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**Agricultural Credit and the Build-up of Social Capital  
in the Brazilian Amazon Frontier**

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## **Agricultural Credit and the Build-up of Social Capital in the Brazilian**

### **Amazon Frontier**

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#### Introduction

It has been argued that development projects based on physical capital investments are not expected to yield positive rates of return over the long term, if social capital of beneficiaries is not accounted by donor agencies as an important input component (Bhatt and Tang, 1998; E. Ostrom, 1999; Jagger and Pender, 2002). As an underlying principle to achieve coordination among actors and activities to overcome collective action problems, the relatively recent introduction of the social capital concept in the social sciences discourse has been showing extremely useful to better understand, and account for, institutional puzzles. How important are trust relations for a community, in establishing consensus over rules and norms underlying the sustainability of cooperation networks? As a fundamental concept for understanding institution dynamics, social capital can be defined as "the shared knowledge, understandings, norms, rules, and expectations about patterns of interactions that groups of individuals bring to a recurrent activity" (Coleman 1988; E. Ostrom 1990, 1992; cited by E. Ostrom 1999). Similarly, Putnam, Leornado and Nanetti define social capital as "features of social organization, such as networks, norms, and trust, which facilitate action and cooperation for mutual benefit" (1993).

The role of social capital on achieving long term results from social actions can be thoroughly illustrated in the credit and financing domain. The main requisite for participation in rotating credit associations in Italy and many other countries is not the physical collateral that borrowers provide as a guarantee against default; rather, approval of projects is based on individuals' reputation and trustworthiness as reported by fellow

citizens (Putnam, Leonardi and Nanetti 1993). Micro-finance programs can be more efficiently designed when lending agencies consider the social capital present within the borrowing groups as a factor that can lower transaction costs (Bhatt and Tang, 1998). In communities where social norms and rules are highly respected, and members do trust each other into a significant extent, micro-credit loans can be more easily arranged for groups of borrowers, who are jointly liable for repayment, reducing considerably transaction costs. Communities sharing lower levels of social capital require, normally, contracts and training programs to be done at an individual basis, so lending agencies can minimize the risks associated with low repayment rates. Transaction costs do, however, increase under such circumstances (ibid).

The context which this paper is intended to explore is one where different levels of social capital among rural smallholders in Amazonia influence both the performance of credit programs and the rules upon which credit operates at the regional level. Small farmers and native Amazonian's had traditionally a very small slice of the rural subsidies cake. Moreover, they had hardly their voice heard concerning regional development policies (Brondizio, in press). I will discuss the assertion that once new opportunities of regional integration and development arose from the Brazilian Constitution of 1988, with the creation of FNO<sup>1</sup> funds, build up of social capital among farmers was very important to grant their participation those funds not only as passive beneficiaries, but by enabling them to influence the re-design of the rules of credit originally established by the Bank (Tura and Costa, 2000). Those scholars argue that this change had by itself a significant impact over the organization of the rural sector, which played a role on extending economic growth and political participation beyond that would be created by FNO alone (ibid). I will discuss this second issue also, based on the underlying theory of social credit and micro-financing, and on our own previous empirical knowledge of the region (Brilhante et al, 2000; Fiorini et al, working paper).

This paper is organized into four sections: first, I present an overview of the social capital literature, with some emphasis on interactions with credit programs and institutions.

<sup>1</sup> FNO - Constitutional Funds for the North (Region of Brazil)

Next, I will discuss some aspects related to credit policies in the Brazilian Amazon and more specifically in the State of Para, (Figure 1), through the perspective of its institutional dynamics and, into some extent, as a process arising from its regional socioeconomic and political backgrounds. This part builds heavily on a FNO analysis recently published (Tura and Costa, 2000). Third, I want to present shortly some preliminary results of our on-going agricultural credit research in the region, with emphasis given to the impact of rural credit in Land Use - Land Cover Change (LUCC) and in agricultural production, and discuss briefly those results in light of what they represent for regional development. Forth, I will discuss the build-up of social capital in Amazonia, its effect in the performance of rural credit and the interactions with the physical environment and with diverse sectors of society.

#### Concepts of social capital

The social capital term became popular in academic circles through a classic article by James S. Coleman in the late 80's (Coleman, 1987). The idea was of an organizing concept in the social sciences, bringing together elements from the study of markets, of the State and of interpersonal relationships (Dasgupta and Serageldin, 1999, preface). Specifically, Coleman refers to two intellectual streams used to describe and explain social action, and the need of an integrating tool to bring them together: 1) the social actor and the social norms, rules and obligations arena where action takes place; and 2) the rational and self-interested actor, and the market and utility maximization environment governing the flux of social actions (Coleman, 1987). Social capital is the concept proposed for such integration, and is defined by its function, where it "constitutes a particular kind of resource available to an actor" (ibid, pi6). This resource is not, however, a magic tool that serves to every end independently of its state; like physical and human capital, "a given form of social capital valuable in facilitating certain actions may be useless or even harmful for others". Also, the same extension made from the concept of physical capital embodied in assembled tools and machines to the concept of human capital which is embodied in the development of human skills can be made for social capital, as it "draws in changes in relations among persons to facilitate action" (ibid, pi 9). If human capital is

somehow difficult to measure, when compared to physical capital, social capital is even more difficult (E. Ostrom, 1999).

As a theoretical concept, however, it is generally acknowledged that social capital may undertake different meanings across disciplines and different sociological contexts (Dasgupta and Serageldin, 1999). Furthermore, some economists do not agree with the naming convention "social capital" to define what the term is supposed to mean, either because of the difficulty involved on measuring it as a capital stock (Solow, 1999), or because the concept should be a "third leg of the human capital stool" (Arrow, 1999,4). The later stresses that emphasis in social networks, as an important welfare growth driver, had been long accounted in the social sciences, and that those networks work as important counter-effects against market failures caused by asymmetric information.

