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A Baseline Study of Land Reform Settings in Northeast Brazil

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A baseline study of land reform settings in Northeast Brazil[1]

Abstract: This research project was intended to assess the impacts of the Land Bill Programme (PCT), a market-based land redistribution scheme in the Northeast of Brazil, in terms of changes in the living conditions in land reform settlements, which allowed us to make a comparison of the cases with other conventional approaches, particularly the projects carried out by the National Institute for Colonisation and Agrarian Reform (INCRA). Eventually some patterns came forth from the collected data, with the findings providing a thorough understanding of the issues involving the implementation of land reform schemes in the Northeast countryside scenario. It has been deduced from our survey material that, even though land loans played a valuable role in providing access to land by the rural poor, market-based land reform has failed to trigger socioeconomic development throughout the Brazilian Northeast. These findings have provided a sound base for developing the arguments entailing our main hypothesis, namely to assess the extent to which regional planning principles and practise, if systematically used, can combine market-based and state-led land reform schemes with a view to enhancing rural livelihoods whilst improving the regional economy.

1 Introduction

Land funds have been used, both internationally and in Brazil, to tackle the issue of land reform. Different approaches have been taken to that matter, with varying degrees of success or failure. Lessons therefore abound. For instance, in Kenya in the 1980s, land funds were strongly associated with land restitution and redistribution programmes, although the use of funds was not followed by necessary support services (Hoogeveen and Kinsey, 2001). In Scotland, public funding was introduced in 2001 to help rural communities meet the purchase price of land in the land market. The reform succeeded to the extent that there was "creative community planning and learning" (Bryden and Hart, 2000). In 1995 land-related loans were made available to disadvantaged groups in South Africa to mitigate poverty and land concentration resulting from the apartheid regime, but the schemes were plagued with a series of coordination inefficiencies between governmental agencies (Brink et al., 2005). A lease system was developed in Ukraine after 1999 to give peasants the right to work small parcels of collective land with a stable

[1] This report summarises my field work in Brazil, with primary data gathered by a 3-member team between December 2008 and May 2009. The fieldwork was carried out under the auspices of both the Cambridge Overseas Trust and a Darwin College's Finley Bursary.

income for the term of the lease. Notwithstanding the intricacies of the legislative framework in Ukraine restricted the reform's expected outcomes (Valletta, 2002). Colombia became in 1994 the first Latin American country to make an option for loans-based land reform giving attention to transactions of land. It was also the first one to realise that high interest rates could lead to defaults in loan paybacks (Fajardo, 2002; Borras; 2005).

At the same time, that literature recognises a need for governments to act in tune with regional planning for a more efficient placement of land, which would require not only providing funds for land reallocations, but also designing concerted actions that would benefit an entire region. For example, Marsden and colleagues (2004) urge governments to move away from a sectoral approach to land reform in direction to creating territorial policy networks. Dale (2000) believes that land reform schemes could be more effective with the use of decentralised planning processes, coupled with monitoring systems and coordination between government agencies. For Spencer (2007), governments should explore possibilities of central-local partnerships to provide infrastructure. Parnell (2004) focuses on the importance of developing organisational interfaces between political and administrative functions to fight poverty. Building institutional capacity to conciliate renewable natural resources with rural poverty mitigation is the penchant of scholars such as Alston *et al.* (2000), Barrett *et al.* (2005), and Ikejiofor (2005). In a few words, these and other studies support the creation of collaborative networks intent on obtaining sustainable land reform results.

This work brings to light some of the problems deriving from the lack of regional planning as a strategic governance tool in Northeast Brazil. In the mid-1990s, a government initiative known as the Land Bill Programme (PCT) was established in that region to fight rural poverty associated with landlessness. Like in many other countries, the Programme was a loans-based, market-oriented approach to land reform aimed at lowering the costs to poor landless households of obtaining productive land, and was in place between 1997 and 2002. The expected regional impact of the policy was a substantial decrease in the rural poverty rate in areas where the family farm system prevailed. As we will se ahead however, it remains disputed whether the market-based approach in the Northeast of Brazil has established itself as an effective tool for fostering

sustained socio-economic growth. With concrete examples from selected land reform settings, we argue that the factors leading to suboptimal results were not restricted to the economic viability of each individual site, but included the lack of a suited space for planned conjunct actions as a means to achieve broader regional development.

The following sections report the study of the quality of live in a sample of 11 municipalities hosting 13 land reform settlements, with fieldwork carried out between December 2008 and May 2009. Evidence from a survey involving settlers and settlement leaders was drawn together to identify the socio-economic characteristics of the PCT population, as well as similarities and distinctions between the selected sites with respect to production, infrastructure and accessibility to basic goods and services. The purpose of the survey was therefore to understand the extent to what settled families in the Northeast were positively affected by the Land Bill Programme and how this related to the growth of the regional economy. The fieldwork was undertaken using both quantitative and qualitative research methods.

The quantitative method consisted of administering survey questionnaires to a representative sample of 260 rural households who received PCT loans in the period 1997-2002. Sampling was arranged by randomly picking out households from the surveyed sites.[2] Basically, the respondents were asked whether participating in the PCT programme resulted in a beneficial influence on their livelihood, specifically in terms of access to: (i) good quality land; (ii) basic services such as education and health facilities; (iii) adequate housing; (iv) enhanced ability to perform profitable activities; (v) higher household income. Since the survey also aimed to assess beneficiaries' views of the policy, the households were also presented with open-ended questions regarding any other improvements as well as difficulties resulting from their activities on the settlement. We did this amongst various groups of settlers, such as settlers living and working on their plot as well as those working on nearby farms or in adjacent towns.

In addition, a second type of questionnaire was administered to a sub-group of settlers consisting of settlement leaders, also known as project headmen, who were presumed to apprehend the overall picture of the settlement. The main purpose of this questionnaire (two respondents per site, totalling 26 respondents) was to obtain a more

[2] The research team requested one adult in each family to respond to at least 40 questions.

comprehensive understanding of: (i) the overall infrastructure on and around the sites; (ii) how the settlers organised farm and non-farm activities; (iii) the impact that such activities were having on their standard of living; and (iv) the relationships between the economic performance of the sites and the local and regional economy. The questionnaires used in the survey are given in detail in Annexes A-1 and A-2.

The qualitative method involved personal in-depth interviews that targeted settlement leaders and landowners.[3] Insofar as the study's main goal was to unpack critical elements that could explain the socio-economic performance of the sites, these interviews focused more tightly on the settlements' potential to carry out production (a) for the families' subsistence, (b) for sale in the market, and (c) to generate a surplus for productive investments. The availability of items of infrastructure was also addressed in the interviews in connection with its role in the overall performance of the sites. In addition, we contacted land reform officers at state-level branches of the Brazilian Ministry of Agrarian Development to collect information concerning the design of the policy and its implementation, as well as to highlight central issues involving the role of the Programme in the regional economy. These interviews as well the questionnaires resulted in a series of important qualitative and quantitative findings,[4] which are discussed in the subsequent sections.

The remainder of this work is organised as follows. Section 2 describes characteristics of the surveyed areas that are particularly relevant for understanding the socio-economic issues we discuss in the sequel. Section 3 outlines the process of land redistribution under the Land Bill Programme and delineates a profile of the PCT population as well as the redistributed plots. Sections 5 and 6 then use the results from the surveys to identify both the status of economic activities on PCT settlements and the living standard of settled families. Section 6 provides a classification of the sites in our sample based on the socio-economic indicators we used to evaluate the performance of the settlements in sections 4 and 5. Section 7 provides a synthetic comparison of the

[3] The interviews lasted between 45 and 60 minutes in average, and there were no "right or wrong" questions. We assured the interviewees that the information would remain confidential and there would be no "reprisal" from their responses whatsoever so they were asked to be as frank as possible in replying to the questions.

[4] The results were supplemented with data from an expanded census conducted by the Brazilian Institute for Geography and Statistics (IBGE).

results from the surveyed sites with broader regional indicators. Finally, section 8 presents our closing remarks.

2 The surveyed areas: features and facts about the Northeast

The Northeast region of Brazil covers 1.6 million km², about the size of France, Spain and Germany combined, and has a population calculated at 53.5 million people, dispersed over nine states. The major urban centres are located along the Atlantic coast. The indices for human development are low (for instance, longevity 0.61 and income 0.66, as compared to 0.73 and 0.72 respectively for the rest of Brazil).[5] Since poverty is much higher in the countryside, there has been, on the one hand, extensive rural out-migration over the years to the neighbourhoods of major urban centres and, on the other, the surge of *favelas* (slums). All the capital cities in the Northeast have in their periphery extensive slums of improvised huts built of cardboard where violence, diseases and hunger are a daily part of their population's lives.

The most deprived areas of the Northeast are, however, in the semi-arid and transitional zones. These are areas characterised by having semi-desert weather/ characteristics which comprises roughly 81% of all Northeast region. The average annual temperature in these zones ranges from 24C to 28C, rainfall is extremely erratic from year to year, and droughts frequently occur everywhere though in varying scales of intensity. The annual rain precipitation averages 350 mm (in the coastal and rainforest zones it averages 1,700 mm) and there is close to no rain throughout the driest months (June to September).[6] During drought times there is a further reduction in fresh water flow from the rivers feeding the area. On the other hand, the region is sporadically affected by inundations, particularly in major river basins such as the Parnaiba river and its tributaries. The soil in the driest areas is hard to cultivate (soil composition is mostly chalky and the surface is degraded by continuous utilisation) and the vegetative cover is

[5] Source: IPEADATA (Brazilian Institute for Applied Economic Research — www.ipeadata.gov.br).
[6] Source: Brazilian Ministry for the Environment and Water Resources.

characterised by flat grassland. Yet there are areas even in the semi-arid where the soil fertility is relatively high, such as Sertoes do Caninde and Sertao do Pajeu.

