Microcredit, Social Capital, and Common Pool Resources

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Microcredit, extending small loans for income generating activities to the poor in predominantly developing countries, has become one of the most talked-about developmental tools to appear in the last few years. Despite the significant interest and financial support microcredit has received, and loan recipients who make at least part of their living by exploiting their local common pool resources (CPRs), very little has been written exploring microcredit's effects on these resources.

In this paper we explore how three common characteristics of microcredit programs affect the sustainable use of CPRs by creating physical, human and social capital. First, microcredit extends credit to the very poor to promote microenterprise activity, which may increase production and consumption activities and in turn may change the demand for common pool resources and the technology for their use. Second, microcredit programs often focus on women, who are the primary users of common pool resources in many developing countries.

Finally, microcredit often employs group meetings and group lending techniques, building human capital and strengthening the social capital of the community. This social capital, in turn, can lower the costs of collective action in managing local CPRs. If, as Elinor Ostrom proposes, the difference between those who have "broken the shackles of a commons dilemma and those who have not" is an *internal* difference, and, as she argues, failure may be due to the fact that "participants may simply have no capacity to communicate with one another, no way to develop trust, and no sense that they must share a common future,"[1] then finding ways to strengthen the social capital of a community may be one key to solving the complexity of the commons.

In this paper our primary goal is to develop the theoretical links between microcredit and CPRs. Our focus is rural microcredit and the associated common pool resources:

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irrigation, other water sources, fishing pools, grazing lands and forests. We begin with a short background on microcredit and some of the conscious organizational ways in which it is being linked to environmental resource goals. We then describe the implications of microcredit for common pool resources, beginning with the physical and human capital effects of microcredit's unique program characteristics. Most of our attention and empirical support, however, is devoted to the more neglected social capital effect. We offer an analysis of some limited broad-based data taken at the 1999 Microcredit Summit and support this with a case study of deforestation in Vietnam.

I. BACKGROUND ON MICROCREDIT

Microcredit is extended by microfinance organizations (MFOs) that may also offer savings, insurance, or other financial services. Despite a long informal history throughout much of the developing world, microcredit was only popularized recently in the development community by the work of the Grameen Bank in Bangladesh.

When asked why he started the Grameen Bank in Bangladesh, Mohammad Yunus usually tells the same story. He was teaching economics at the University of Chittagong in Bangladesh in the 1970s and was frustrated by economic theory's limited ability to explain, and therefore help, the poor of Bangladesh. As an academic, he says, one tends "to see the world with a bird's eye view." In the villages he tried to gain what he calls "a worm's eye view," one that showed problems that were immediate and real. His cathartic experience came when he met a woman in the village of Jobra who spent her day weaving stools, yet made barely enough money to feed herself. He realized that the reason she was unable to make a reasonable profit was because she had to sell her stools to a trader who only paid her enough to cover the cost of raw materials for the next day. He writes,

> The cost of the bamboo was five taka. She didn't have that cash. Her life was miserable because she could live only in that cycle: borrowing from the trader and selling to him. She couldn't get out of that circle. It's such a simple issue. All you can do is lend her five taka and it's solved.[2]

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[1] Elinor Ostrom, (1990), p.21.
[2] Ahsan, p. 12.

Yunus tallied the amount of money the villagers felt they needed to get ahead. The total was around US$50 for 42 people. Yunus lent them this money, and then began borrowing from the government and making micro-loans district-wide. In 1983 he was given permission by the government to create the Grameen Bank (GB),[3] which today serves over 2 million borrowers and is the largest MFO with replications worldwide.

The goal of the GB from the beginning was to target the poorest of the poor who worked in the informal sector of the economy, "…the hawkers and venders seen peddling their wares on street corners, the farmers and hucksters who sell locally grown foodstuffs in remote villages and towns, and the entrepreneurs who recycle used bedsprings, make brooms, sew clothing in their homes or in little shops located in alleyways and shantytowns.[4] Historically, workers in the informal sector have been excluded from formal banking due to several possible factors. To begin with, these workers are overwhelmingly female and the banking system is overwhelmingly male. Second, they lacked the literacy and connections necessary to get loans. Paperwork was often lengthy and required the ability to read and write. Third, making such tiny loans was seen as financially unsustainable due to the high transaction costs the bank faced. In order to meet costs, many bankers believed interest rates would have to be prohibitively high. Finally, workers in the informal sector were perceived as credit risks because they lacked physical collateral.

Information asymmetries between borrower and lender plague most credit markets, and arise from the lenders inability to know the true credit worthiness of the borrower. In addition, problems of moral hazard arise, whereby lenders assume riskier behavior one they have the loan. These particular traditional problems in rural credit delivery can be summarized as low potential profitability and imperfect information.[5]

Despite these problems, Yunus found that workers in the informal sector were indeed credit worthy. To expand the base of borrowers the bank's business was conducted openly in the villages utilizing simple procedures that did not require literacy and could therefore include the poorest and women. To encourage payback, payments were frequent

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[3] Ibid., p. 15.
[4] U.S. House of Representatives , p.2.
[5] Problems in rural credit delivery are discussed in FAO/GTZ (1998) World Bank (1975, 1993) and Adams & Vogel (1992). For a more complete discussion of imperfect information see Stiglitz and Weeiss (1981), Stiglitz (1990), Besley and Coate (1995) and Conning (1997)—all cited in Bastelaer (1999).

and small, and borrowers formed peer groups that gave support and exerted repayment pressure.[6]