A common attribute linking social capital across its different interpretations is that trust relationships among members of a community or society compose the core of its function as a mean to achieve cooperation in recurrent activities. Putnam et al (1993) put it simple: "the greater the level of trust, the greater the cooperation involved in activities; and cooperation itself generates trust". These authors classic work was a comparative analysis between the civic north of Italy and the south, where levels of cooperation achieved among individuals are poor because of the lack of trust. They make a strong point on explaining that lack of cooperation must not be understood as irrational behavior. By the contrary, Game Theory predictions are said to be compatible with this outcome, especially under circumstances where actors are not allowed to communicate among themselves. Deficiencies in communication lead to lack of trust. Like in the Prisoner Dilemma, all participants would be better off if they could cooperate. In the absence of a commitment which is mutually respected, players have the incentive to defect under their own rationale. The usefulness of Game Theory in this case resides on explaining how rational players may produce, under untrustworthy circumstances, outcomes that are not rational from the perspective of the group (Ostrom, 1990). Another point made by Putnam and his colleagues is that because of the risk of cooperation not being reciprocal, it is necessary not only to trust the others, but also to believe that one is trusted by others.

Putnam and colleagues point out also that "the steady accumulation of social capital is a crucial part of the story behind the virtuous circles of civic Italy" (1993, p.171). Part of the reason is that they compare social capital to a public good: "like many other public goods, social capital tends to be undervalued and undersupplied by private agents, hence the need to be provided as a by-product of other social activities". Also, as social capital can be translated into higher participation in decision-making processes, more effective results in the performance of any communal activity are obtained, when compared to top-down structures of management. Another aspect of Robert Putnam's view of social capital, raised by Kenneth Arrow (1999, 4) is that community members' affiliation to organizations has by itself clear positive impacts over economic and political efficiency of those communities, even if they "play no role in either the polity or the economy". The later compares this assertion to Max Weber's polemic theory of religious influence over economic performance. "Shall Putman's theory follow a similar path ?", he asks, stressing that the complexity demanded for empirical validation of both models is high and may extend this kind of debates over a long time.

Ostrom (1999, cited by Janssen, 2001) explores social capital as a fundamental component on influencing the ability of a group to support a new rule; "when sufficient social capital is build up in a community, proposed rules will be more easily accepted and followed". Janssen (2001) noted that social capital lowers the costs of cooperation, as it stimulates collective action. The main idea behind studying social capital is that social bonds and social norms are an important part of the basis of sustainable livelihoods. E. Ostrom notes, however, that "a policy is only good as the theory underlying it" (1994, 319), and calls for the importance of policy analysis grounded on empirically supported theory.

While studying a CPR dilemma in southern California, namely a groundwater management problem, Elinor Ostrom stressed that the community of beneficiaries was who took the leading role on framing institutions for groundwater management (1994). The importance of external agents was more of providing technical information than the involvement in crafting rules. External authorities also helped on monitoring and

enforcement of those rules. But the main point is that there was sufficient understanding, in the community, that well designed and respectable rules were necessary to revert a situation that would otherwise lead to a chaos comparable of Hardin's classic Tragedy of the Commons (1968). The importance of rule designs that contemplate the majority is that, according to E. Ostrom, rules do not operate by themselves. The knowledge necessary to implement those rules is the essence of social capital. The process of creation and development of social capital is not always growing, "like all forms of capital, social capital takes a long time to develop and can be destroyed rapidly" (ibid, 323). She notes also that individuals with considerable experience crafting their own rules acquire a larger repertoire of satisfactory rules than those without such experience (ibid, 326). Also, she shares Coleman's inclination in that social capital is not a "magic tool" that works for all kinds of community settings; rather, "The capacity to change the structure of a situation is a variable in field settings, not a constant" (ibid, 327).

Another aspect of E. Ostrom's treatment of social capital is that boundedly rational theory suits better to the idea of communication among actors, when compared to the neo-classical rational actor. Rational choice theory has been important on predicting game outcomes in which players are not allowed to communicate among themselves. When it comes to repetitive games with communication, however, experimental results fit poorly to theoretical predictions of Game Theory (1994, Ch. 7). Boundedly rational individuals, however, extend rationality beyond pure self-interested motivation, to capture benefits arising from cooperation networks. Concerning availability of social capital, E. Ostrom points out that "boundedly rational individuals with heuristics that involve cooperation and extending trust are often able to reach and sustain agreement. Boundedly rational individuals without such heuristics are not" (1994, 324). Because of its importance in understanding dynamics of rule framing and changes, social capital has been included as part of the core community attributes in policy analysis tools such as the framework of Institutional Analysis and Development (IAD), developed by the Workshop in Political Theory and Policy Analysis - Indiana University.

Social Capital and Credit Programs

Rotating credit associations is popular in Italy and in many other countries because it provides credit opportunities to those that have no access to regular markets (Putnam et al 1993). Reputation is not just an important asset for those institutions, but one that determines whether borrowers are illegible or not for credit, once no "legal Leviathan stands ready to punish defectors" (Putnam et al, 1993). This calls for the importance of social capital as an attribute of connections among members in a community. Social capital helps in handling incomplete information and lack of enforceability, when credit arrangements are based in mutual trust. Putnam and colleagues stress that this is not a blind trust, but one that "entails some degree of predictability in the behavior of independent actors" (ibid, 171). In rotating credit associations, social capital substitutes what in formal credit institutions is called collateral, because its function is, in this case, to act as a guarantee against default.

Bhat and Tang analyze results of replicating in California micro-lending programs originally implemented in developing countries (1998). They consider that the successful experiences of institutions such as The Grameen Bank in Bangladesh, or Action Internacional in Latin America, yielded results "less than encouraging" in the US. The main reason of the failure is, according to the authors, the adoption of a relatively successful model without paying attention to the working parts that sustain it. Among the negative results are high loan default rates, inability to reach sufficient numbers of borrowers, portfolio management problems and a continuous dependency on subsidies. The authors consider that the major cause of those programs' failure is "the hidden beast of transaction costs in credit delivery", which are the non-financial costs incurred by lenders and borrowers during loan disbursements and the periods preceding and succeeding it. Next, they provide an extensive list of what kind of operations comprise transaction costs related to credit programs, as for example: a)for lenders: designing credit contracts, assessing credit feasibility, and monitoring and enforcing group loan contracts; b) for borrowers: screening potential group members, agreeing on formal or informal group rules, negotiating with the lender, filling out necessary paperwork, time spent on project

appraisal and meetings, and monitoring group activities and enforcing rules. I selected here only part of their extensive list of transaction cost variables.