Demand for public goods and services in these zones is high, public investments are in short supply. Tap water systems are precarious in many locations in the sense that the flow of indoor water cannot be guaranteed. Additionally, there is in most cities an environmental problem due to untreated sewage being released into the rivers flowing across the city and into the countryside, indicating high levels of coliform bacteria in the water used for irrigation and human consumption, only to become a source of water-borne diseases. For instance, a considerable number of riverside communities suffer with dysentery and native bilharzias (an infestation with a resulting infection caused by parasites typical of the region's rivers) and are still subject to acute viral diseases transmitted by the bite of mosquitoes.[7] Moreover, public health facilities are unsatisfactory. These environmental and structural features, combined with inequitable distribution of land, have produced a scenario of rural deprivation. Additionally, land invasions in these areas have been linked to the escalating decline in economic resources (Domingos, 2002; Fernandes, 2004; Medeiros, 2007; Caldeira, 2008).

The Northeast countryside is characterised by high rates of unemployment (only 35% of the rural population actually perform some kind of economic activity) and the resulting rural-to-urban migrations and peri-urbanisation. Furthermore, almost 70% of the rural population in the region are poor, with their monthly per capita income not reaching US$20 in average.[8] Cash transfer programmes, foodstuff baskets and a range of aid schemes from both government agencies and NGOs are important means of poor families' sustenance in these circumstances. In 2007, 5.5 million Northeast families benefited from the *Bolsa Familia* (a family voucher scheme), representing slightly more than half of the country's beneficiaries. On the other hand, land reform sites in the region remain to a high degree underdeveloped and poorly serviced.

Agriculture and livestock are key economic sources for the rural communities in the region, although only 7% the Northeast's GDP comes from the farming sector. Small producers including producers on land reform settlements in the rainforest zones practice

[7] Source: Brazilian Ministry of Health.
[8] Source: Comision Economica para America Latina y el Caribe (CEPAL).

simple forms of farming. In the summer crops are submitted to the dearth of water and intense exposure to the sun and agricultural yields register deep decreases. The severe shortage of rainfall brings in devastating effects: key productive activities in the sites are disrupted and crops are almost completely lost. Livestock activities are also severely hit. In such circumstances families survive on the basis of their meagre savings or government aid and it is common that some households migrate to major urban centres in search of jobs. Coupled with the fact that most of the capital cities are located in resource-privileged areas, labour-intensive industries as well as large-scale plantations of sugarcane which similarly requires ample amount of human labour dominate the coastal zone of the region.

High landlessness (about 40% of the rural population) is an additional constraint. The region's harsh agro-climatic features impose limitations on the availability of arable land for land redistribution schemes. Reflecting the broad picture in the Northeast the majority of family-farms in the semi-arid and transitional zones are of small size (<100 ha) although the PCT projects in these areas have significantly smaller farms (less than 20 hectares per settled family). Both family-run farms and plantations of great scope strive on a highly unequal distribution of natural resources albeit large commercial farms are as a rule located on higher potential cultivable properties. Those large farmers (*latifundiarios)* occupy extensive tracts of land, which is a crucial land reform issue in Northeast Brazil, as grassroots movements in the region have struggled to bring about changes in the institutions of property and labour relationships. Between 1993-2002, about 2.3 million hectares of land on which crops could be grown or in areas situated at the vicinity of public use facilities were expropriated from major farmers in the Northeast as a result of land occupations by movement activists.

Considering these facts, the Brazilian government decided to introduce in the mid-1990s a market-based mechanism of land reform in the Northeast, the Land Bill Programme (PCT). The objective was to mitigate two of the main problems mentioned above, namely high landlessness and high incidence of poverty. The following sections analyse the impacts of the Programme through a baseline study of selected areas of the region. These are areas that represent the multiple dimensions of the socio-economic potential of the Brazilian Northeast. The settlements can be compared in several aspects

allowing for a unique perspective on the socio-economic development of PCT beneficiaries. Likewise, the location of the selected settings in relation to roads, distance to market centres as well as the availability of natural resources closely reflects the situation of PCT sites in the Northeast region as a whole. Moreover, in selecting the sites it was taken into account that the Land Bill Programme was designed to be able to operate in similar manners in a diversity of geographic contexts.

Table 1: Sample of PCT settlements

State / PCT sites	Municipality	Agro-climatic zone	Total area (ha)	Number of plots	Settled families
Maranhao					
Vila Castro Gomes	*Arame*	*Transitional*	*1,851*	*48*	*48*
Vale do Barbosa	*Grajau*	*Transitional*	*1,700*	*42*	*42*
Ceara					
Barra Bom Tempo	*Crateus*	*Semi-arid*	*640*	*12*	*12*
Lagoa	*Crateus*	*Semi-arid*	*1,000*	*22*	*10*
Santo Amaro	*Crateus*	*Semi-arid*	*1,669*	*29*	*27*
Pernambuco					
Nossa Sra de Fátima	*Bezerros*	*Transitional*	*762*	*35*	*6*
Engenho Coepe	*São Lourenco*	*Rainforest*	*504*	*24*	*24*
Engenho Cana Verde	*Barra Guabiraba*	*Transitional*	*987*	*47*	*47*
Fazenda Dois Braços	*Bonito*	*Rainforest*	*680*	*9*	*9*
Bahia					
Novo Horizonte	*Guaratinga*	*Rainforest*	*1,181*	*49*	*49*
Fazenda Sao Geraldo	*Itanhem*	*Transitional*	*1,187*	*69*	*69*
Minas Gerais					
Amaralina	*Joaima*	*Semi-arid*	*557*	*33*	*33*
Duas Barras	*Padre Paraiso*	*Semi-arid*	*466*	*33*	*25*

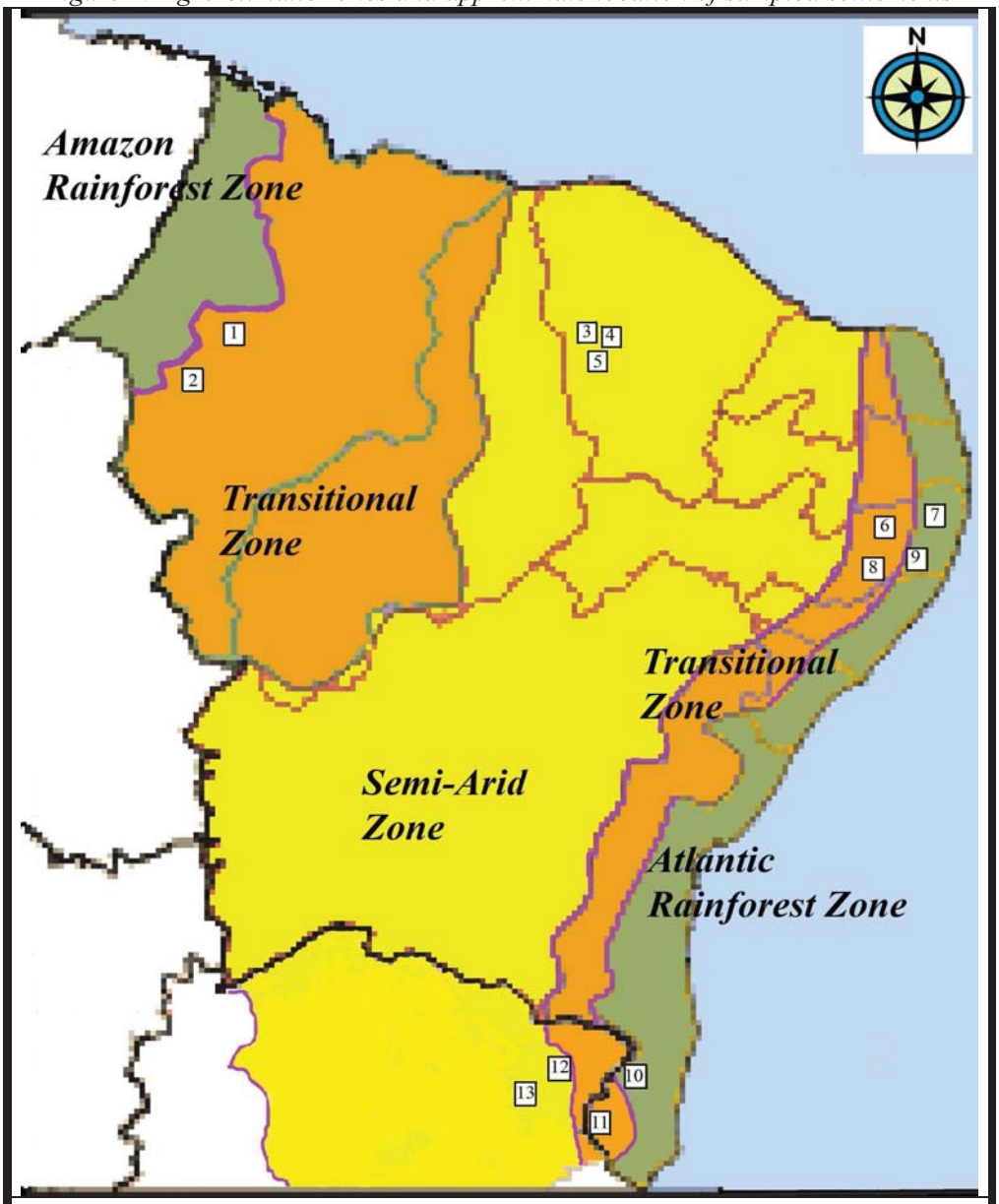
Source: 2008/2009 author's on-site field work

According to Table 1 above, our sample of sites comprises:

- Areas with climate, soil types and vegetation representative of the majority of family-farm sites in the Northeast;
- A range of natural resources that include major rivers such as the Jequitinhonha and the Sao Francisco (in the semi-arid), the Una and Parnaiba (in transitional areas), with strong influence on cropping;
- A range of agricultural activities (for subsistence or profit) as well as livestock production that were also found in most areas of the region;
- Differences in access to infrastructure and services, as well as in distance to urban areas and major markets.

Also, as depicted in Figure 1 ahead, our sample covers three main agro-climatic zones representative of the broader Northeast region. The *semi-arid* comprehends dry areas in the interior of the Northeast (known as the *Sertao Nordestino*), where natural resources are generally very scarce; the rainforest zone (*Zona da Mata*) comprises areas within the Atlantic rainforest along the east coast and close to capital cities, with in general better soil and rainfall conditions; and the transitional zones (*Agreste* and *Mata de Cocais*) between the rainforest zones and the semi-arid, where drought risk is moderate and native vegetation is less abundant. Besides, the Figure reflects a general tendency of PCT sites to be concentrated on (or close to) transitional or rainforest zones. In due course, the mix in the sample thus serves the purposes of comparing and analysing the extent to which the characteristics of a given area can be a component of consequence in the spatial patterning of the distribution of settlements under land reform schemes.