Groups lower transaction costs for both borrowers and lenders.[7] Borrowers are spared frequent time-consuming trips to the bank and the interest rates, while higher than the rates for more formal bank loans, are still lower than moneylenders. For the banks, having group leaders collect the weekly payment from the whole group and deliver it to the bank reduces the amount of transactions by a fifth or more (depending on the group size). An individual self-select into lending groups, which promotes group homogeneity in terms of gender, landholding, and income and promotes repayment.[8]

Finally, although borrowers do not have physical capital to act as collateral, they have social collateral. By utilizing the existing social capital – the networks of trust and relationships in the village -- group techniques helped to ensure repayment of the loans. Participants may be required to borrow in groups (joint liability), select their own group members, act as mutual guarantors, or receive loans contingent on others in the group paying their loans back (contingent renewal).[9] These group incentives and dynamics are reinforced through regular, often weekly, group meetings.[10] They reduce the costs of information asymmetry common to most lending situations by aligning borrowers' incentives and using their superior knowledge of each other to screen members, monitor repayment, and exert peer pressure. This concept, the idea that social collateral could substitute for physical collateral in the provision of loans, was an entirely novel idea in the world of formal banking, though it had been in existence in informal banking for some time.

Microcredit and Environmental Resources

The 1990s have seen an enormous growth in the level of microlending occurring worldwide. In 1996, the International Microcredit Summit met in Washington D.C. and was

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[6] Todd, (1996) p.19.
[7] Not all MFOs use group lending. In Indonesia for example, Bank Rakyat Indonesia (BRI) and Badan Kredit Kecamatan (BKK) loan to individuals, using the testimony of a respected community figure as collateral on the loan. Bastelaer, (1999), 9.
[8] Bastelaer (1999), 12.
[9] Ibid., 10. The legendary repayment rates of most MFOs tend to be exaggerated, but are still impressive by formal banking standards. Despite high repayment rates, most MFOs, including the Grameen Bank, still rely on subsidies. See Morduch (1998).
[10] This also reduces information asymmetries between lenders and borrowers since other villagers are far more likely to understand the credit-worthiness of an individual than a non-local bank manager.

attended by over 2,900 people, representing 1,500 organizations from 137 countries.[11] The goal of the meeting was find a way "to reach 100 million of the world's poorest families, especially the women of those families, with credit for self-employment and other financial and businesses services, by the year 2005."[12] Considering the financial support and international acclaim microcredit programs have garnered, this goal is lofty, but not impossible.

Yet, if the summit leaders reach their goal, the provision of credit to such a huge proportion of the poor would represent a very fundamental shift in development policy. [13] There are many people who see this shift as positive, but there are a growing number of scholars who are expressing concern about such a change. They fear that money will be shifted away from other development programs into microcredit, when there is so much that we still don't understand about the success of the Grameen Bank.[14] Little is known about the definite impact of microlending on borrowers, but even less is known about its effects on environmental resources. [15]

There are few examples of financial MFOs that explicitly tie environmental management to lending, though environmental practices often appear in the members' conditions of lending. In large part this may be due to the precedent set by the Grameen Bank in their 16 conditions that borrowers are encouraged to adopt. Members pledge that "…we will keep our children and the environment clean, we will build and use pit-latrines, during the plantation seasons, we will plant as many seedlings as possible."[16] These conditions have been copied by hundreds of Grameen replication banks worldwide.

Microcredit and the environment are, however, frequently coupled within conservation NGOs or development NGOs with a conservation agenda. For example, Thailand's Population and Development International (PDI), is trying to discourage deforestation in the Western Forest Complex along the Myanmar border using microcredit to promote alternative, resource sustainable, livelihoods, such as more soil friendly and

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[11] Microcredit Database, (April, 1999).
[12] Ibid.
[13] Many microcredit advocates stress that MFOs can become financially self-sustaining, eliminating the need for donor funds. This is part of an industry debate between the "institutionalists" and the "welfarists". See, for example, Morduch (1998) and Woller (1999).
[14] See, for example, Buntin (1997); Solomon, (1998), Roth, (1997), Also see Hashemi's (1997) insightful essay.
[15] Empirical evidence is limited because of the paucity of appropriate household level data in most developing countries, and the expense and conflict of interests of MFOs conducting their own evaluations. For a review of the empirical literature, see Sebstad and Chen (1996), and IFPRI (1998).

organic crops, harvesting non-timber forest products, and aquaculture. In an effort to preserve Cao Hai Lake in Guizhou, China, as a migratory bird refuge, conservation officials are using microcredit to finance livelihoods that reduce pressures to drain the lake.[17] Conservation International hopes to reduce deforestation and poaching by increasing the value of forests as tourist sites. They use microcredit to encourage local craft makers to supply gift shops in the Kakum National Forest Preserve. Also in Ghana, TechnoServe is exploring microcredit as a means of controlling inventory of the shea nut and reducing elephant killing. In Bangladesh, the research organization UBINIG is helping farmers in the Tangail district reduce their dependence on pesticides, begin composting for fertilizer, and practice mixed cropping aided by seed banks. Myrada, based in Bangalore, India, has a mission to "recreate a self-sustaining habitat based on a balanced perspective of the relationship between natural resources and the legitimate needs of people." They organize credit management groups of the rural poor, manage micro watersheds, and reforest arid areas. In some cases these organizations have, or are attempting to develop microcredit capacity themselves, while in others they are partnering with more specialized credit suppliers, such as local or international banks or other NGOs.