It is very interesting to note the overlapping of variables they consider as components of transaction costs with determinants of social capital. The difference is subtle, though: while the former is an attribute of the project, based on the economic perspective of Cost-Benefit Analysis (CBA), the later is an attribute to the community, based on the political scientist/sociological perspective. Bhat and Tang relate to this connection later in their paper (1998). Actually, they consider social capital as an important determinant of transaction costs in credit programs. As I mentioned in the introduction, an economically sound strategy employed by micro-finance institutions, concerning reduction of transaction costs, is to consider different loan arrangements according to the state of social capital encountered in borrower communities. In this sense, Bhat and Tang (ibid, 628) consider three general kinds of arrangements:

- a) group loan with joint liability: most of transaction costs accrue to the borrower group; requires more mature level of social capital;
- b) individual loan with joint liability: contracts are made at an individual basis, but individual actions affect group's performance; transaction costs split more evenly and social capital at intermediary levels are needed;
- c) individual loan with individual liability: higher transaction costs; group acts only on providing initial information about other possible borrowers. This design is normally recommended for contexts where migrant communities exhibit typically low levels of social capital development (members hardly know each other, language problems).

#### A typology for rules

As in many institutional settings, credit programs operate according to a nested set of rules. Classification of rules is especially important in comparative studies and on framing of a common language to understand institutional evolution. Also, it helps to

better understand the impacts that changes in rules have over specific action situations. The levels of analysis described here follow the Institutional Analysis and Development (IAD) framework developed by scholars at the Workshop in Political Theory and Policy Analysis - Indiana University (see for example E. Ostrom, 1990; E. Ostrom et al 1994, Crawford and E. Ostrom, 1995). Rules at the operational level correspond to the ones affecting potential action situations to be taken in a determinate action arena, at a day-to-day basis. Operational level of rule framing is embedded into the collective choice level, which is embedded into the constitutional level of framing. The collective choice level defines which individuals are illegible for operational rule framing at the operational level Constitutional level defines who is illegible to change rules at the collective choice level (E. Ostrom et al, 1994, 46). A typology of rules is depicted below (E. Ostrom 2002, Ch6):

<b>Rule type</b>	<b>Rule description</b>
Position	Define actions that participant in positions can take at specific nodes in a process
Entry and Exit	affect how individuals are assigned to or leave from positions
Authority	Affects the assignments of particular action sets to positions
Aggregation	affect the level of control that individual participants exercise at a linkage
Scope	Affect which outcomes will be affected and the range of effect
Information	Affect the level of information available in a situation about action/outcome linkages
Payoff	Affect the benefits and costs assigned to particular actions and outcomes

Extracted from: E. Ostrom, 2002

#### Historic contextualization of economic incentives in the Amazon

The general guidelines of the first couple of decades of Amazonia's colonization and the contemporary policy of tax incentives have been well described already (Moran, 1981; Fearnside, 1986; Mahar, 1989; Schminck and Wood, 1992). I will, however, make

some comments on the philosophy of colonization that was dominant at that time, and try to capture some points on how were public funds used.

Amazonia has been seen as an extractive resource for colonizers coming from abroad since the colonial period (Moran 1981). This mentality extended through the rubber period and the mineral exploration boom, and is still operating throughout the region. During the early 70's, the initiative of the military government to colonize Amazonia was carried out by establishing INCRA<sup>2</sup> settlements along the Transamazon Highway through PIN - Program of National Integration (ibid). The slogan of the military president by the time was "A land with no people for people with no land". Some scholars believe that the military government used the social justice coat to cover the inner real reason of the colonization programs, which was occupation to guarantee sovereignty over national territory (Mahar, 1989). Settlement programs were plagued with planning and execution problems and eventually the smallholder model was the one to be blamed (Moran, 1981). This led to a policy of higher concentration of investments and incentives for large infrastructure and cattle-ranching projects for which environmental and social impacts earned justifiable monster waves of critique throughout international policy and academic panels.

The financial return from funding large estates was insignificant even by the regional economic growth perspective, if not negative: during the period 1975-1985, only 12.3 % of those estates were able to attend to the productivity goals initially set for the projects, and the rest was considered as economically inefficient (Gasques and Yokomizo, 1990; cited by Costa, 2000). The number of jobs created was less than half of the initially planned. Contrasting to this, household agriculture, in properties with less than 200 hectares, showed a remarkable increase in generation of value: agricultural output value increased 5% a year in real terms, during 1980-1985, while animal (beef and dairy) output value increased 7% per year for the same period (LBGE, 1985). This period corresponds to an extremely difficult economic period for the country, but for which the whole agricultural

**INCRA - National Institute for Colonization and Land Reform**  
<sup>3</sup> Large estates - larger than 5000 hectares

sector also grew, with the exception of the large estates in the Amazon, that were still receiving subsidies based on political subservience and using them for a speculative land market. New sources of funding were proposed for those sectors with the premise of regional development and for the agriculture "modernization" plan<sup>4</sup>.

The end of the military period in Brazil in the beginning of the 1980s' coincided with the collapse of the "agricultural modernization" model. The proposition of this model by the military was, however, quite conservative: the initial estate structure was maintained and modernized into agricultural firms, with huge investments in infrastructure and forest conversion to pastures with public funds; the maintenance of the land tenure structure and the lack of support to small-scale agricultural projects ended up neglecting the household model to **insignificance** (Graziano da Silva, 1982). **Agrarian Reform** was already a proposition from leftist parties by the period that anticipated the military coup of 1964, and seen with no-sympathetic eyes by the government at that time.

The boom in agricultural output during 1980-85 is noted primarily for perennial crops, which experimented a 13% increase in total value, and a 2.5% increase in value by rural establishment, after discounting the increase in number of establishments (IBGE, 1985). Agricultural credit for household farmers, however, showed an inverse relationship: total amount of credit in 1985 was 40% less than in 1980. Results from fieldwork conducted in the Altamira region by ACT<sup>5</sup> - Indiana University confirms that credit loans dropped significantly during the 70's and continued to drop until 1989, when loan rates increased sharply again until 1998 (Fiorini et al, 2000). This drop is correlated to difficult economic conditions: high inflation, the second oil crisis, increased interest rates and international debt, and a problematic macroeconomic policy during Figueiredo's government (Abreu et al, 1996). Inequity in credit relocation was clear: while credit for small landholders dropped 75% and dropped 70% for medium-sized farmers<sup>6</sup>, large estates experienced an increase of 74%. Medium-sized farms showed also a remarkable increase

<sup>4</sup> note that the numbers shown above were not published until 1990 (Gasques and Yokomizo, 1990);

<sup>5</sup> Anthropological Center for Training and Research in Global Environmental Change

<sup>6</sup> Medium-sized farmers were considered, in the IPEA study, as ranging from 200 - 5000 hectares; small landholders are the ones with less than 200 hectares.

in agricultural output value, increasing 6% per year at a net rate basis. If this growth was not rooted on agricultural credit, what supported it? The author's thesis is that it was based on fiscal incentives of other sort (Costa, 2000 - investigate further).