Figure 1: Agro-climatic zones and approximate location of sampled settlements



1 – Vila Castro Gomes	*6 – Nossa Sra de Fatima*	*10 – Novo Horizonte*
2 – Vale do Barbosa	*7 – Engenho Coepe*	*11 – Fazenda São Geraldo*
3 – Barra Bom tempo	*8 – Engenho Cana Verde*	*12 – Amaralina*
4 – Lagoa	*9 – Fazenda Dois Bracos*	*13 – Duas Barras*
5 – Santo Amaro		

3 The access to land under the Land Bill Programme

The Land Bill Programme was pilot tested in Northeast Brazil at a time when a surge of demand for land associated with peri-urbanisation was reaching the small countryside towns of the region. As a consequence, the Programme targeted economically disadvantaged, migration prone landless individuals, or people with land insufficient for a livelihood, in deprived portions of the region. Moreover, the Programme was designed not only to ensure the redistribution of good, arable land, but also to supply a range of support services that helped raise beneficiaries income and standard of living. In line with these objectives, the Programme consisted of two dimensions. The first dimension involved providing credit for the transfer of land rights on a willing seller – willing buyer basis (SAT funds), with land reform agencies in charge of making sure that the properties would be transacted at market prices. The other dimension involved a second round of credit lines to finance small infrastructure projects, involving SIC funds and the PRONAF.[9] According to the Brazilian Ministry of Agrarian Development, an estimated 551 transactions of land took place under the Programme between 1997 and 2002, involving nearly 370,000 hectares of land, which resulted in the settlement of more than 14,000 families. The Programme was terminated in February 2003, following charges of corruption and misuse of the funds.

From the beginning, many people living in impoverished rural communities of the Northeast expressed the desire to take part in the scheme. However, according to the community-oriented conception of the PCT, interested families needed to constitute associations of small farmers before applying for the loans. Though within a restricted scale, PCT associations were formed in five Northeast states. The main objective of the associations was the acquisition of enough arable land to produce food to sustain groups of landless families. It was thus the association's responsibility to choose a suitable property and negotiate the acquisition of it with its owner, since there was limited knowledge amidst rural families about the workings of the Land Bill Programme. Once the land was selected and a price agreed upon, the formalised association was asked to

[9] SAT means *Subprojeto de Aquisicao de Terras* (Land Acquisition Subproject) and SIC means *Subprojeto de Investimento Comunitario* (Community Investment Subproject). PRONAF is the National Programme of Assistance to Family Farms.

present a statement from the seller confirming their willingness to sell the property at the stated price to a state-level land reform agency. The land agency would basically make sure that there were no legal impediments to the transaction and the accorded land price was within acceptable boundaries. With the approval of the state agency, the association was regarded as eligible for immediate credit from a special fund that was operated by the *Banco do Nordeste do Brasil* (Bank of Northeast of Brazil).

Eligible associations were granted a combined credit package for the purchase of the land (SAT) and for on-farm improvements (SIC). Within the limits of that loans package (equivalent of U$11,000 per family), associations were encouraged to acquire high quality properties for the smallest amounts, insofar as the lower the price of the land, the greater the money set aside for post-purchase investments, such as civil works, goods and agricultural equipments. In addition, each beneficiary family was entitled to a start-up grant of approximately U$440 for settling expenses. Following the purchase of the land, a settlement was created and the plots were divided into family-farm units established by agreement amongst the beneficiaries. Association members also decided on the payment responsibilities regarding each individual allotment. The formal rights to the property were held collectively by the association, but the title remained as collateral for defaulted debt payments. Individual titles were not passed in the name of the families until the debts were completely paid off. Undoubtedly, PCT associations were able not only to manage collective land transactions but also to raise land funds at favourable rates from banks due to their associative nature. It was a significant step forward particularly considering that landless workers outside the PCT sites were being charged relatively higher interest rates by the rural credit bank, or were completely refused credit because of lack of land as collateral.

The Land Bill Programme was designed to be complementary to the traditional INCRA instruments of land redistribution. As such, rural estates larger than 15 fiscal modules[10] are subject to expropriation in compliance with Brazilian law and could not be negotiated according to the PCT framework. Actually in the majority of instances the

[10] A fiscal module is the minimum size of a landholding deemed necessary to support a family. The size of a fiscal module is established by the federal government in hectares, and may vary across municipalities and regions due to varying agro-climatic conditions. In the Northeast a fiscal module ranges from 30 to 90 hectares.

plots distributed under the scheme turned out to be of a modest size, averaging approximately 26 hectares per family (the distribution is centralised at the median value of 24). The total average area in our sampled settlements' was 1,014 hectares, whereas the mean value for a plot was 34.4 hectares. However, there were 290 plots out of 452 in which the size stood below the minimum value of 30 hectares as recommended by the National Institute of Colonisation and Agrarian Reform for the Northeast region (the smallest plot has 14 hectares). Still, there were 162 plots with a surface area above the minimum value. These were settlements mainly located in the rural sub-regions of Cocais, Mata Sul and Inhamuns Crateus. In sum, 64% of the plots in our sample had less than 30 hectares, which was below traditional INCRA standards for land redistribution in terms of territorial extent, showing that the mean size of a typical PCT plot is smaller than the surface area of an average family farm in the Northeast. In addition to that, no more than 80% of the land could be put in agricultural use whereas the remaining unfarmed part should be left covered by native vegetation in compliance with an applicable Federal law requiring that legal reserves must be set aside in land reform sites for permanent preservation of native plant species and animals.

Notwithstanding plot size had little implication with regard to economic performance and the standard of living of settlers in our sample. Duas Barras, for example, was the smallest of the surveyed sites but, as we will see ahead, one of the most prosperous in many aspects. Therefore, other elements such as the quality of the plots, location and infrastructure should be taken into account. Overall, the inferior quality of the properties acquired under the Programme can be explained by the following factors: 1) scarcity of arable land due to agro-climatic conditions, which constrained farm expansion; 2) the relatively small amount of money put into the transactions; 3) the fact that extensive tracts of land were already controlled by large commercial farmers not willing to sell their properties; 4) inability of institutional structures (land reform agencies and PCT associations alike) to attract high-quality land to the Programme; 5) lack of coordination between the federal government and regional and local units involving the selection of areas for the implementation of the policy.

With respect to the quantity of households per site, we noticed that most settlements fall into two categories: those between 6 and 27 households and those with

the total number of households ranging from 33 to 69 families per site. In average, PCT settlements in our sample accommodated 39 families, although the number ranges from 6 (Nossa Senhora de Fatima) to 69 (Fazenda Sao Geraldo). One of the problems entailing settlement extent, as mentioned above, was that small properties limited the quantity of families participating per site. In practice, the total number of families in a project bounded the size of the SAT/SIC package granted for land purchase and communal on-farm investments, thus restraining the scope of the Programme itself. We saw indications however that some PCT associations recruited a greater number of families as a means to become entitled to proportionately bigger funds. Since the maximum loans package per family, as mentioned earlier, was U$11,000 (plus U$440 for settling expenses), a higher value would have allowed for the acquisition of greater areas, depending naturally upon the land's price, or the amount necessary for farm-related investments. One way or the other, this limitation reduced the number of beneficiary families as well as the extent of plots distributed. Box 1 provides insight into how the interviewed settlers assessed their allotment in terms of price and a range of other aspects.

Box 1: Settlers' own assessment of purchased plots

Plot's location	*Frequency*	**Plot's price**	*Frequency*
Good	*30%*	*Cheap*	*18%*
Average	*41%*	*Fair*	*52%*
Bad	*29%*	*Expensive*	*28%*
Plot's size		**Plot's overall quality**	
Large/enough	*2%*	*Good*	*67%*
Medium/just fair	*62%*	*Average*	*28%*
Short/ not enough	*36%*	*Bad*	*2%*
Plot's adequacy for farming		**Overall assessment of PCT**	
Good	*64%*	*Very good*	*27%*
Average	*32%*	*Good*	*67%*
Bad	*10%*	*Bad*	*4%*
		Very bad	*1%*

Source: 2008/2009 author's on-site fieldwork

In terms of price paid for the plots, their location and size, the overall assessment was satisfactory, yet the most popular complain was that the settlement was not adequate for farming, particularly in the sense that the land transfers were not attached to the means necessary to create surpluses that enabled households to upgrade their standard of life. A word must be said however on the way the plots were allocated as some association headmen took advantage of the peasantry's complete lack of bargaining experience to entice them into accepting low price plots. This fact might be connected to some episodes of corruption and mismanagement of PCT funds involving transactions of land under the Programme. We estimate that 73% of the PCT beneficiaries we interviewed, which is equivalent to approximately 170 households, had very little or no participation in the land purchasing process, leaving the task almost entirely to an association. Only 19% played some part in the selection of the land or in direct negotiation with landowners. The fact is that, by agreeing to pay lower prices for the land, the settlers were expecting higher economic returns (i.e. higher agricultural profits). In many cases however, the plots purchased under such circumstances were actually unproductive property, whilst good lands turned out concentrated in the hands of the leaders. This was always conducive to lower levels of production, due to an inequitable distribution of resources.

In some visited areas in the rainforest zones a number of properties were brought to the land market for speculative purposes. That is, landowners produced an artificial scarcity of land whilst the demand for land due to the Programme was high, what contributed to inflate lands' price. Rural properties in the semi-arid and transitional zones, on their turn, have been evaluated considering the availability of water under the surface soil or the property's suitability to install irrigation systems. Particularly in the semi-arid, extensive tracts of unproductive land were put on sale at lower prices by landowners who were interested in getting some money out of the government's Programme. Furthermore, the possibility of land occupancy by members of the Landless Workers Movement (MST) and the resulting expropriation by the state actually reduced the attractiveness of many properties for investments in productive activities. An increase in the supply of land was in fact observed in conflict-driven areas thus reducing its price. Nevertheless, according to a key informant at the Ministry of Agrarian Development

(MDA), recent evaluations by local real estate experts in all five states showed that although PCT transactions may have exerted some pressure on land prices in adjacent countryside areas, those transactions did not affect land markets at a regional scale, denoting that the Programme was limited in scope compared to the amount of lands available for land reform in those states.