There is also a small, but growing group of MFOs and microenterprises concerned with producing "green" products or technologies. For example, Grameen Shakti is dedicated to providing renewable energy sources, such as solar PV, biogas, and wind turbines to villages in Bangladesh that are without electricity. Likewise, the Solar Based Rural Electrification Concept (SO-BASEC) in the Dominican Republic and Honduras uses microcredit to promote solar-based renewal energy. Other examples include the Asia Institute of Technology promoting biotechnology-based microenterprises such as mushroom and bioorganic fertilizer production that reduce the harm to watersheds.

These energy technologies and eco-tourism activities will reduce demands on local forests for fuelwood. Efforts to improve agricultural techniques and reduce chemical use place watersheds and other CPRs at less risk. Still, Green MFOs appear to be in the minority. In our survey of MFO participants in the 1999 Microcredit Summit, only about a third of the respondents said that they had sustainable natural resource or environmental requirements or conditions of lending associated with their program and 43 percent felt that

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[16] Khandker, World Bank (1995) - Grameen Bank, 133.
[17] New York Times, May 18, 1999.

there was no discernable impact on the environment or natural resource use from the credit they provided.

Despite this perception, changes in the physical, human and social assets that arise from microcredit activities will affect a community's production, consumption, and management opportunities and decisions around common pool resources. However, whether the net effects are negative or positive is difficult for us to posit without extensive empirical evidence, as the effects clearly will depend on agro-climatic zones, the particular CPRs, local and non-local institutions, design of the microcredit program, and so forth. Logically it seems reasonable to put forth that the net physical capital effect of increased production and consumption opportunities— including increased demands on common pool resources, and increased waste and byproducts compromising the quality of the common pool resources— is probably negative. What we hope to engage a debate on, however, is how the human and social capital that is both strengthened and produced by MFOs may counter these negative effects on the physical capital—namely the CPRs—of a community. The next section will explore how MFOs affect the capital base of a community, and, in turn, how they affect the sustainable use of common pool resources.

II. IMPLICATIONS OF MICROCREDIT FOR COMMON POOL RESOURCES

Microcredit's effect on common pool resources begins with the unique characteristics of these programs: extending credit to the very poor, lending primarily to women, and often employing group lending methods. Table 1 indicates how each of these program components will change an existing constraint that the borrower lives under, and hence will lead to a change in their productive or consumptive behavior. It is these behavioral changes that have implications for common pool resources.

Table 1

MFO Characteristic ⇒	**Δ in Constraints**	⇒	**Δ in Behavior**
Credit extension (*Physical capital*)	↑ income/ownership	↑ stewardship	
			↑ demand for environ quality ↑ resource use
	↑ income diversity ↓ discount rate		↑ stewardship
Focus on women (*Social and Human Capital*)	↑ reproductive control	↓ fertility ↓ resource use	

Group lending (*Social and Human capital*)	↓ costs of collective action ↑ knowledge	↑ public goods ↑ management of CPRs

Microcredit affects environmental and common pool resources through financial, human and social capital changes: changes in the levels, diversity, or regularity of borrowers' income; changes in their discount rate between present and future consumption; changes in the role of women and providing them with a forum in which to exchange of information; and changes in the cost of collective action for managing other environmental resources.

II.1. Credit extension to the poor and the creation of financial and physical capital

Microcredit's role in developing physical capital is relatively obvious. Microcredit lending, if successful, promotes microenterprise activity that among other things, can increase, smooth and diversify the borrower's income and increase levels of physical capital. Credit allows microentrepreneurs to invest in small-scale capital such as sewing machines, loom, bicycles, rickshaws, livestock, tools, and other supplies. These relatively large investments would otherwise be difficult for individuals, living at or near subsistence levels, to acquire. It is these physical investments that allow the borrower to produce goods and services otherwise not possible. In turn, these income and property effects can lengthen a borrower's time horizon, or lower their discount rate – the rate at which they are willing to trade off present for future consumption. Extending credit has environmental resource consequences both through the direct physical capital investments and the potential changes in borrowers' income.

Income Effects

We know that poverty and the environment are intimately linked. The poor are less able to place resource conservation above other, more pressing, survival needs, often rendering them the primary victims of their own, and others, environmental degradation.

The evidence is weak, but growing, that microcredit raises the income and/or assets of at least some participants.[18] As income increases, we expect the quantity, composition,

[18] For a summary of the results of several impact studies see Sebstad and Chen (1996), Schrieder et. Al (1999), or Anderson and Nugent (2000).

and timing of economic activity of the poor to change.[19] Changes in consumption activities afforded by increased income have both positive and negative effects. The negative impacts include generating more, and more toxic, waste,[20] the severity of which depends on scale, the absorptive capacity of the environment, and the infrastructure and services to deal with it. On the positive side, rising incomes tend to be correlated with improved household infrastructure including sanitation and cooking facilities, greater access to safe drinking water, and increases in contraceptive use. Fuel use will often change as income rises, the impact of which depends on the fuel and fuel burning technology used. Switching from biomass or coal to electricity, for example, may reduce the destruction of forest sinks and CO_2 emissions.[21]

The relationship between income growth and resource use in production is even more complex. For rural, largely biomass-based subsistence economies, growth involves either intensification of agriculture, extensification of agriculture, or new rural non-farm activity including resource extraction.[22] Some of these activities change environmental resource use directly, others through changes in property rights and ownership, and others in the use of labor, capital or technology that complement or substitute for natural resource inputs.

The extensification of agriculture has the most direct implications for common pool resources. In some cases additional income relieves the pressure to farm new lands, while in others it affords the ability to do so. In general, clearing new land for crops, rather than using existing land more intensively, increases deforestation pressures, the use of marginal lands, and environmental impacts from migration.[23] Deforestation implies a loss of timber, bark, saps and pharmaceuticals, loss of species habitat, soil erosion, and in watersheds, increased runoff of rainwater leading to soil loss and clogging of water reservoirs and irrigation systems. Tertiary lands are often more marginally productive, suffer more from soil erosion— especially if they are on hillsides— and require more fertilizer and water.