The 1985-1990 period was marked by important changes in the credit policies in Amazonia. The new Constitution of 1988 created the Constitutional Funds, which were called FNO for the North region. The publication of LPEA study (Gasquez and Yokomizo, 1990) relating to the policy of fiscal incentives of the previous period, was determinant on showing the negative impacts of previous credit policies. IBGE<sup>7</sup> published the 1985 Agricultural-Husbandry census, that showed how smallholders, despite of credit support, were able to maintain increases in value for agricultural crops and husbandry despite the lack of support. Both studies showed the general flaw of the ruling policy. Also, the environmental movement gains importance outside the social movement sphere, extending itself to the policy decision-makers sphere, and playing an important role on re-design of developmental strategies for the Amazon Region (Costa, 2000).

Another important event in consonance with results obtained from the Agricultural-Husbandry Census were the results from the evaluation of PPA - Program for Food Production, by NGO Communities for Life - executed in the State of Para, between 1986 and 1988. This micro-finance group-based program supported credit for 586 projects and 10,877 families<sup>8</sup>. The evaluation corresponded to 57% of the projects considered mature by the end of 1988; 90% of those showed a 20% net profit over the investment.

An important point concerning who is illegible to credit concerns land titling. Thus, there are some frontier expansion issues that need to be taken into account, if we want to better understand credit policy. The expansion of the agricultural frontier in Amazonia has been executed by two distinctive general patterns: one is by official settlement projects as the ones carried out by the government (such as INCRA projects) or by the private sector; another front advances through illegal squatting of public land, and is arena for delicate

<sup>7</sup>IBGE - Brazilian Institute of Geography and Statistics

<sup>8</sup> Which corresponds, in average, to 18.5 families / project.

violence problems on which the weak are pushed constantly further into the expanding frontier (Schmink and Wood, 1993; Alston et al, 1995). Those squatters sell eventually their land once minimum infrastructure arrives and prices are attractive, and move further into the frontier. Land legalization is a complicate issue involving high transaction costs, and commercially motivated investors from an expanding urban sector, with bureaucratic connections in proximate towns are more likely to negotiate land titling, after buying land from the squatters (Alston et al, 1995). The later have been hardly considered in any policy for rural and agricultural development until the instauration of FNO - especial in 1993, which I discuss below.

#### Implementation of FNO credit and efforts for changing rules

The Brazilian Constitution of 1988 determines that 3% of the Industrial Production Tax (LPI) and 3% of the Commercial and Services Circulation Tax (ICMS) go to the Constitutional Fund (CF), which is used to support projects in less development regions of the country. The Amazon Region gets 0.6% of the CF, where it is re-named Fund for the North Region, or FNO. The rest of CF goes to the Northeast (1.8%) and Center-West regions (0.6%). FNO is structured as follows (Mattos, 2001): 5 programs for rural development and 5 programs for industrial development; as a result of de-centralization policies, each region has autonomy in designing their own program rules, which are to be done at the collective choice level. Agricultural credit is managed by BASA - Bank of Amazonia S.A., which, together with another regional agency (SUDAM), were responsible for conducting a series of audiences with the interested sectors of society, like Farmer Unions (Sindicatos) and NGOs<sup>9</sup>, to establish operational rules. Four principles were established for how FNO funds were to be used : a) Diminish intra-regional development inequalities; b) Promote auto-sufficiency in food supply; c) Promote regional sustainable development; d) incentives to familiar labor. The agricultural credit program was subdivided into three sub-program categories: for small farmers, for medium and for large farmers, each to be managed according to specific sets of operational rules.

<sup>9</sup> Including FASE - Federation of Agencies for Social and Educational Assistance, CONTAG - Confederation of Workers in Agriculture, CPT - Pastoral Commission of the Earth (Catholic Church)

Some consider that the initial implementation of FNO agricultural credit in 1990 constituted basically an extension of previous programs, which were traditionally biased towards supporting mainly large projects such as extensive cattle-ranching (Tura, 2000). Local oligarchies, dependent into some extent from the ranching activity as an income generating source<sup>10</sup>, and protesting against poor economic performance and waste of public funds of previous corporate initiatives<sup>11</sup> of mega-ranching projects, claimed access to FNO sources with the premise of those funds to be used for their genuine intention - regional development. The result was that a significant proportion (%?) of those funds, were still used to support large cattle-ranching, which was against another of FNO general principles: to be used for sustainable development (Costa, 2000).

Collective action by smallholders through farmer unions was important to change those initial set of rules, especially boundary rules establishing bureaucratic impediments for their participation. The most important impediment was the requirement of land titles as a pre-requisite to apply for FNO loans. As mentioned above, squatters represent an important component of frontier expansion, especially in areas where INCRA is not present, and have not access of land documentation; equally, migrants who buy land from them. Even in official colonization areas as INCRA settlements, many landowners do not possess land title. Establishing land title as a requirement for loans, rules were automatically excluding squatters and part of the migrants from FNO access. A second motive of discontent was that the "small farmer" category included initially properties up to five rural modules, which in Altamira, for example, corresponds to 500 hectares; the bulk of subsistence and familiar agriculture are settled in plots that may vary up to 100 ha; many settlers end up buying other plots, so that it is not rare to find familiar agriculture being

<sup>10</sup> Land speculation by those groups is not mentioned, but goes probably "hand-by-hand" with cattle ranching.

