of the concept of social capital into sociology, noted that the trustworthiness of the social environment is central to interpersonal relations.

Gleaser et al. (2001) took a capital accumulation approach and developed a model of social capital formation at the individual level in which individual social capital was defined as social networks and charisma. They found that social capital formation at the individual level could be explained by seven factors: (1) The relationship between social capital and age is first increasing and then decreasing. This is true in the case of other forms of capital accumulation as well. (2) Social capital declines with expected mobility. (3) Social capital investment is higher in occupations involving higher skills. (4) Social capital is higher among homeowners. (5) Social capital falls sharply according to physical distance. (6) People who invest in human capital also invest in social capital. (7) Social capital appears to have interpersonal complementarities.

Taken together, the literature on social capital formation explains how constraints in an individual's environment shape the size and form of social networks that he/she will form. The self re-enforcing nature of social capital is demonstrated. Trust and norms of cooperation, i.e. the cognitive forms of social capital (Upholf, 2000), come out as important mechanisms through which exogenous factors may affect participation in associations and social networks. Because trust among rural populations exists within small, tightly closed social networks, associations (local organizations) are likely to be formed voluntarily among individuals who already

have some predetermined relationship, such as relatives or a group of friends, suggesting that there could be some interaction between these two forms of social capital. However, this literature does not examine the interaction between the two forms of social capital.

4.4. Summary

There has been increased interest in the role of informal institutions in the adoption of new technologies in developing economies. This chapter has shed light on different forms of social capital and the channels through which it could influence the management behaviour of small-scale producers in developing economies. Despite conceptual weaknesses, previous studies demonstrate that social capital plays a significant role in agricultural development. Social capital may influence the choice of a technology through social learning and bilateral transfers. The evidence summarized in this chapter also demonstrates that social capital is not uniformly distributed among rural households. Both household and community attributes may contribute to variations in the distribution of social capital.