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[19] While the fungibility of microcredit loans has raised some serious concerns about their long term effectiveness in promoting sustainable livelihoods, for the rural poor in particular it is difficult to separate out production and consumption decisions, since labor is the main productive asset and adequate nutrition is essential to work. The environmental implications, however, do depend on whether loan funds are used for productive activities, or channeled into consumption

[20] Dasgupta and Mäler (1994), 7.

[21] Though this depends on how the electricity is generated.

[22] Dasgupta and Mäler.

[23] Deininger and Minten.

For rural, farm-based microenterprises, the most environmentally harmful activities that may be promoted by microcredit are chemical intensive agriculture, livestock slaughtering and aquaculture because of the excessive use and unsafe disposal of the hazardous chemicals. Aquaculture poses additional risks to common pool wildlife resources and the use of farmland.

Rural non-farm (RNF) activities that can pollute the air, land and water— largely through toxic emissions and by-products— include small scale mining, metalworking and electroplating, tanning, textile dying and craft enterprises, brick production, and foundries for food processing, wood processing, cotton ginning, or chemical production. Though perhaps more common in urban microenterprises, any activity that is energy intensive, including small-scale transportation and road-stand restaurants, will require fuel and water resources which may increase demands on local CPRs.

Increased income, however, may promote resource stewardship through increasing property rights and lowering discount rates. Women and the poor in particular have often been denied access to credit, because they lacked the collateral of land. In some villages, culture, law and regulations permitting, increased income may afford increased land and other property ownership. Title creates incentives to practice better long run stewardship of the owned environmental resources.

Similarly, the higher an individual's income, the less they must be preoccupied with satisfying current consumption needs. It becomes possible to trade off some current consumption for a higher, more sustained future return. If the result is a lower discount rate, the environmental consequences are similar to those as land ownership including an increased willingness to use organic fertilizers and pesticides and techniques such as integrated pest management that can reduce both the demand on common pool water resources and the toxins reducing the quality of those resources.

Income Diversification

Diversifying income can be an important result of microcredit, particularly for the rural poor who are dependent on agriculture and are subject to weather fluctuations and crop cycles. Income can be diversified through savings or other financial services offered by the MFOs, additional farm activities such as new crops, and new or expanded non-farm activities. Again, the common pool resource consequences depend on the activity. For

example, credit can provide the opportunity to diversity by increasing livestock holdings, which can lead to overgrazing and pressures to deforest. Conversely, credit and insurance services could reduce the need to hold insurance in-kind, traditionally accomplished by carrying excess livestock, and reduce pressure on these same CPRs.[24]

II.2 Focus on women and human capital creation

As a group, MFOs overwhelmingly focus on recruiting and extending credit to women, though the loans and activities may ultimately be controlled by males in the household.[25] MFO's reasons for targeting women may differ. Women are reputed to be better credit risks with higher payback rates, easier to discipline, more inclined to use income they control for improving children's nutrition and education, and they possess more unrealized entrepreneurial capacity. Some MFOs may simply wish to increase women's economic power. Regardless of the motivation, both the financial, business, technical, reproductive or other training that is a part of many microcredit programs, as well as the spreading of knowledge and best practices by borrowers who are required to meet regularly, both adds to and utilizes the human capital of the borrowers and the community.

The human capital effects of microcredit are a result of both the direct financial, business, technical, reproductive or other training that is a part of many microcredit programs, and the spreading of knowledge and best practices by borrowers who are required to meet regularly.[26] Accordingly, human capital is less likely to be produced in programs that do not offer these services or who do not use group lending methods. Women's empowerment, defined as increasing autonomy over their lives and control over decision-making, is believed to— on net— improve with access to credit, though studies reveal that in most cases, women do not fully control their loans and some forms of domestic violence may be increasing.[27]

Increases in income or property rights for women attributable to microcredit will have environmental consequences similar to those outlined earlier. Some of these consequences may be pronounced, however, because of women's common roles but limited

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[24] Dasgupta and Mäler (1994).
[25] See Rahman (1998) and Sen Gupta.
[26] For a discussion on the educational and other human capital effects of microcredit, see Schrieder (1999).
[27] See Hashemi, Schuler and Riley (1996), Khandker (1998), Rahman (XX).

rights. These roles contribute to a unique and intimate relationship with environmental resources and knowledge about local ecosystems. Women have gained valuable knowledge and a sophisticated appreciation of local ecosystems through their daily work. This includes understanding the varied functions of different forest resources, the multiple uses of crops, soil features, water flow, and health care for small livestock.[28] MFOs that offer technical training on resource management directly contribute to women's human capital. MFOs that require regular group meetings offer women the opportunity to share their own knowledge and best practices. The value-added may be particularly high for women, otherwise unexposed to training, and women in cultures who otherwise have few or no opportunities to leave their home.

In most developing countries, women are responsible for gathering fuelwood, non-timber forest products, and collecting water. They are responsible for cooking and household sanitation. They suffer the most, therefore, from deforestation and desertification, and have a particular incentive to maintain or improve their local environment and common pool resources. This incentive has translated into some of the most creative conservation initiatives worldwide. Women's groups have organized to collectively lease and revive exhausted cropland, offer leadership in water supply and management, plant trees, construct terraces, and provide education about a variety of resource conservation opportunities.[29] The group lending and meeting aspect of MFOs can facilitate and strengthen these initiatives.