<sup>11</sup> Refers to large "development projects" owned by southern and trans-national corporations who benefited from the tax-incentive policy; An important distinction is made here between large farms local owners, who depend into some extent from their land as a source of income and reproduction of their social class, from corporative latifundium investors, for whom land is merely part of the investment portfolio, and where decisions of production operations obey strictly to financial criteria. Differences between these two general categories can be found also at the political influence level: while the former lobbies more locally and informally, the later is constrained by formal institutions acting at broader national and even international levels (Costa, 2000)

practiced by households that own 200 hectares or more. A significant proportion of settlers, however, depend from a much smaller resource base. In older settlement areas, like Zona Bragantina and Sto. Antonio do Taua, familiar agriculture is intensively practiced in plots no larger than 30ha (Arima, 2000). Hence, including all under the same category, and having additionally two other categories for medium and large farmers, a disproportionate slice of the rural credit cake ends up going to medium and large farmers. A third FNO initial rule considered too harsh and potentially limiting smallholder participation was the high requirements for loan guarantees demanded: all kinds of goods were required, even property mortgage.

Collective action took the form of public protests organized mainly by the Farmer's Unions and supporting NGO's, and were named *Gritos* (meaning "screams"). Many of *Gritos* took place in the State of Para during 1990 - 1995, and were motivated not only by protests against FNO regulation, but rather against several socio-political issues operating in the region: violence against rural smallholder leaders, urging for agrarian reform, discontent with mega-projects like hydroelectric dams, and fighting for better conditions in the rural area, like roads and electric energy (Tura, 2000; Costa, 2000). In one of those protests, farmers camped for three days in front of the BASA agency in Belem<sup>12</sup>, until they were allowed to have representatives sitting in the FNO negotiation table (Costa, 2000). The *Gritos* were intended to give smallholders a voice and a face in the agricultural decision-making context. Specifically, the arguments underlying claims for substantial changes in credit policy were as follows: a) Big corporative estates (latifundiums) failed to bring regional development, hence they were not supposed to deserve further funding through FNO; b) Smallholders are not resistant to technological innovation; by the contrary, smallholders have been playing an important role in adapting production techniques to new constraints and opportunities based principally on their evolving knowledge of the agroecosystem cycles<sup>13</sup>; c) The recent expansion of smallholder agricultural production systems is based on diversification and in conformance with an increasing awareness of environmental respect, as shown by the expansion in perennial

<sup>12</sup> Belem - capital of Para State;

<sup>13</sup> See Brondizio (in press), for complementary info about the strategic role played by estuarine caboclos in the evolution of the technical expertise of the acai production chain.

crops; thus, small landholders are more consonant with FNO prerogatives of sustainable development; d) successful previous experience of micro-credit - PPA program, under a group-financing system.

Results from the protest movement culminated in FNO - especial, that started to rule in 1993. I will present the changes that occurred in the rules operating FNO using E. Ostrom's typology of rules (2002, Ch6), to illustrate with more detail the kind of effect that each change has over the action situation. A general exposition of FNO rules for the "small-farmer" category was extracted from Tura (2000, p39), and can be appreciated in Figure 1a - a) positions: there are three positions: farmer, bank officials and rural extensionists. Extensionists provide technical assistance and monitor projects; b) there were three main entry rules: 1) besides limiting participation for farmers with titles only, other documents were normally requested, making the process too bureaucratic and time-consuming for small farmers; 2) only up to five Rural Modules, 3) VBP - Gross Annual Value of Agricultural Production - should not pass an upper limit; an example of exit rule is that in-debt farmers were excluded from getting credit; c) authority rules: exemplified by the financial charges accruing towards the loans: 6% of annual interest rates plus 80% of inflation. Also, credit for a specific project is not allowed - for obvious reasons - to be used for other ends than that of the project; d) scope: only approved projects, as defined by the technical support, could be financed; e) aggregation rules: I could not identify any aggregation rule at the operational level as in 1990; f) Information: technical assistance was not included in the projects through FNO; once presentation of contracts and negotiation of loan disbursements were done at the individual basis, prohibitive transaction costs limited the amount of information passed to farmers; g) payoff: all kinds of financial guarantees were requested, including mortgage, for the protection against insolvency. I am uncertain, though, about the consequences of different pay-off rules.

Figure 1b) shows some changes in the configuration of rules implemented through FNO - especial, in 1993: a) positions: no change; b) entry: titles were no more requested, and upper limits for both size of property and production were lowered; a new entry rule was that all participants should be organized under associations or cooperatives, and those

would than be responsible for either: a) provide only information on whether candidates were really local farmers or not<sup>14</sup>; b) support individual loans to farmers with group liability<sup>15</sup>, in the sense that default borrowers would jeopardize future loans made to any member of his/her association/cooperative, and even expose them to legal prosecution by the lender agency. As with the micro-financing structure shown above, this change would potentially drop transaction costs significantly; c) authority: annual interest rates dropped to 5% per year, plus only 60% of inflation; d) scope: no change e) aggregation: a minimum number of associates was required for credit to be given to unions; f) information: technical assistance was now provided to farmers<sup>16</sup> g) payoff: for insolvent farmers, financed items would be pawned; no more mortgages.

A significant proportion of small farmers demands have been attended with the implementation of FNO - especial. A basic characteristic of the "conservative modernization" program, however, was maintained: credit was bounded forcefully to the agricultural inputs industry (fertilizer and pesticides), in a way that rural extension agents in charge of judging and monitoring technical viability of projects, demanded expenses with chemicals to be mandatory, maintaining, by this way, part of the previous subsidy mentality. The value of chemical inputs is then automatically subtracted from the credit budget. Farmers were expected to receive training on the use of chemical inputs through the technical assistance service. The problem is that technical assistance did not work as expected.

#### Credit and Land Use in the Altamira Region - State of Para

A long term research project in Land Use and Land Cover Change (LUCC) is being conducted in the Altamira Region by ACT - Indiana University. The engagement of farmers in credit programs, and its subsequent impact in crop productivity and land cover change is one of the focuses of the project. A sample of 171 farmers was interviewed in Altamira during 2001-2002; a set of the questions was directed towards the use of credit.

<sup>14</sup> This rule would be equivalent to arrangement c) as described by Bhat and Tang (1998)

<sup>15</sup> In this case, the rule is equivalent to arrangement b) as described by Bhat and Tang (1998)

<sup>16</sup> Problems with the kind of technical assistance provided are discussed below.