The Programme targeted rural workers, or at least people with some experience in farming. Additionally, the Programme leaned towards a category of rural households who were unable to find a job in the agricultural sector, or because they did not have land of their own to cultivate and feed their family and migration to urban settings became a natural consequence. In order to verify whether settlers in our sample matched the government's target population, an attempt was made to trace a basic profile of the beneficiaries' occupation prior to enrolling on the Programme, as well as their profile after enrolment, with results presented in Box 2.

The results in the box demonstrate that programme beneficiaries within our surveyed area involved groups from different neighbouring and distant districts, from various walks of life and different levels of farming experience. However, a typical settler in our sample was one that had previously been a rural labourer working on a salary basis in some nearby location. As a matter of fact, most associations were created under the Programme with the expectation that the properties would be purchased in areas situated in close proximity to beneficiaries' home or at least in the same district. This was a logical claim for the aspiring PCT beneficiaries because remaining in their place of origin would help preserve the social structure involving the rural populations whilst preventing the relocation of families to remote areas. Although these respondents expressed a preference for settings close to where they lived, it is worthwhile remarking that the prospect of receiving title probably played a more significant role in the decision to join the Programme than distance from their previous residence.

Box 2: Settlers' basic profile

Former local of residence	*Frequency*
Same land	*9%*
Same locality/town	*29%*
Nearby locality/town	*42%*
Locality off by more than 100km	*16%*
Different state	*4%*
Reason to join PCT	
Own initiative	*34%*
Initiative by relative or friend	*43%*
Initiative by social movement	*21%*
Other	*2%*
A social movement activist?	
Yes	*17%*
No	*82%*
Schooling level	
Illiterate	*53%*
Semiliterate	*7%*
Attended elementary school	*21%*
Attended fundamental school	*12%*
Attended high school	*4%*
Attended technical school	*0%*
Attended university	*1%*

Past occupations	*Frequency*
Urban wage labour	*9%*
Rural wage labour	*38%*
Temporary urban labour	*1%*
Temporary rural labour	*18%*
Domestic duties (servant/ maid)	*2%*
Agriculture/cattle-raising	*29%*
Student	*2%*
Small business owner	*1%*
Unemployed	*1%*
Other	*1%*
Current occupations	
Urban wage labour	*2%*
Rural wage labour	*4%*
Temporary urban labour	*1%*
Temporary rural labour	*2%*
Domestic duties (servant/ maid)	*1%*
Agriculture/cattle-raising	*92%*
Small business owner	*1%*
Student	*1%*
Other	*1%*
Kids attend school?	
Yes	*71%*
No	*29%*

Source: 2008/2009 author's on-site fieldwork

Our evaluation of the sites showed that prior to joining the Programme a minority of beneficiary families already lived on the land. These were members of organised groups who had occupied the property and subsequently decided to join the Programme to receive title. Others previously lived in close countryside areas, whereas the larger group came from a neighbouring town. Another small category was constituted of former residents of more distant municipalities or even a different state. It was clear for that matter that some of the beneficiaries were willing to move over large distances for the sake of title. On the other hand, 34% said that joining the Programme was their own initiative, 43% said to have followed the advice of some relative or friend (their

acquaintances were rural workers on the same location or close farms) and 21% said it was the result of their engagement in a social movement. In general, there were two main reasons leading these people to apply for PCT funds: either because they became aware that there were almost no alternative options following the scarcity of work in nearby commercial farms, or otherwise because they believed the government would eventually expropriate the property and grant them the land title anyway without them having to pay off the loans.

Occupational status was another important factor analysed in our study. The vast majority of plots were distributed among individuals with some previous experience in rural activities. Very few respondents were acquainted with any sort of collective landownership (whether rural or urban). Some of them had quit farming due to age, health problems, debts owing to previous land credit programmes, or because of losses due to droughts and crop failures. We also found that almost 85% of the participating families had already worked on rural areas, 10% in urban areas and the remaining 5% were students, unemployed or had other occupations. These percentages refer to the last activity before entering the PCT, so we are not assuming that those who declared to perform urban activities had no experience working on agriculture. In summary, the majority of beneficiaries previously worked on rural areas, but a relevant part had more connections with close urban centres than with the rural ambiance.

These former urban workers or farmhands became now small producers on own land, growing field crops, and/or raising livestock or poultry, although most of them turned out practicing meagre subsistence farming. Indeed, the vast majority (92%) of those we interviewed indicated to carry out agriculture or livestock-related activities. For analytical purposes, we divided these individuals in two large groups: small farm-owners and non-owners workers. The first group (86%) was composed of full time self-employed rural producers that work on a family-farm basis – along with spouse and children – on their parcels of the distributed land, awaiting the final transfer of title. Individuals in the other group (6%) were rural labourers performing secondary tasks on someone else's land on a salary basis. A few occupations were nevertheless identified amidst sitting families other than just farming or ranching. Our sample evidenced a small record (7%) of sitting

beneficiaries that admitted to perform some kind of urban activity and some of these were students.

In general, respondents declared not being engaged in one of those peasant movements that can be traced to the numerous land invasions occurring in various parts of the Northeast throughout the last decades which involved landless workers, big farmers, and elements of the Landless Workers Movement (MST). Less than one-fifth of the settlers we interviewed admitted active involvement in these movements. They claimed instead that their demands are focused on better infrastructure for agricultural production, better schools and sanitary conditions for their family, and increasing personal income. This is a somewhat surprising result, as the area has a history of fierce opposition to the market-based approach from grass-roots movements backing traditional land reform schemes. However, many beneficiaries expressing their concerns about the Programme believed that becoming an MST activist could be a more effective tool to come into possession of good land.

It is important to mention that although quite a few of the respondents admitted openly to having a will to vacate the site in the future, that was more due to legal prohibitions against transferring the plots (and the loan obligations attached to them) to someone else than their contentment with life in the project. Nevertheless, many PCT settings were found practically deserted by the time the field-based research took place.[11] Almost half of the settlers on Engenho Coepe, for instance, spent most of their time in an adjacent town named Sao Lourenco da Mata, where they had much easier access to public services, education and leisure. A quite similar story was told by one anonymous settler on Engenho Cana Verde,[12] who disclosed that the president of the PCT association happened to own a house in town and would come to look over their plots during the weekends. Also on PCT Amaralina, families were less than optimistic that the Land Bill Programme would generate a lasting positive impact on their lives and started a movement back to their original towns.

[11] Examples of completely abandoned settlements include Garrafao, Nova Terra and Lagoa do Gato, in the state of Maranhao, Canavieiras, in the state of Bahia, and Vale Verde, Tamboril da Esperanca and Maravilha, in the state of Minas Gerais. In other cases, contact with the settlers was difficult because plots were scattered and households were used to spending a big part of their time performing off-farm duties.
[12] Interview carried out in PCT Engenho Cana Verde, municipality of Barra de Guabiraba in December, 2008.

"We understand that the government wanted to help us, and provide the means to make this land a place of profit, but we don't have an option. We wish we could stay and work the land and sell our produce, because we are poor and have nothing", said a settler in Amaralina.[13]

Landowners were unenthusiastic about the Programme as well and some turned nervous in interviews when the issue of impending land invasions was discussed. They were straightforward uttering about the poor security of their properties and were apparently worried about it. This came as no surprise inasmuch as organised groups of squatters were invading large farms in surrounding areas with, in many cases, the support of left-wing political parties. An important fact to be noted is that not all the invaded properties fully met the legal criteria for land expropriation, i.e. large pockets of land at least 80% of which are in unproductive use. But as aforementioned, these properties weren't negotiated under the scheme since the landowners saw little incentive to sell the land. One landowner suggested that the Programme would be very useful if it led to the development of a greater area than just the immediate site area, because "in the future that would increase the value of my properties as well. If I knew that would be the case I would be happy to sell part of the property." Another landowner perspective was that the impact of the Programme could be greater than just increasing lands' value, having also a positive impact on the security of their property. "If the policy worked, we wouldn't need to be afraid of land invasions anymore."[14]

During the survey settlers were inquired about how essential possessing land is for them. Land rights were all-important not only for their prospects for wealth creation but also for them being formally recognised as members of the rural society. The proportion of these families who had a provisional title was predominant, representing 43% of the interviewed population. 21% declared having the definitive title already, whereas 34% of the survey respondents just didn't know. Notwithstanding even the respondents who had title did not regard themselves as having a higher degree of tenure

[13] Interview carried out in PCT Amaralina, municipality of Joaima, in February, 2009.
[14] Interviews carried out in two farms located in the countryside area of Crateus, in December, 2008.

security than families that received land through expropriation mechanisms. Those who answered the questionnaires were also asked about the role of PCT in improving their situation. The dominant response (by 68% of those surveyed) was that just possessing a piece of land was not enough to make their lives better (only four percent answered that their lives became much better). They also pointed out that many household heads were forced to look for jobs in nearby towns due to inadequate infrastructure and sometimes scarcity of natural resources in the settlements.

By the same token, beneficiary failure to upgrade their condition (and ultimate desertion) could indeed be associated to the lack of financial sustainability in many settlements, that is, insufficient resources to invest in infrastructure and productive activities. In the next section we will address the relationship between level of production and quality of life in PCT sites.

4 Agriculture and livestock production on PCT settlements

According to the PCT framework, settlers' associations that successfully completed a land transaction with SAT funds became qualified to apply for complementary SIC start-up loans, in order to establish the settlement and initiate production. Whilst SIC funding was not projected to be enough for the establishment of an autonomous agricultural undertaking, PRONAF financing was an additional credit line accessible to beneficiaries that worked on a family farm regime.[15] Prospect SIC and PRONAF beneficiaries should draw up proposals for productive investments on the purchased plots (basic services, infrastructure and inputs) and submit them to a state land agency, including an outline of their demands for technical assistance and specialised training tailored according to the settlement's productive activities.