Reproductive Control

The evidence is growing that microcredit programs may contribute to reduced fertility.[30] This is not surprising, given the higher opportunity cost of bearing children for a successful female microentrepreneur, relative to a women employed only in household or farm activities and where the child may be a more important source of labor. Also, as women's income rises, child mortality rates usually fall, lessening the need or desire to bear as many children.

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[28] World Resources Institute (WRI) (1994), p.46.
[29] Ibid., 54.
[30] Schuler, Hashemi and Riley (1997).

There may, however, be an even more direct avenue of influence from microcredit to reproductive control that would explain cases like Bangladesh where fertility rates are plummeting though mortality rates are not. Some MFOs also provide, indeed encourage, family planning education as part of their program and regular meetings. It may be that either their new economic power, new information, or new support system, has allowed women to take more control over childbearing decisions. Participants with the Bangladesh Rural Advancement Committee (BRAC) and Grameen Bank, for example, are far more likely to practice contraception than the national average.

The environmental resource implications of reduced fertility are reasonably unambiguous: fewer children usually mean less resource consumption and less waste. If fertility is declining because of increasing income, however, it may be that though total consumption is falling, per capita consumption is rising. As always, the net effect also depends on how the composition of activities changes, not simply the level.

II.3 Group Lending: Social Capital and Human Capital Effects

The least explored outcome of microcredit is the production of social capital arising from group-based microfinance programs.[31] Social capital is "the institutions, the relationships, the attitudes and values that govern interactions among people and contribute to economic and social development."[32] Interest in social capital's role in economic growth has been growing since the work of Robert Putnam (1993) and James Coleman (1990).

Social capital can be conceived of as networks of horizontal and vertical linkages. Horizontal linkages are generally considered those positive social networks that contribute to the overall productivity of a community, such as volunteer associations. Coleman added the notion of vertical linkages "characterized by hierarchical relationships and an unequal power distribution among members,"[33] and allowed for social capital to produce negative as well as positive associations, depending on its function: ... A given form of social capital that is valuable in facilitating certain actions may be useless or even harmful for others.[34] Olson

[31] Bastelaer (1999).
[32] The World Bank Social Capital Initiative Working Paper No. 1, p.2.
[33] Grootaert, (1998).
[34] Coleman, (1990), p.302.

(1982) and North (1990) employ a more encompassing view of social capital to include informal and formal institutions that govern how individuals relate.

It is fairly well understood how microfinance programs use the existing networks of horizontal associations to lower some information and transaction costs. Bastelaer (1999) also notes the importance of hierarchical relationships, including relationships between borrowers and lenders that become personal through regular meetings and/or that create traditional patron-client relationships and the need to demonstrate allegiance, and relationships between MFOs and local or national governments.[35]

Less well understood is how MFOs create new social capital. Microfinance programs use existing social capital, particularly in their group lending techniques, but arguably also create new social capital through their meetings and other services: "microfinance has the potential to enable collective action, the coming together of the community, and more sustainable community-based organizations…In as far as microfinance interventions allow to invest in education and training, members of the community can acquire skills that will allow them to locally design, develop and manage community projects."[36]

In villages where members are meeting weekly as a condition of their loan, the additional costs of collective action for other village undertakings, many of which are common pool resource-based, is significantly lower. Communication among participants greatly increases the chances of successful collective action. Ostrom, Gardner and Walker (1994) have shown in a series of experiments that given the right institutional framework to communicate "players successfully used the opportunity (1) to calculate coordinated yield-improving strategies, (2) to devise verbal agreements to implement these strategies, and (3) to deal with nonconforming players."[37] Bastelaer (1999) also argues that social capital is created when MFOs such as the Grameen Bank and its replicators require all members to engage in the same behavior every week, such as repeating the list of decisions that accompany group membership. This routinization creates a corporate culture, or cultural habit.

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[35]For example, the Grameen Bank's close relationship with the Government of Bangladesh is maintained through government officials who sit on Grameen's board. Evans (1996) writes about the synergy between local government and a Grameen replicator in Vietnam. Most microcredit programs in Vietnam also work through the powerful Vietnam Women's union.

[36] Schrieder (1999), 74.

As Ostrom (1994) and others have noted, it takes effort and energy to create social capital. Group-based microfinance can lower the costs of monitoring and enforcing existing rules and norms, and also the costs of crafting new rules -- investing in social capital.[38] Regular meetings, repeat interaction, and common credit goals can facilitate the communication, knowledge about fellow actors, common understanding about the incentive structure, and trust prerequisite to collective action.[39] By nature of its credit activities, microfinance adds further incentives for cooperation by increasing the anticipated payoffs, and lowering discount rates.

It seems less likely that microfinance meetings per se would be used to determine collective choice rules, as much as they would be used to monitor and amend the day-to-day operational rules governing CPR use.[40] This is because the microfinance participants may only be a subset (though arguably an important one) of the local CPR users, and because in many cases they are likely to be women. If, as is often the case, the women are primary users of the local CPR, microfinance activities may provide a conduit for changing the operational rules among themselves.

III. EMPIRICAL SUPPORT

We conducted a survey of the participants of the 1999 Microcredit Summit and queried them on many aspects of the workings of their organizations. Among many other questions, participants were asked what percentage of their clients were women, whether they used group or individual loans, the environmental impact (if any) of the microfinance activities in their area, as well as the participants being asked to list and rank the most important impacts they felt their credit and other financial services provided. The data collected is quite informative about perceptions of both the effect of microfinance activities on the environment and the perceived importance of social capital in MFO operations.