57 farmers (33.3%) received agricultural credit during the previous five years, and other 114 (66.6%) did not; most projects were FNO-especial; 59% of the farmers who received credit responded that they did it through associations/cooperatives. Does it mean that 31% received credit without being formally filiated to either entity? There are two possible answers : a) entry rules regarding being filliated to organizations might have changed; b) they did not understand the question correctly. When asked about land titling, 54% responded that they do have them. Others have either a receipt from the previous owner or legal certificates, and 13.6% had neither of those.

All interviewees from 2001-2002 were previously interviewed in 1997-1998. By that time, they were asked what area was allocated to different crops and other land use types, such as pasture, fallow and forest. They were asked also about their agricultural and husbandry annual output. Returning to the area in both years 2001 and 2002, we asked them the same questions again. I will briefly present here some results from a comparison of farmers who got credit in the previous five years with farmers who did not, in two aspects: a) land cover change; and b) change in crop productivity and in the number of heads of cattle. Since farmers were asked what was the objective of the use of credit, the pair of questions above could be analyzed separately by category; for example: farmers who got credit for coffee had their coffee plantation area and coffee production compared to the ones of farmers who did not get credit.

The comparison of changes in crop and other land use areas is presented in Table 3, and a comparison of changes in crop production is presented in Table 4. Note that the area under annual crops and coffee decreased, during the 1998 - 2002 period, for both groups of farmers: the ones who received credit and the ones who did not. All other land use categories, except forest, showed an increase in area. Differences of changes between groups were only significant at the 5% level for the change in area of cacao. While the credit group had its area of cacao increased by 1.5 hectares (ha), in average, this area increased in only 0.6 ha for the non-credit group. The area under pasture increased also more for the group that received credit<sup>17</sup>. Forest decrease showed an average of 5.2 ha for the credit group and a 3.8 ha for the non-credit group.

<sup>17</sup> This is an unexpected result, since projects for pasture expansion were not allowed under FNO premises; what might have probably happened, is an indirect effect of credit over forest conversion to pasture: once

Both productions of coffee and cacao increased during the period, for both groups, and so did the number of cattle heads. While the cattle heads increased more for the non-credit group, cacao and coffee increased much more for the credit group. Since the area under coffee decreased in the period, financial resources from credit were probably used to increase production only, as for example increases in fertilizer applications. Also, coffee prices paid to the farmer experienced a huge fall in the 1998 - 2002 period. Many farmers are destroying their coffee plantations, in order to plant other crops such as cacao, which prices are expressing an opposite behavior. An important point to consider, though, is that 1998 was marked by a strong El Nino draught, which might have affected crop yields. Cacao yields might have not been affected as much as coffee, since cacao harvests are better distributed throughout the year, while the coffee blooming period concentrates within the El Nino critic season. If we consider that crop yields were indeed affected by the El Nino in 1998, than our optimistic results of the effect of credit over cacao and coffee yields might not be so great as shown in Table 4.

Who gets FNO - especial ?

The reason to ask this question is that once we know something about the profile of FNO borrowers, it is possible to have some clues about how funding agencies assess the risks involved in funding agricultural projects for small farmers. This information might lead us to evaluate some possible scenarios about the perceptions of B AS A, Banco do Brasil and other funding agencies of FNO, about social capital development in rural communities, and about what type of lending design would be more appropriate given these perceptions.

What follows is a synthesis of the FNO typology presented originally by Arima for the FASE study done in State of Para (2000). The sampling scheme in his report is as follows: nine municipalities of Para State were sampled: Braganca, Cameta, Castanhal, Maraba, Mojii, Santarem, Sto. Antonio do Taua, Tome-Acu, Uruara, and the sampling size was of 978 households. The research was facilitated by the Rural Workers Union of Para

**farmers guarantee financial resources for subsistence from agriculture, more money is saved to be invested in other activities.**

State (STR - Para), who convoked farmers for interviews in the headquarters of STR on each of the above cited municipalities. The authors call the attention to the fact that some special care was taken to guarantee that not only STR associates participated from sampling, which would create biases. They note explicitly, however, that since transportation was deficient in some municipalities, farmers living closer to urban centers (up to 50 km) were sampled with higher frequency than the ones living further.

Characterization of farmers follows. *Gender*, most of FNO approved projects (93%) are in name of men, who are normally also the head of households. *Origin*: most of the borrowers are native from Para State, but this index varied greatly by micro-region; in two out of the nine micro-regions from the set (Maraba and Uruara) beneficiaries were mostly from other states of Brazil, especially Maranhao and Bahia. *Education*: the level of education sampled was considered overall very low; 13 % of FNO borrowers are virtually illiterate; other 15% studied only for one year, and can be considered technically illiterate also; low levels of education can compromise successful repayments, as noted also by Bhatt and Tang (1998); management skills of businesses affect likelihood of repayment, and are directly associated with educational background. Arima (2000) showed also that Amazonian smallholder farmers with complete basic education - first four years completed - exhibit a 10% greater probability of being satisfied with the FNO rules currently in use. *Size of properties*: the average size of properties across the sampling sites was of 48 ha. Recent colonization sites, such as Uruara, exhibited a larger average property size of 106 ha. But in this municipality, most interviewees owned only 1 plot. *Land use*: Secondary vegetation occupies a larger proportion of properties in old-colonized sites (Braganca, Castanhal, Sto. Antonio do Taua). In recent colonization sites (Maraba and Uruara), areas of forest are smaller than expected, and only about 50 ha of forest remains. In these same sites, cattle ranching is proportionally more important than agricultural activities. This is to be expected, since most farmers from these municipalities live far from urban centers. *Land titling*: 18.5% of the interviewees do not have any kind of documents that can be used to prove ownership of the land. 60% of the sample does not have permanent land titles. Considering the initial set of FNO rules, that required land titling to approve projects, this means that only 40% of the farmers would potentially be included. Since FNO-especial does not require land title, this change in the rules can be considered an

important achievement for beneficiaries. *Diversified agricultural output*: annual crops such as manioc, rice, corn and beans play an important subsistence role for the interviewed farmers. Perennial crops area showed an increase 2.6 times since the previous condition (before FNO). This results match to the ones of Altamira presented in the previous section. *FNO and the environment*: a lot of mature secondary vegetation and some mature forest has been converted to agriculture/pasture due to FNO funding, especially in recent frontier sites. This goes against FNO and BASA initial premises of sustainability, according to the authors, but it is also acknowledged that monitoring costs for deforestation would be high, thus a rule prohibiting FNO projects to be established on forest land would be not easily enforced. Some indirect impacts of FNO over deforestation are likely: once farmers finance subsistence and commercial crops with FNO, more financial resources are left to be invested on pasture expansion and advance over forested land. This seems to match also with our Altamira data previously shown,

About 96% of FNO funded projects contained perennial crops into some extent, 41% included annual crops and 31% financed husbandry. This means that most projects financed more than one economic activity. This was also noted for Altamira, where instead of annual crops, which received almost no funding at all, funding went for many projects for infrastructure improvements, such as electric generators. Technical assistance linked to FNO seems to be problematic, as reported by farmers: only 50% of the farmers showed satisfaction with the levels of technical assistance received.