These second-round funds should primarily be committed to preparing the land and amplifying the fields for cultivation of perennial crops, as well as for improvements in livestock production. In addition, up to eight percent of the SIC loans could have been

[15] Past studies undertaken on the Northeast of Brazil (Buainain et al., 2000; Ferreira, 2001; Domingos, 2002) have demonstrated that the family-farm system is more productive than large landowner farms, thus evidencing that the unequal land distribution restrains productivity and employment.

utilised for technical assistance. Part of the funds could also be used to build basic infrastructure and agro-processing facilities, as well as for the purchase of farm vehicles for communal use. The status of production activities we found on the surveyed sites, however, did not reflect the Programme's goals, as indicated in Box 3.

Box 3: Composition of PCT settlers' farming activities

	Frequency	Notes
Effective use of the plot		
Extensively used	*20%*	for crop fields, pastures, and/or dwelling
Partially used	*60%*	
Idle	*20%*	
Main farming activities		
Temporary cropping	*78%*	beans 85%; corn and cassava 69%; coffee15%
Permanent cropping	*25%*	palm cactus 46%; banana 15%
Livestock	*65%*	average herd size = 7 head
Secondary farming activities		
Agro-processing	*28%*	mostly to produce flour
Horticulture	*12%*	mostly pumpkin and okra
Silviculture/forestry	*4%*	mostly firewood extraction
Type of farming		
Collective	*24%*	basically through cooperatives
Individual/family operated	*76%*	
Main techniques		
Use of own seeds	*53%*	except seeds provided by the cooperative
Use of pesticides	*17%*	
Use of fertilisers	*19 %*	mostly inorganic
Use of herd vaccines	*46%*	for bovine herd only
Technical assistance from government		
Enough	*0%*	
Some, not enough	*46%*	visits by agents not frequent
Lacking	*54%*	
Farm machinery/ implements		
Farm tractors	*32%*	mostly borrowed or rented
Irrigation schemes	*15%*	mostly through piped networks
Access to rural credit		
PRONAF	*50%*	mostly small amounts
Other	*1%*	not specified

Sources: Ministry of Agrarian Development and 2008/2009 author's on-site fieldwork

A prominent aspect to be stressed in our study, however, is that the bulk of acquired plots (about 60%) were only partly cultivated. Not more than 20% were cultivated in an intensive manner and almost 20% of the plots were not in use. Little mechanisation of vegetable crops was observed and, except for a few agricultural items, on-site cropping did not imply economies of scale. The prevailing activity was restricted to subsistence crops including the cultivation of tropical fruits and vegetables. With an eye toward what the settlers' family would need during the coming few months, commercial farming occupied a small part of their activities. In general, agricultural production was carried out in tandem with raising animals (chicken, cattle and goats) for food and, exceptionally, profit. This evidence is consistent with the intense risk of draught in the areas. That is, granting that there was enough forage for the animals, the activity presented lower risk than planting vegetable crops. However, grazing and ranching were also for the families' subsistence, counting on small herds of cattle, goats, donkeys or mules

Also, the SIC/SAT package could not afford the provision of major infrastructure that required long-term investments due to an upper limit of US$11,200 per beneficiary. Start-up expenses were to be "capped" at that ceiling value as well, and just covered expenses incurred in preparatory arrangements, such as clearing livestock fields or building fences plus an initial set of supplies for production. Since they were operating with little to no surplus to accommodate economies of scale, there was less than sufficient investment by households from their own income and (according to the table above) about half of the families applied for PRONAF funding. However, PRONAF loans were also limited due to the families' low capacity to accommodate extra loan obligations in their budget. As a result, these funds were focused on the purchase of basic items of infrastructure and some hands-on technical assistance in order to overcome, to a certain degree, the limitations of the Programme's loan package.

In reality, settlers in our sample blamed the insufficiency of technical assistance coordinated by state land agencies for the difficulties they were going through and many found that some sort of training would have been a decisive factor, particularly because in the stunning majority of instances they had never lived or worked on a land reform setting. As a matter of fact, the service was rare (46%) or completely absent (54%), yet

their inability to cope with large scale farming was also connected to the fact of them not being farmers at the time of joining the Programme, albeit being part of a rural population that had undertaken services in a farm. It should be noted that very few PCT associations used the funds to establish agriculture cooperatives of small producers that might have enabled collective undertakings involving production and commercialisation of produces (as seen from the Box, less than one-fourth of settlers were able to produce collectively).

This was the case in Duas Barras, Fazenda Dois Bracos and Fazenda Sao Geraldo, where establishing cooperatives benefited agricultural activities on the sites in a number of ways. A headman interviewed in Duas Barras, for instance, believed that the family farms were too small (17 hectares in average) to justify the acquisition of a tractor or any other type of heavy farm machinery for use on a single plot. According to him, amounts of land larger than a 17ha plot were required for paths and roads since the settlement's physical access was in bad condition adding to the time needed to get to markets. He added that individual settlers on the site did not possess the means of transportation indispensable for delivering their produce even into Padre Paraiso (the nearest town) and their plots weren't sufficiently mechanised. "The cooperative provided cheap solutions to our problems here on the settlement", said the interviewee.[16]

The supply of inputs required for agricultural activity in the form of vegetable seeds or seedlings was available in different amounts across the visited settings, although the majority of settlers used part of their start-up funds to buy seeds. Fertilisers, pesticides and other agricultural chemicals as well as farming apparatuses and machinery were used without technical support. Mechanised self-cultivation was nearly absent, providing further indication of the unfeasibility of the settlements for large-scale agriculture. Similarly, the minority (32%) of settlements had tractors or other motor vehicles suitable for farming applications so they utilised workable animals as mules and oxen to do the hard tasks. Irrigation supplies were also precarious or completely neglected in the majority of settlements. Agribusiness in the visited sites was thus distinguished by slow technological advancements.

Features such as road accessibility and proximity to a marketplace were seen as preconditions for the commercialisation of produces. Notwithstanding physical access

[16] Interview carried out in PCT Duas Barras, municipality of Padre Paraiso, in January, 2009.

was, as a rule, so precarious in many sites that row crop tractors would sometimes be used to transport harvested crops to town markets in the rainy season. Table 2 shows the quality of main roads serving the municipalities hosting the sites in our sample. The table includes only roads with some accessibility by settlers established in the area. As suggested from the table, the dubious condition of these roads imposed constraints to growth in the settlements settlers due to high costs of transportation.

Table 2: Quality of main roads in the sampled areas

State	Road name	Road type	Municipalities served	2009 situation
Maranhao	BR-226	Interstate highway	Grajau	Average
	BR-222	Interstate highway	Arame	Average
	MA-006	State road	Arame; Grajau	Very bad
	MA-379	State road	Arame	Very bad
Ceara	BR-226	Interstate highway	Crateus	Bad
	BR-403	Federal road	Crateus	Regular
	BR-404	Interstate highway	Crateus	Bad
	CE-187	State road	Crateus	Bad
Pernambuco	BR-232	Federal road	Bezerros; Bonito; Barra de Guabiraba	Good
	BR-408	Interstate highway	Sao Lourenco da Mata	Average
	BR-104	Interstate highway	Bonito	Regular
	PE-097	State road	Bezerros	Very bad
	PE-103	State road	Bonito; Barra de Guabiraba	Average
	PE-085	State road	Barra de Guabiraba	Bad
	PE-040	State road	Sao Lourenco da Mata	Very bad
Bahia	BR-101	Interstate highway	Itanhem; Guaratinga	Average
	BR-418	Interstate highway	Itanhem	Average
	BA-290	State road	Itanhem	Bad
	BA-283	State road	Guaratinga	Bad
Minas Gerais	BR-116	Interstate highway	Padre Paraiso	Good
	BR-367	Interstate highway	Padre Paraiso; Joaima	Average
	MG-105	State road	Joima	Very bad
	MG-342	State road	Padre Paraiso	Very bad

Source: Brazilian Transports Confederation (CNT).

Distance was also seen as a major impediment for the overriding majority of families we interviewed. According to Table 3 ahead, only about one-third of the settlements were simultaneously situated in close proximity to marketplaces and counting on roads of acceptable quality (up to an hour ride on paved or partially paved roads). PCT Engenho Coepe, despite being situated in the rich Atlantic Rainforest zone, was by far the worst case scenario. An interviewee in that settlement reported that transportation costs absorbed an astounding 80 percent of the settlers' revenue from agriculture.[17] Undoubtedly, the commercialisation of PCT produces faced major impediments as a result of the difficulties highlighted above, with the few exceptions of settlements cultivating higher value crops, such as coffee in Duas Barras and Fazenda Sao Geraldo. At least in these two cases, the perceived strategy was to use the agricultural profits to expand and consolidate production activities according to the characteristics of their allotments. The following table provides a synopsis of the productive activities in our sample of sites.

In summary, with quite a few exceptions, the PCT settlements we visited had the following aspects in common: the associations did not manage to establish a strategy: (i) to increase on-farm production beyond the subsistence level; (ii) to generate enough surpluses to secure productive investments;[18] and (iii) to consolidate the family farm system as a successful mechanism for poverty alleviation. Taking a rather cautious approach to avoid underestimating the potentialities of the market-based scheme, it can be argued that further economic activity needed be generated within the settlements that could result in higher employment and income, thus adding to the socio-economic status of sitting families, as assessed in the next section.

[17] Interview carried out in PCT Engenho Coepe, municipality of Sao Lourenco da Mata, in November, 2008.

[18] There are reports from the literature supporting the notion of property rights as an incentive to invest. For instance, De Soto (2000) noted that in Latin American countries investment in land grows considerably when occupants obtain accredited title to the land.