As mentioned previously, of the 147 total respondents, 64 (43 percent) felt that there was no discernable impact on the environment or natural resource use from the credit they provided. Of the 79 MFOs with a 50 percent or higher rural clientele, (as opposed to urban

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[37] Elinor Ostrom, Roy Gardner, & James Walker (1994),p.167.
[38] Ostrom 1990, 1992.
[39] Ostrom 1994, 532.
[40] Ostrom 1994.

or per-urban), 52 (65 percent) said that they felt that there was an environmental impact and 26 (33 percent) felt that there was none.

Of those rural MFOs that reported some sort of discernable impact, the type of impact reported was both negative and positive.

Potentially positive for environment	Percentage responding "Yes"
1) Less deforestation	63
2) Increased organic farming methods	50
3) Increased crop rotation	40
4) Increased use of integrated pest management	33
Potentially negative for environment	
1) Fuel use has increased	29
2) More deforestation	12
3) Decreased crop rotation	9
Ambiguous	
1) Increased chemical fertilizer use	23
2) Increased chemical pesticide use	21
3) More irrigation	38
4) Less water use	13
5) More water use	42
6) Fuel source has changed	38

Of the top four impacts, then, "more water use" is ambiguous as to whether it indicates a positive or negative environmental impact, but the other three appear to be positive: less deforestation, increased organic farming methods, and increased crop rotation. While the net environmental effect may still be negative, such positive overall results show that certain microfinance programs may, in fact, lend themselves to sustainable CPR use, at least in certain regards. The MFOs themselves may recognize this, to an extent,; A little over a quarter of the total MFOs listed improving the environment as one of their most important impacts.

The results are also encouraging in relation to social capital. MFOs were asked, "What are the most important impacts of the credit and other financial services your organization provides?" Out of the following list, they were asked to rank all of the impacts that they felt applied to their organization(1 being most important, 2 being the second most important, etc.): develop financial skills, create jobs, improve incomes, reduce fertility, improve environment, create business skills, and social cohesion. Of the 147 who responded, almost exactly 50 percent (74) listed social cohesion as one of the most important impacts they felt

their financial services provided. Of these respondents, 35 percent felt it was the first or second most important impact they provided.

Anecdotes that support these experimental findings abound in the field. Collective action can increase the provision of public goods such as irrigation, crop insurance, and sanitation. It is also vital for improving the management of common pool resources (CPRs), such as grazing lands, groundwater basins, fisheries, and community forests. In the Western Forest Complex in Thailand, for example, group meetings facilitated by PDI were used to report on forest burning activity and coordinate village responses to support deforestation measures. In the Philippines, Bayan reports a correlation between microfinance activity in a village and the cleanliness of public spaces. In all of these cases, the scale of microcredit's influence on environmental resources becomes much more apparent. In Madagascar, access to member-based financial institutions encouraged agricultural intensification by increasing lowland rice yields and upland soil fertility. Increased access to capital, however, also increased upland farming opportunities, though on net, an increase of 1% of households involved with microfinance organizations decreased upland use by .36%.[41]

Case Study: Deforestation in Vietnam

Introduction: Vietnam's Forests

In Vietnam, the forests "provide subsistence products directly and indirectly to most of the rural population and generates work opportunities for more than 28 million people."[42] Since Vietnam has a total population of only 77,311,210 (July 1999 est.)[43], this means that over a third of the total population depends upon the forests for survival. According to the Vietnamese government, Vietnam has close to 33 million hectares (ha) of land, of which 8 million ha are classified as agricultural land, 11 million ha as forest and 12 million ha as "unused" land.[44]

Deforestation is happening at a much faster rate than reforestation, and, because of this problem, Vietnam is facing many negative ecological consequences. Deforestation leads to

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[41] Zeller et. al.
[42] Hines, (1995), p.1.
[43] CIA Vietnam Factbook.

> serious environmental degradation, including deep gully erosion; loss of topsoil, humus, and soil fertility; and drying up of water sources during the dry season. Not only does degradation result in almost total loss of local productivity, it may also have disastrous consequences in downstream agricultural areas, due to destructive flash floods and siltation of dams, reservoirs, and irrigation canals.[45]

Flooding has been a particularly serious and prevalent problem. The past year has been especially difficult for central coast of Vietnam. They were hit by two major floods within the space of two months, hundreds were killed and tens of thousands had to be evacuated. It is understandable that, when surveyed, one village in the Thach Ha District of Vietnam listed natural disasters as highest on a list of problems facing the area. For them, environmental degradation and its serious effects are not abstract concepts. On the contrary, it means the difference between life and death, and, as a result people are, as a whole, receptive to opportunities that will bring them greater security.

Poverty, Fuelwood and Deforestation

Many of the challenges that are apparent in Vietnam are, in fact, existent in many other developing countries in the world. Like other countries, it struggles with finding a way of balancing economic liberalization and privatization, a growing population with food, fuel and social needs that are very much tied up in land and forests, and the need to protect its biodiversity and environmental balance. Vietnam, with almost 50 percent of its people living below the poverty line, experiences deforestation in part because people who live on the economic margin often turn to exploiting the forest in order to survive. This often takes the form of selling their labor for fuelwood collection or collecting independently and selling their wood to middlemen. The contribution of fuelwood collection to the deforestation of Vietnam is huge. Deborah Hines, a scholar for the United Nations reports the following causes of deforestation by region:[46]

	fire damage	encroachment and shifting cultivation	fuelwood	logging	total w/o fuelwood
Northern Mountains	0	35	115	17	52
Northern Midlands	0	10	11	23	33
Red River Delta	0	0	33	5	5
North Central Coast	1	7	96	4	12

[44] Asian Development Bank, (1999), p. 1.
[45] Le Trong Cuc (1996),p.7.
[46] Hines, p.5.