Advances obtained through FNO credit

FNO is considered by the authors of the FASE study as the most important financial policy for the Amazon regional development ever proposed. From 1989-2000, more than R\$ 1 billion<sup>18</sup> were applied to the rural sector, benefiting more than 67,000 smallholder families<sup>19</sup>, who were classified as mini-farm producers by BASA. But are the social benefits from this kind of subsidy for agriculture outweighing the social and

**By the time the FASE book was published (2000), R\$ 1 billion was equivalent to US\$420 million, approximately.**

**<sup>1</sup> Considering FNO - especial alone, 29587 projects (corresponding to approximately the same number of families) were financed.**

environmental costs? Let's consider one more time the initial objectives established for FNO: that preferential support is to be given to familiar agriculture, to diminish regional inequalities, to contribute for regional food security and for sustainable development in the Amazon. In practice, 52 % of FNO resources and 90% of the project contracts are put available for mini and small farmers. Concerning regional development, however, one of the BASA's evaluations (Sobrinho, 2000) considers that even if total agricultural output had increased in disfavored parts of the State, regional inequalities did not change significantly with FNO. Food security in big cities is expected to have increased, with increases in agricultural value, but needs further investigation. Last, FNO was often implemented on previous forested land, and often recommended so by extension technicians, implying in contradiction with one of FNO initial principles<sup>20</sup>. The procedure is done this way because recently opened land produces normally higher crop yields.

Actual problems from the implementation of FNO: a) 32% of default rate; the cause of this high default rate is, according to the authors, that repayment turned out to be more difficult with the worsening of Brazilian macro-economic profile in 1998; supply of credit is actually larger than the demand, which, according to the author (Arima, 2000), reflects that financial charges in rule by 1998 are too high for the farmers. Regional social and infra-structural limitations, such as low educational level of participants and lack of basic infra-structure such as electric energy and roads, affect FNO performance. 78% of FNO borrowers do not have access to electricity, turning perennial crop products difficult to process and to conserve; lack of roads makes commercialization even more difficult. Also, the deficiency on technical assistance is considered to have negative impact over repayment rates. Next I discuss FNO outcomes in light of social capital development.

#### Social Capital build-up in the Brazilian Amazon

Considering the three general kinds of arrangements studied by Bhat and Tang for micro-finance institutions (1998), namely a) group loan with joint liability; b) individual loan with joint liability; and c) individual loan with individual liability, what kind of

<sup>20</sup> FASE book mentioned this fourth principle as "promote regional sustainable development" only, without going into details about what was being specifically meant by this (Tura and Costa, 2000). Those authors consider the use of FNO funds for forest conversion to agriculture, however, to be against this principle.

arrangement is likely to be more efficient in light of the social capital among rural communities beneficiaries of FNO ? It looks like this is a very tough question to be answered, especially because each community in the studied FNO's range exhibit particular histories of migration, land occupation and engagement in production processes which confer them unique characteristics of social capital dynamics. Moreover, in agreement with Mahar (1989), there are several issues that contribute to the complexity of determining real costs and benefits from subsidized credit in the Amazon, including lack of data availability, and the difficulties to obtain accurate information about how credit is actually used by the farmers. However, some lessons from general aspects of social capital and credit can be drawn from the past experience, and I will try to discuss some of them.

Let's first consider rate of repayment as the indicator of efficiency. Once we have 32% of overall default rates by 1998, efficiency can be considered low under this criteria. FASE's book suggestions of causes, as described above, do not explicitly mention social capital of rural communities or the type of loan arrangements used by the lenders (BASA, Banco do Brasil and SUE) AM) as part of those causes. The Bank requirement of farmers' membership to unions and cooperatives as part of the entry rules for participating in FNO-especial might be seen as a tentative of reducing transaction costs, building on international successful experiences of micro-credit financing already available by that time, such as the ones reported by Grameen Bank and Action Internacional. Explicitly, arrangements b) individual loan with joint liability and c) individual loan with individual liability, according to Bhat and Tang (1998), might have been used for FNO-especial. Under b), default borrowers would expose the whole association for the burdens of not being illegible for future credit, and under c), the association is responsible only to provide information about prospective borrowers, and does not respond to any default burden. Relying in social networks of farmers and on the support they receive from NGO's as a mechanism to support successful group-lending operations under b) and/or c) arrangements, lenders might have:

I - Considered regional diversity in social capital, in which case arrangements b) and c) were applied differentially and based on previous assessments of community social networks.

II - Overlooked local diversity of social capital while establishing one of those arrangements as the only one to operate over the entire Amazon region. If this is correct, one might imply that under arrangement b), some unions and cooperatives in communities exhibiting currently lower levels of social capital development might have failed to support cooperation and trust norms necessary to attend FNO repayment obligations. By the same token, under arrangement c) and in communities with higher levels of social capital developed, lenders might have wasted opportunities to reduce transaction costs that would be available under b) arrangement. Considering that transaction costs are very important on determining the amount of technical assistance available to borrowers<sup>21</sup>, this might have in turn affected the repayment rates.

Technical assistance as currently promoted is, however, wasting many opportunities of enhancing efficiency of the credit program. First, the process of project design and implementation is traditionally carried out through a top-down approach, in which farmers agricultural experience is neglected, and through which farmers are deliberately exposed to high financial, ecological and health burdens with the "agriculture modernization" rule that makes purchasing of chemical inputs such as fertilizers and pesticides mandatory. This top-down approach is probably a consequence from joint colonialism and protectionism behavior especially in the rural sector in Brazil, to which the agricultural working class has been traditionally exposed (ref). My personal point-of-view is that this process is deeply rooted in lender-borrower relationships of agricultural credit. Not only lenders act as they are the owners of the money, and thus empowered to dictate rules in all decision-making levels, but also farmers positioning is traditionally a passive one, of acceptance and with no space for democratic institutional crafting. This opens space for opportunistic behavior which plagues the rural sector. Once farmers are not involved in the project design and on rule framing, chances are that they behave like expecting always something to be done "by the government". If farmers are not involved in designing their own project, allowing it to remain the responsibility of the extension agent, how is the dilemma of appropriation of the resources for production to be resolved?