Table 3: Characteristics of settlement production in the sample

	Barra Bom Tempo	Lagoa	Santo Amaro	Fazenda Dois Braços	Engenho Cana Verde	Engenho Coepe	Nossa Sra de Fátima
Main crops	*beans/ corn/ palm cactus*	*corn/ beans/ cassava*	*cassava/ corn/ palm cactus*	*cassava/ beans/ corn/ banana*	*cassava/ corn/ banana*	*cassava/ potato/ beans*	*corn/ beans/ palm cactus*
Other activities	*cattle-raising*	*cattle-raising*	*not informed*	*cattle-raising*	*off- site jobs*	*off- site jobs*	*off- site jobs*
Share of outputs sold within settlement	*about half*	*little*	*little*	*little*	*little*	*little*	*little*
Share of outputs sold in next town	*about half*	*all/ almost all*	*none/ close to none*	*about half*	*about half*	*little*	*all/almost all*
Share of outputs sold in distant localities	*little*	*none/ close to none*	*little*	*about half*	*little*	*little*	*none/ close to none*
Share of outputs sold through a cooperative	*none/ close to none*	*none/ close to none*	*none/ close to none*	*all/ almost all*	*none/ close to none*	*none/ close to none*	*none/ close to none*
Share of outputs sold to major industries or shop chains	*little*	*little*	*none/ close to none*	*about half*	*none/ close to none*	*none/ close to none*	*little*
Road access to markets	*unpaved road*	*partially paved road*	*unpaved road*	*partially paved road*	*paved road*	*unpaved road*	*unpaved road*
Time to nearest marketplace	*up to one hour*	*less than ½ hour*	*over one hour*	*up to one hour*	*less than ½ hour*	*over one hour*	*less than ½ hour*
Carrying capacity	*truck*	*pick-up vehicle*	*pick-up vehicle*	*truck/ farm tractor*	*car/ draft animals*	*farm tractor*	*truck/ farm tractor*

Table 3: Cont'd

	Vila Castro Gomes	Vale do Barbosa	Fazenda Sao Geraldo	Novo Horizonte	Duas Barras	Amaralina
Main crops	*corn/ beans/ palm cactus*	*cassava/ corn/ palm cactus*	*coffee/ beans/ cassava/ fruits*	*beans/ cassava/ palm cactus*	*coffee/ cassava/ beans/ banana*	*cassava/ corn/ beans*
Other activities	*cattle-raising/ off- site jobs*	*cattle-raising/ off- site jobs*	*cattle-raising/ cassava processing*	*cattle-raising/ off-site jobs*	*flour milling/ livestock*	*flour milling/ off- site jobs*
Share of outputs sold within settlement	*about half*	*little*	*little*	*little*	*little*	*little*
Share of outputs sold in next town	*about half*	*little*	*about half*	*little*	*about half*	*none/ close to none*
Share of outputs sold in distant localities	*none/ close to none*	*none/ close to none*	*about half*	*none/ close to none*	*about half*	*none/ close to none*
Share of outputs sold through cooperatives	*none/ close to none*	*none/ close to none*	*all/ almost all*	*none/ close to none*	*all/ almost all*	*none/ close to none*
Share of outputs sold to major industries or shop chains	*little*	*little*	*none/ close to none*	*none/ close to none*	*all/ almost all*	*little*
Road access to markets	*partially paved road*	*unpaved road*	*partially paved road*	*unpaved road*	*paved road*	*unpaved road*
Time to nearest marketplace	*less than ½ hour*	*up to one hour*	*up to one hour*	*up to one hour*	*up to one hour*	*less than ½ hour*
Carrying capacity	*pick-up vehicle/ truck*	*pick-up vehicle/ draft animals*	*truck/ car/ bus*	*car/ draft animals*	*truck/ car/ bus*	*car/ motorcycle*

Source: 2008/2009 author's on-site fieldwork

5 The standard of living of PCT beneficiaries

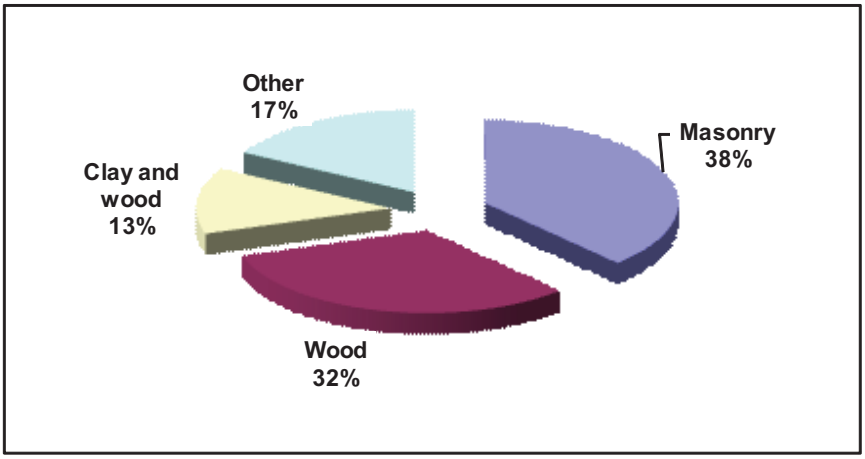
The Land Bill Programme sought to bring down rural poverty in the Northeast mainly by raising the incomes of nearly 15,000 disadvantaged families formerly without land or with insufficient land to secure a livelihood. Upon completion of the land purchase process and as a condition to become eligible to get post-purchase funds, PCT associations had to draw up small infrastructure subprojects within a broad range of civil services such as housing, electricity, water supply installation, schools and health posts, or repair services in secondary roads and bridges, as far as regarded indispensable for settlers' activities and wellbeing. However, as discussed in the precedent sections, limited access to natural resources and infrastructure, coupled with the virtual absence of productive investments were central factors contributing to slow socio-economic growth on PCT sites.

Our study of the selected sites revealed major deficiencies associated to inadequate infrastructure and inferior service provision. For instance, the survey captured information concerning the supply of water. Rainfall incident and water volume were amidst the significant determinants of rural outputs, according to our statistical analyses. Particularly for families settled in the semi-arid, agro-climatic conditions were not favourable to agriculture, as renewable resources were scanty and the areas were highly vulnerable to drought. Obtaining potable water was, consequently, a major challenge. The majority of families had no tap water in their dwellings and took water from water carriers (trucks) or a public well. Without doubt in the settlements located closest to the town there was water supply through house connections. Yet sometimes this water was only made available for a few hours during the day or just a couple of days per week. As a result the settled families were not able to permanently reach treated water, thus resorting to unreliable sources to fetch water. It should be stressed however, that only a minority of families in our sample of settlements received treated water on an uninterrupted basis and there was over the interviews an insistence that the government should improve the access to water for agriculture and residential consumption.

We also inquired settlers regarding the quality of sanitation facilities and waste disposal. Not all PCT beneficiaries had flush toilets facilities inside dwelling and many

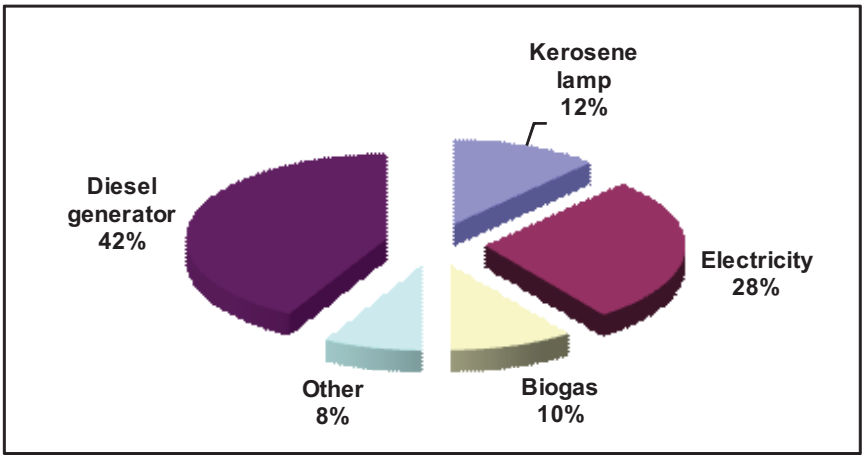
used pit latrines or outside toilets. In some sites there were communal refuse dumps, yet even in these few cases the existing rubbish removal service was of very low quality (rubbish was collected by local authority less than once a week). The quality of on-site health premises was equally unacceptable or completely inexistent. Graphs 1 to 3 give the proportions of additional basic services as well as household items that reflect the condition of the PCT families. It must be emphasised that the items presented in the Graphs are not exhaustive; some have been omitted because they were not indispensable to our evaluation of the sites.

Graph 1: Housing types



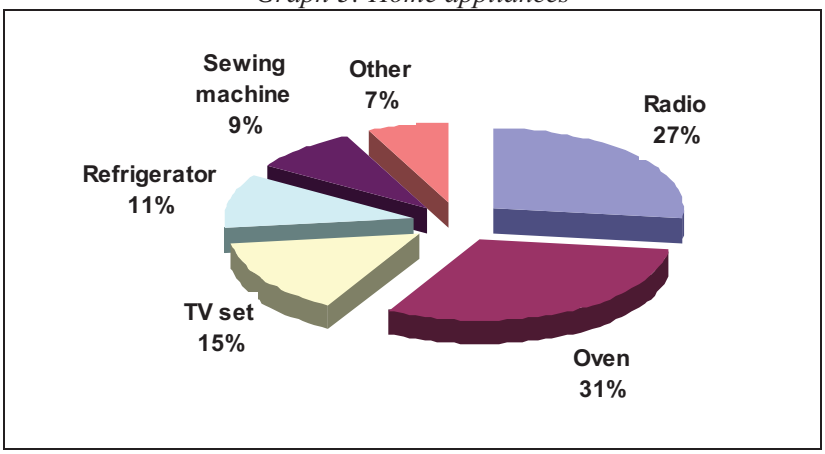
Source: 2008/2009 author's on-site fieldwork

Graph 2: Source of indoor illumination



Source: 2008/2009 author's on-site fieldwork

Graph 3: Home appliances



Source: 2008/2009 author's on-site fieldwork

As for access to schooling, becoming a PCT beneficiary did not seem to make a difference. Difficulties were observed involving sending kids to school not only in terms of distance and mode of transport (which were a challenge for the families indeed) but also the expenses incurred (school fees, uniforms, books and so forth). The result was that the level of education in our sample of PCT beneficiaries was strikingly low. Amidst the adults, the outright majority of respondents remained illiterate or semi-literate. The number of respondents who were completely illiterate was 110 out of 233, representing approximately 53% of the respondents. If we added households who could only read and write (14 respondents, which represents 7%) we would have a contingent of 124 respondents, representing 60% of the total. A less numerous group (21%) attended elementary school (1st to 4th grade). The third category of respondents was composed of those who attended either fundamental or high school (16%). Only one respondent had higher education.