South Central Coast	0	15	46	4	19
Central Highlands	4	95	69	8	107
N.E. Of Mekong	2	15	78	4	21
Mekong Delta	11	95	32	13	27
Total	17	180	482	78	275

Clearly logging plays the biggest role in the deforestation of the Northern Midlands, and encroachment and shifting cultivation play the largest in the Central Highlands, but fuelwood collection in both of these regions is the second biggest contributor and, in the rest of the country, it claims the majority of the responsibility for deforestation.

So far, few studies or government policies have centered on the problem of fuelwood collection, preferring to focus on slash and burn or shifting cultivation, addressed with resettlement and educational polices. Part of the reason seems to be that fuelwood collecting as an informal-market activity is very difficult to estimate. A more central reason, however, is that policy makers see an increase in fuelwood collection as an inevitable result of population growth and a rise in household consumption. Yet much of the rising demand seems to be coming from industry, rather than households. The demand for feulwood for industrial and urban purposes has spurred the growth of a sprawling informal market, composed of cash-desperate rural citizens. As early as 1992 the FAO stated that

> numerous reports describe progressive reduction of forest area by rural wood harvesters who gather fuelwood for their own use and for cash sale to supplement their household income. The process is clearly visible, especially along the main road through Lang Son Province and along the main north-south highway on the hills of densely settled coastal lands, notably in Thanh Hoa and Nghe Tinh provinces. In many places, there are distinct foot tracks up steep hillsides used by the gatherers, who frequently can be seen carrying wood to roadsides from natural forests.[47]

By 1996, the amount of fuelwood being sold on the open market was increasing dramatically. If, as they indicate in their report, household fuel was gathered rather than bought, then we can assume that generally the fuel that was sold was being used for commercial purposes. By the mid-1990s (they do not specify exactly when their data were collected), they estimated that "about 20-25 percent of the total firewood produced annually

[47] Ibid.,p.68.

is traded on the market."[48] And that market seems to be overwhelmingly informal rather than formal. Deborah Hines of the UNDP noted that "An informal collection and distribution system is still very much in operation in QN Danang as well as many of the other project provinces. Unauthorized cutters sell to unregistered traders who then sell to private wood processors."[49]

Microcredit and Social Capital in Vietnam

If fuelwood collection is, indeed, responsible for so much forest degradation, then what can be done? Officially monitoring and enforcing a ban on fuelwood collection would be too difficult, costly and complex to engage in and would fail to attack the source of the problem. Because poor people use firewood collection as a way of smoothing income problems, it would seem that if the poor had other avenues to smooth and increase income, it seems they would be less likely to engage in surreptitious grazing of the forests. Furthermore, once their dependence upon the forest for cash-generating activities was reduced, they might be able to lower the costs of acting collectively to monitor and enforce rules against forest exploitation.

Some villages in Vietnam that possess both a strong stock of social capital and enough economic alternatives to utilizing CPRs have successfully worked with outside groups to collectively protect and monitor their forests. In one village, meetings were used to demarcate the area of forest to be protected and to determine fines for violators:

> As forest trees were cut down even in the village forest, some villagers began to question the exploitation of the natural resource. Fortunately, at this time the district officer in Lamphun was promoting forest conservation. A series of campaign meetings were held with village headman from various villages for this particular purpose. In the village, local agreement on village forest demarcation was successfully reached. Furthermore, local regulations were laid down to promote conservation. Anyone found cutting down a tree would be fined 20 baht. After that illegal logging for cash income went into decline. It should be emphasized that all of this was verbal agreement among local people without any legal or official documentation. (p.9-10)

Using these principles, Rambo and Cuc of the East-West Center program on Environment suggest to:

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[48] FAO and Ministry of Forestry (1992), p.28
[49] Hines, p.8.

> draw upon the growing body of knowledge about management of common property resources to develop institutional mechanisms to facilitate acquisition and development of blocks of barren hill land by small groups of poor households. The already-demonstrated ability of small groups composed of kin and close neighbors to co-own buffalo suggests that similar small face-to-face groups might also be able to successfully manage tracts of hill land held as common property. Loans might be given at preferential rates to such groups, for example. If organizational methods similar to those pioneered by the Grameen Bank in Bangladesh were employed, the default rate on such loans might be lowered to an acceptable level.[50]

In this way, microfinance organizations, working with the social capital of rural farmers, can work to improve the maintenance of common pool resources.

In Vietnam, the use of microcredit did not really become popularized until the institutionalization of *Doi Moi*, a shift from a state planned economy to market liberalization instituted by the Vietnamese government in response to a stagnant economy and international isolation. Until 1988, the Vietnamese financial system consisted only of the State bank, which acted in both a commercial and governmental capacity. [51]Under Doi Moi, however, this monolithic structure was broken down into institutions created to deal with specific, sectoral credit needs. As rural land collectives were parceled out to individual households, the demand for credit rose sharply as individual farmers found themselves in need of money for inputs previously supplied by the collective. In order to meet this demand for rural credit, the Bank of Agriculture (VBA) was established, and in 1995, the Bank of the Poor (VBP) was created as a subsidiary of the VBA. By 1996, the VBA provided credit to 7 million households with an average loan size of US$118.[52] The VBP, on the other hand, is a non-profit branch of the VBA and was set up to target poorer clients. No collateral is required and loans average US$96.[53]

The government banks were not meeting the need for rural credit, especially for small loans. But, just as the demand for rural credit blossomed, so did the amount of NGOs that were willing to provide it. Vietnam's liberalization coincided with the furious rise in popularity of microcredit lending around the world. According to Heather Grady, microlending peaked in about 1996 and has been leveling out since that time. Most microcredit programs work through the Vietnam Woman's Union (VWU) and it is estimated

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[50] Cuc et al.(1990), p. 125.
[51] Wolff, (1999), p.53.
[52] Fallavier, (1998)
[53] Fallavier, p.66.

that by 1996, the Women's Union was running 50,000 women's saving and credit groups worldwide.[54] Using this mass organization as an intermediary is another example of the vertical ties inherent in much of the social capital created through microfinance.