<sup>21</sup> **The lower the overall transaction costs, more financial resources are available to be invested in technical assistance**

How are farmers expected to engage in constructive resource-use rule engineering, monitoring and enforcing, if they do not feel themselves as owners of the projects? Is the overall paternalistic structure of credit and rural extension to be kept? Social capital needs constructive work to be able to build up continuously, for which participation is a key word. One successful example of social capital adaptation, (and build up) under the harsh agro-environmental conditions of Amazonia is the example of Tome-Acu, where Japanese immigrants in the beginning of the 20<sup>th</sup> century implanted successful production systems based on black-pepper.

Many changes are hopefully taking place, like the ones leading to the transformation of FNO rules to FNO-especial, which build heavily in collective action and which affect, as a feedback, the levels of social capital in the community, in a process theorized by Ostrom (1994). Leticia Tura shows that, in 1995, the State of Para counted with 1,365 rural associations 175 cooperatives; 62% and 52%, respectively, were created after 1991. FASE's book recognizes that a considerable increase in the number of the associations and cooperatives that were created during 1993-1996 are due explicitly to means of applying for credit. Once credit was provided, most of them just vanished (Tura, 2000). But she argues that, in many instances, this process lead effectively to increases in organization levels, and cites examples of strong cooperatives in the State of Para that are strongly inserted into the market economy. This result supports Putnam's theory that participation in organizations increase political and economic efficiencies of production systems, no matter if those associations are connected to economic and politic systems or not (Arrow, 1999).

Many associations of rural smallholders are formed by farmers who are conscious about the long term effects of sustainable agriculture, and are thus promoting sustainable practices such as avoiding fires and deforestation, and enhancing soil organic matter through mulching and agroforestry. With the help of environmental NGOs, those associations are proposing an alternative program of credit to the FNO called Proambiente (Mattos, 2001). This program would build on the Carbon exchange market to finance farmers practicing sustainable agriculture. Interest rates would be reduced by this way, and

an additional source of income would be available for farmers who were able to show accumulation in the Carbon stock along the life-period of the projects. Other scholars call the attention to the positive impacts of recent de-centralization policies adopted by Brazilian government over a constructive and continuous process of self-governance in Amazonia (Nepstad, 2001). Once highway network expansion programs are currently also proposed by the actual government, effective institutions to monitor timber and ranching activities along affected areas is of primary importance.

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Table 1: FNO rules as in 1990

Type of rule	Part of action situation	Effect on Structure	Behavior & outcome
Position	Positions	3 positions: farmer, bank officials and rural extensionists (= technicians providing assistance)	Farmer requests funding to bank officials through projects: extensionists monitor projects
Boundary (E&E)	Participants	Entry: Properties up to 5 modules; high VBP limit; land titles requested, among other documents; Exit: in-dept farmers cannot get credit	Credit limited to farmers with land titles and access to/knowledge of bureaucratic processes; medium sized farmers labeled as "small"
Authority	Actions	Financial charges: 6% of interest rate + 80% of the inflation rate; Credit is to be used for project only	Difficult for small farmers to pay loan
Scope	Outcomes	Projects need to make economic sense to be approved	Project are required to include expenses with chemical inputs; given local conditions, some people argue that this shouldn't be a requirement
Aggregation	Link between Action and outcomes		
Information	Info about link	No technical assistance included (how were projects monitored ?)	Lack of information about technological innovations
Payoff	Costs & Benefits of Actions & Outcomes	Insolvent farmers: all kinds of financial guarantees were requested, including mortgage	High turnover rate due to insolvent farmers selling their plots

Adapted from: Tura and Costa, 2000

Table 2: FNO – especial rules as of 1993, according to Ostrom’s classification system (2002):

Type of rule	Part of action situation	Effect on Structure	Behavior & outcome
Position	Positions	same	same
Boundary (E&E)	Participants	Entry: Properties up to 2 modules; low VBP limit; no land titles requested, only Syndicate’s certificate of land possession and IDs; Exit: in-debt syndicates cannot get credit	Credit extended to mini-farmers and with no land titles; medium sized farmers displaced from “small-farmers” credit category
Authority	Actions	Financial charges: 5% of interest rate + 50-70% of the inflation rate, depending on the case; Credit is to be used for project only	Easier for small farmers to pay for loan
Scope	Outcomes	same	Same
Aggregation	Link between A & O		
Information	Info about link	Technical assistance included	More information about technological innovations, but with side-effects
Payoff	Costs & Benefits of Actions & Outcomes	Insolvent farmers: financed items are pawned	Less severe consequences ?

Adapted from Tura and Costa, 2000

Table 3: Land Use change from 1998 - 2002 (hectares)

		Annuals	Coffee	Cacao*	Oth_Per	Pasture	Fallow	Forest	Total area
Sum of Areas	Credit (n = 57)	-62	-14	87	16	271	41	-299	5,945
	Non-credit (n = 114)	-107	-98	64	75	269	125	-436	12,404
	Total	-169	-112	151	91	540	166	-735	18,349
Average	Credit	-1.1	-0.2	1.5	0.3	4.8	0.7	-5.2	104.3
	Non-credit	-0.9	-0.9	0.6	0.7	2.4	1.1	-3.8	108.8
	Total	-1.0	-0.7	0.9	0.5	3.2	1.0	-4.3	107.3

\* - Statistically significant at the 5% level

Table 4: Change in agricultural and animal production

		Cattle (# of heads)	Cacao (kg)	Coffee (kg)
Sum of areas	Credit (n = 57)	1,155	213,090	116,875
	Non-credit (n = 114)	3,001	98,836	10,460
	Total	4,156	311,926	127,335
Average	Credit	20.3	3738	2050
	Non-credit	26.3	867	92
	Total	24.3	1824	745