From another viewpoint, family income was in our statistical analysis the main parameter for evaluating the well-being of land reform beneficiaries. One survey per sampled household was conducted to collect information on their financial situation (see Box 4), and we observed little variation in average household income for our population of 260 PCT beneficiaries.

Box 4: Settlers' income and economic situation

Main source of family income	*Frequency*	Own a motor vehicle?	*Frequency*
Farming	*41%*	*Yes*	*26%*
Other on-site activities	*7 %*	*No*	*74%*
Off-farm activities	*52 %*		
		Own a house?	
Income from on-site activities		*Yes*	*86%*
Enough	*39%*	*No*	*14%*
Not enough	*60%*		
		Status of income after PCT	
Income from welfare programmes		*Higher*	*22%*
Bolsa Família	*62%*	*Much higher*	*19%*
Bolsa Escola (Scholarship)	*2%*	*Same*	*55%*
Fome Zero (Zero Hunger)	*1%*	*Lower*	*4%*
Auxílio Gás (Gas voucher)	*1%*	*Much lower*	*0%*
None	*33%*		
		Will be able to pay off loans?	
		Yes	*22%*
		No	*78%*

Source: 2008/2009 author's on-site fieldwork

For the sites surveyed, the break-down of settlers' income was, however, very difficult to estimate since the families did not have a record specifying all sorts of income earned by the family members. In addition, an increasing number of household heads were engaging in more than one kind of activity. Some were working part-time on someone else's farm regularly, or were hired only for seasonal work, e.g. for harvesting in the end of the growing season. Others were subject to long hours of underpaid labour on the emergency fronts (a drought-relief programme that involves digging water reservoirs). Whilst working on their own allotment, settlers devoted more time and effort to agriculture production than livestock production. Even so they were not completely independent from off-site occupations.

Notwithstanding settlers were quick to attribute a small part of their income to crop production.[19] Conversely, almost half (43% to 52%) of the amount of families'

[19] A PNAD (National Households Survey) census launched nationwide in to 2000 showed that the main income source amidst land reform settlers changed to some extent from off-farm jobs toward agricultural

income was originated from work outside the settlement. The per capita monetary income ranged from US$60 per month in the driest sub-regions to US$130 in the potentially wealthier areas, like the Zona da Mata or the Sao Francisco basin. Even if their total earnings were considered (that is, self-employment profits plus salaries from farm and off-farm occupations), the amount per capita had a mean value below the national minimum wage (about US$175, as of December 2008). Net of loan payment, the total family income accruing from all these activities varied between 2.5 and 3 minimum wages, depending on the setting's location and number of paid family members.

One should also consider as substantial part of sitting families' income the foodstuff baskets they received from the government's welfare programmes, or aid consisting of a monthly monetary payment. These are cash transfer schemes created to promote the basic well-being of families in need, particularly individuals living in areas characterised by longstanding deprivation associated to high concentration of land (Soares et al., 2006). In many cases the provision of subsistence goods was combined with conditional government schemes, for instance, the *Bolsa Familia* (Family Voucher programme) for which eligible families had to fulfil a number of conditions including sending kids to school regularly, as well as taking medical examinations and vaccination. Families passing the criteria were given magnetic cards for cash withdrawal, with benefits of roughly US$80 a month. The concentration of welfare programmes in the Northeast follows the region's high poverty rate and lack of productive resources, especially because the region is susceptible to severe droughts. 67% of our surveyed families were identified as welfare programme beneficiaries.

When these factors are taken into consideration, it becomes easier to understand why almost 80% of the respondents faced difficulties meeting their loan repayment obligations. At the time they contracted the loans, the terms for repayment were 20 years with up to three years' grace at a yearly interest rate of 6%. Loan recipients living in harsh agro-climatic areas were granted a 50% reduction on that rate in case of anticipation of payment. The burden on beneficiaries' budget caused by loan obligations was believed to diminish over time since the expected farming outputs would be able to

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activities. The census covered other regions of the country, resulting that their sample was mostly composed of INCRA settlers.

raise the settlers' earnings relative to the constant flow of required repayments. In other words, it was taken for granted that the loans would secure the economic feasibility of the family farms. Our study indicates, however, that PCT settlers had little ability to generate income to simultaneously service loan liabilities and secure their livelihoods, let alone save cash for production enhancements.

Although the municipal governments were officially in charge of providing public education and health facilities on the settlements, they were focused on addressing the basic needs of their rural communities generally speaking, resulting that some of those services were only accessible by sitting households that happened to live in close proximity to urban centres. Some headmen told us they believed that the settlement was being deliberately neglected by authorities simply because land reform beneficiaries were seen as vulnerable minorities without a political voice in the area. One way or the other, insufficiency of public resources in terms of large-scale infrastructure benefiting land reform sites can in fact be seen as a major factor leading to low levels of production, falling together with low family income and less promising socio-economic prospects for sitting families.

6 A classification of PCT settings according to socio-economic criteria

We observed in the survey differences in terms of production, on-site infrastructure and accessibility to basic goods and services. Therefore, we could classify the settlements in three main groups, according to the aspects analysed in the previous sections. Although no defined patterns were observed in terms of agro-climatic conditions about all main agro-climatic zones in the Northeast were represented in each group, it is noted that the dynamism of production and standards of living improves as one moves from one group to the next.

- Group 1: Amaralina, Engenho Coepe, Engenho Cana Verde, Vale do Barbosa, Barra Bom Tempo, Novo Horizonte and Santo Amaro.
- Group 2: Vila Castro Gomes, Nossa Senhora de Fatima and Lagoa.

• Group 3: Duas Barras, Fazenda Sao Geraldo and Fazenda Dois Bracos.

Group 1

Settlers in the first group considered themselves to live below the poverty line. The type of housing they lived in as well as their condition of lacking basic house needs contributed to that view of themselves. Of the households surveyed, only 23% lived in houses of masonry whereas the majority of houses were made of wood or clay and wood. 29% had an oven and 54% still resorted to kerosene lamps for indoor illumination (see graphs below). Communication was possible in these sites through rural telephony networks, although a very limited number of fixed lines and mobile phones were actually in use. Moreover, settlers were complaining that the public telephone system was bad and internet access was not possible. The fact that settlers in this group lived through the worst conditions in the sample was irrespective of the location of the settlement with reference to an urban centre, since almost invariably transport systems in the sampled towns were generally modest, with a small number of buses operating in routes to the countryside area. That is, rural areas in all groups are served with low frequency by public transportation vehicles. Only in Amaralina and Engenho Cana Verde were households able to easily commute to nearby towns from their rural home to work. As a consequence, settlers in both sites uttered a preference for performing hired labour over working their own land, thus remaining strongly dependent on urban jobs.

In terms of production, these settlements performed very poorly as well. Many settlers complained that their land was infertile and not propitious to farming, except perhaps for grazing of livestock or for the cultivation of some tropical fruits. Extra spending on fencing and digging water wells was urgently required, as well making investments in irrigation for periods of inadequate rainfall. In average, less than one fourth of the purchased area could be irrigated, the worst cases being Vila Castro Gomes and Novo Horizonte. Doubtlessly the low capacity of these sites to irrigate raised serious limitations on the cultivation of corn and beans, and the greater part of the plots would be more appropriate for low profit dry-land production (e.g. palm cactus). Another factor was that the costs of transporting outputs to major markets were regarded extremely high,

due to large distances and the precarious state of conservation of roads linking the settlement with the marketplace.

A serious dilemma observed in this group was that being near to the subsistence level, settlers found it extremely difficult to make the necessary sacrifice in consumption in order to save and invest. Families focused on cheap forms of cropping immediately following receiving the PCT loans package, in order to secure profitability at minimal cost, particularly in the advent of droughts. This turned out to be one of the main reasons that agricultural cooperatives were not organised on the sites as would be expected according to the policy's design. In the beneficiaries' view, the establishment and management of cooperatives, and the associated pooling of resources within community production and marketing would have required technological innovations too expensive for them to afford in the first place. As a result, on-site production was dull and households tended to import all or nearly all their requirements from outside.

Group 2

An intermediary situation was observed on settlements in Group 2. A simplified production system was also seen in these settlements, which has traditionally been used in the Northeast: a combination of small scale livestock farming and substance crops. Additionally, shifting cultivation was quite common amidst families and the ground was at times left fallow. Since a few fertilizers and almost no machines were used, the system depleted the soil of important nutrients limiting in the long run the amount of production on the sites. Large areas with native grasses were observed on the plots. Technical advice regarding appropriate methods to remediate land degradation and soil problems was urgently needed. In some areas that had not gone through intensive use or where soils were not seriously eroded, however, cropping was expected to have higher yields (particularly corn and beans). Even so, some settlers were having troubles fighting pest outbreaks and disease threats to crops. Part of the settled households was engaged in off-farm activities, whereas livestock production was lagging behind. This included small concentrations of cattle, goats and chickens raised for home use or, in fewer cases, profit. However, limited attention was paid to the potential profitability of activities being carried out around the farmstead.

It was common sense among sitting families that having a good road leading to markets in adjoining municipalities would be a factor securing the settlement's economic self-sufficiency. Indeed, since the price of inputs did not vary significantly throughout the sample, it was the costs of transporting the outputs to different positions that made a big a difference. In PCT Lagoa, for instance, the fact that settlers were able to sell at least part of their outputs in the market was due to its proximity to Crateus. Trucks, tractors and other vehicles for communal use were necessary as well. Nonetheless, settlers regretted that the purchase of large-scale machinery to go about transforming, packaging, and commercialising their farm products (crop and livestock alike) would depend upon investments well above the money offered through the PCT scheme as well as on a sufficient number of small producers willing to cooperate. Individual means of farming were then preferred. As a result, the relatively small volume of family farm production was put in an adverse negotiating position with respect to major commercial farmers in the areas.