All of the MFOs utilize group lending of some type quite simply because "the advantages of groups in terms of reducing costs and risks, and in providing social collateral are well known." [55] While the significance of social capital for ensuring high repayment rates has been recognized, the possibility of utilizing and contributing to a community's social capital in order to promote collective CPR management is just being realized. While it is too early to offer evaluations of MFOs in Vietnam who consciously draw upon and expand their community's social capital to promote sustainable CPRs, we can provide at least one example of a MFO who did not and who was, as a consequence, *unsuccessful* in its reforestation project.

In 1990 the Save the Children Foundation piloted a "Mangrove Planting Project" in the Thach Ha District of Vietnam. Families in the program received an area of land to plant and maintain and were given long-term custodianship over the area. The funds for the planting as well as maintenance funds for six years were provided by SCF.[56] Although the SCF included in their mandate a need for a participatory approach, in the end the peasants who participated felt excluded from the decision-making process, women were marginalized, and people felt disassociated with the environmental projects of which they were expected to act as stewards.

In 1992, they conducted an evaluation of the program, surveying the Thach Ha and the Thach Bang Commune, both located in the Thach Ha District of the Ha Tinh Province. In the Thach Ha commune, only 2 out of 8 respondents to the follow-up questionnaire said that they had learned anything by the end of the project, although 100 percent said that they "were relieved from the fear of having to remove our house to other place [sic] due to land erosion, of having our rice fields salinated by flood water from the sea, to say nothing of getting firewood when mangroves grow to maturity."[57] 90 percent of the respondents "complained about lack of discussion of the project. They had only received technical

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[54] Ibid., p.67.
[55] CGAP (1996), p.12.
[56] Save the Children Fund UK (SCF) (1992),p.94.
[57] SCF.,p. 66.

training, but no discussion of goals, methods and organization."[58] All five managers of the project felt that the "population has a general sense of responsibility for the mangroves; one mentions the family contracts as a factor promoting sustainability; and 2 mention the recent regulations to punish forest destruction."[59]

Results were similar in responses of those participating in the Thach Bang Commune, Thach Ha District, and Ha Tinh Province. Ten families were interviewed, and "only 20 percent thought it had affected household income over the longer term and none thought that they had learnt anything from participation in the project."[60] Ninety percent felt that there had been inadequate discussion of the project.[61] Eighty percent felt that the officials in charge of the project felt very little concern for the poor and "had suggestions for how the project might have been done better: three suggested greater clarity and less power to the commune officials on payments; three suggested more instructions on planting; and two clearer stipulations about reward, punishment and responsibility for the mangroves."[62]

In both projects, there is a constant reference to the need to "protect" the forests, but few seemed clear as to how this was to be conducted. In effect, the SCF "created" a CPR in the villages in which it worked, yet it did not seem to create, along with it, an effective means of monitoring or promoting the collective protection of the area. According to Ostrom, individuals can be expected to make commitments to follow CPR rules if the rules: 1) Define a set of appropriators who are authorized to use a CPR; 2) Relate to the specific attributes of the CPR and the community of appropriators using the CPR; 3) Are designed, at least in part, by local appropriators; 4) Are monitored by individuals accountable to local appropriators; and 5) Are sanctioned using graduated punishments.[63]

When we then look at the project implemented by SCF, we can see at least two ways in which it failed to meet these conditions. First, while it had a clear set of "appropriators" who were authorized to use the CPR (the mangrove plantings), the appropriators themselves did not design the project. This is evidenced by the complaints that the participants felt excluded from the decision-making process and subsequent statements that little was learned from the project. Second, individual families were responsible for monitoring and

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[58] Ibid.
[59] Ibid., p.70
[60] SCF, p. 72.
[61] Ibid., p.73.
[62] Ibid., p.72.

protecting the mangroves, which was not amiable to the type of collective action needed to punish transgressors. Individuals had few options for providing the sort of "graduated punishments" that is necessary to deter violations.

In essence, the project failed to draw upon or contribute to the social or human capital of the village. While the project was too recent to critique fully, it seems clear from the responses given that there were many problems in its conception and implementation due to this and other failures.

Conclusion

In sum, there are clearly many connections between microcredit programs, social capital and common pool resource use. As was seen earlier in this paper, many microcredit programs have begun to consciously organize themselves in ways that are linked to environmental resource goals. Furthermore, results from our 1996 Microcredit Summit survey suggested both that MFOs may have, in some respects, positive effects upon the environment and that social cohesion is seen as an important and frequent impact of MFOs worldwide. That MFOs, drawing upon the social capital of communities, may help reduce the degradation of some CPRs was supported by a brief look at deforestation and fuelwood collection in Vietnam. So far, there is much to be understood in relation to the connection between microfinance and the environment. We hope that this paper will begin to address this gap and, more importantly, spark discussion on this under-researched topic.

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[63] Ostrom, (1990) pp. 186-186.

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