Some infrastructure items such as rural electrification with diesel generators were characteristic of this group. Masonry housing and some basic services were also available. Water sources at disposal of small producers were limited, but conformable to minor surface areas prepared to grow crops as well as for human and animal consumption. Quite a few piped networks were at place at the time of the fieldwork to assist in growing crops. However, their irrigation potential was generally restricted to small areas and settlers claimed to have ran out of money for further improvements on the infrastructure side. Agricultural production was thus backed by ordinary natural resource base and infrastructure, and the negative effects of this problem on the sites' latent sustainability should not be underestimated. Overall, production activities in this group combined to some extent subsistence crops with cash crops, yet the socio-economic performance of the sites wasn't up to the standard of group 3.

Group 3

A quite different situation was found in settlements of group 3. A range of basic services was regularly provided on the sites, including primary and secondary schools and even some nurseries. Many of the families we interviewed in this group stressed their

satisfaction with the level of school education for the kids. Likewise, some health posts and dentist clinics were also there serving the community so that sitting families had easy access to onsite health care services. Households lived in simple but functional houses of masonry construction meaning that they didn't have to move to a town to look for affordable housing. A few small shops for the communities were established selling foodstuff and basic household items. Insofar as they had all those services available, many of the settlers we spoke with perceived little trouble in not living close to an urban centre.

Now, which elements enabled PCT settlements of this third category to succeed despite the aforementioned circumstances? Firstly, sustainable agriculture was largely due to the fact that these sites were high-quality farmlands, since in the three cases plots were arable and propitious to grazing, and settlers devoted most of their land to profitable crops. The hillsides on the Atlantic Rainforest zone, for instance, are rich in natural springs and streams resulting that the soil on Fazenda Dois Bracos was fertile and flowing water abundant. Such conditions are deemed to be excellent in the Northeast for the cultivation of high yield crops, appearing mostly at the margins of rivers. It was in Duas Barras and Fazenda Sao Geraldo however, that small and medium scale coffee fields were found, along with more common crop species like the cassava, beans and, occasionally sugarcane. Despite that fact that these sites were located in drier zones, a number of streams of water were seen crossing the settlements in addition to farm dams to pool and retain groundwater coming down the hills. Protected springs, water towers and pumping wells also abounded in these areas, so that most of their plots presented high irrigation potential.

Secondly, physical access to group 3 sites was in reasonably good condition and settlers counted on better road infrastructure (paved or at least partially paved roads), so that a significant part of their crops were offered for sale in nearby towns or other more distant locations. The proximity to interstate highways connecting a variety of cities and towns also played a role making the transportation of horticultural products less time consuming and expensive. Settlers on PCT Duas Barras, for instance, had easy access to at least three major roads (Br-116, BR-367 and MG-342) leading to important markets in the Jequitinhonha Valley and beyond. By the same token, shorter distances to major

consumer markets implied in higher agriculture profits, and vice versa. PCT Fazenda Dois Bracos provides a good example. The settlement was situated within reasonable proximity to Caruaru, the largest interior town of Pernambuco. Almost the entire production of corn on Fazenda Dois Bracos was usually destined to buyers in Caruaru's huge open fairs and vegetable markets. Similarly, there was on Fazenda Sao Geraldo a good concentration of settlers producing cash crops that were sold in various different locations at competitive prices (not just coffee but also a series of other vegetable crops). In brief, transportation costs were lowest in this group.

Thirdly, and as a consequence of the previous two factors, crops were grown and harvested not only for the purpose of feeding their family but also to making profit. Farm surpluses were thus more easily generated in this group that empowered beneficiaries to invest in their plots, such as by creating cooperatives or developing more advanced agricultural techniques to minimise the risk of crop failure.[20] In addition, pieces of farm infrastructure were installed around the farmstead as well as a range of basic services facilities that had a positive impact on settlers' welfare in this group. In summary, the above-average socio-economic performance in these sites was a product of 1) the quality of the purchased land, 2) the accessibility of settlers to the marketplace, and 3) the presence of adequate infrastructure. The following table compares the quality of infrastructure across the areas under scrutiny.

[20] In Duas Barras, for instance, settlers adopted a crop sequencing method, i.e. growing a series of different types of subsistence crops and crops grown for profit in the same area in subsequent seasons to prevent pest build-up, a problem that usually occurs when one crop type is continuously cultivated, and also to reduce the need to use expensive fertilisers to promote plant and fruit growth.

Table 4: On-site infrastructure in selected PCT settlements

	Barra Bom Tempo	Lagoa	Santo Amaro	Fazenda Dois Braços	Engenho Cana Verde	Engenho Coepe	Nossa Sra de Fátima
Physical access	*average*	*good*	*bad*	*bad*	*average*	*bad*	*good*
Health facilities	*lacking*	*lacking*	*lacking*	*lacking*	*lacking*	*lacking*	*lacking*
Leisure facilities/activities	*lacking*	*lacking*	*lacking*	*lacking*	*lacking*	*lacking*	*lacking*
Housing	*average*	*average*	*bad*	*average*	*average*	*average*	*average*
Water supply/irrigation	*bad*	*good*	*bad*	*good*	*good*	*average*	*bad*
Sewage	*lacking*	*bad*	*lacking*	*lacking*	*lacking*	*lacking*	*lacking*
Rubbish collection	*lacking*	*bad*	*lacking*	*lacking*	*lacking*	*lacking*	*lacking*
Telephone/ internet	*lacking*	*bad*	*lacking*	*bad*	*bad*	*lacking*	*lacking*
Electricity	*bad*	*average*	*bad*	*good*	*average*	*average*	*average*
Public transportation	*bad*	*average*	*bad*	*average*	*average*	*lacking*	*average*
On-site school	*none*	*primary*	*none*	*none*	*none*	*primary*	*none*
On-site vegetable markets	*yes*	*yes*	*no*	*yes*	*none*	*none*	*none*
Shops for basic goods	*nearby towns*	*nearby towns*	*distant towns*	*nearby towns*	*nearby towns*	*distant towns*	*nearby towns*

Table 4: Cont'd

	Vila Castro Gomes	*Vale do Barbosa*	*Fazenda Sao Geraldo*	*Novo Horizonte*	*Duas Barras*	*Amaralina*
Physical access	*bad*	*average*	*average*	*bad*	*average*	*good*
Health facilities	*lacking*	*lacking*	*bad*	*bad*	*good*	*lacking*
Leisure facilities/activities	*lacking*	*lacking*	*lacking*	*lacking*	*average*	*lacking*
Housing	*average*	*bad*	*good*	*good*	*good*	*average*
Water supply/irrigation	*average*	*average*	*good*	*bad*	*good*	*average*
Sewage	*lacking*	*lacking*	*average*	*lacking*	*average*	*lacking*
Rubbish collection	*lacking*	*lacking*	*lacking*	*lacking*	*lacking*	*bad*
Telephone/ internet	*lacking*	*bad*	*average*	*average*	*good*	*average*
Electricity	*average*	*bad*	*good*	*average*	*good*	*lacking*
Public transportation	*bad*	*bad*	*lacking*	*bad*	*average*	*good*
On-site schools	*primary*	*none*	*primary/ secondary*	*none*	*primary/ secondary*	*none*
On-site vegetable markets	*none*	*none*	*none*	*yes*	*yes*	*none*
Shops for basic goods	*on-site, nearby towns*	*nearby towns*	*on-site, nearby towns*	*nearby towns*	*on-site, nearby towns*	*nearby towns*

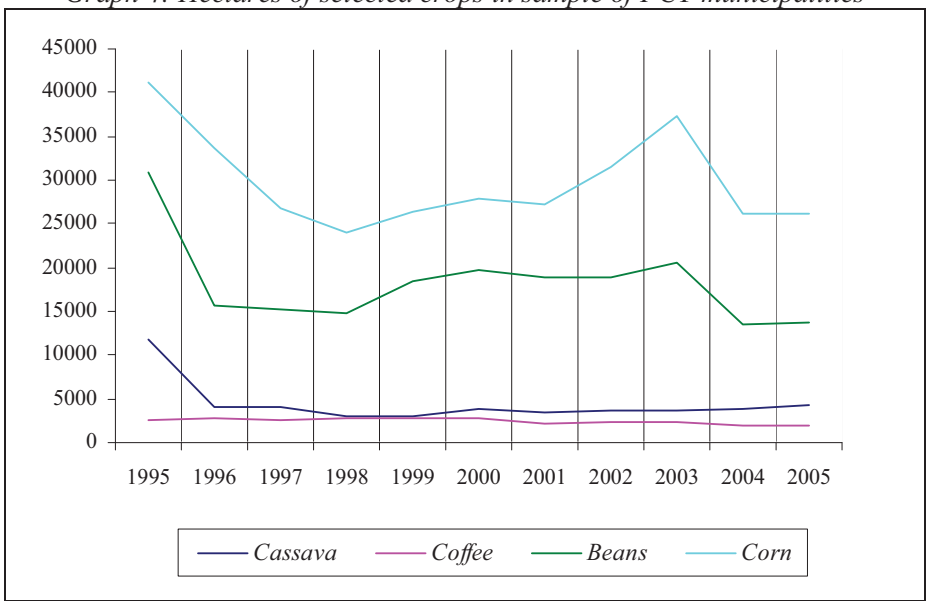
Source: 2008/2009 author's on-site fieldwork

7 The surveyed sites vis-à-vis the regional economy

As discussed in detail, despite the use of mixed farming in the Northeast countryside featuring livestock and agriculture, the emphasis within PCT settings is laid on crop planting. Graphs 4 and 5 show the extension of crop production in our surveyed area over an 11-year span, being 2000 a probable year when the local economy would start experiencing the effects of agricultural activity on their PCT sites (the majority of settlements in our sample were created between 1998 and 1999). A fall is observed in most indicators for the PCT municipalities which somewhat coincides with years of severe droughts in the region beginning in 1997 and continuing until approximately 2001. The aspect of the curves in Graph 5 suggests a similar pattern for the rest of the Northeast. The downward slopes are more pronounced in beans and corn although a recovery always follows except for the cassava. In spite of the fact that cassava is the main agricultural product within PCT settlements, the unchanged pattern of its curve after 1997 gives little indication of the sites' contribution to the growth of the local rural economy. Still, the curves in the Graphs are compatible with the status of cassava cropping as a subsistence activity amongst settlers, as the total area devoted to it is in average no more than one third of that for the other crop types suitable for the family farm system.

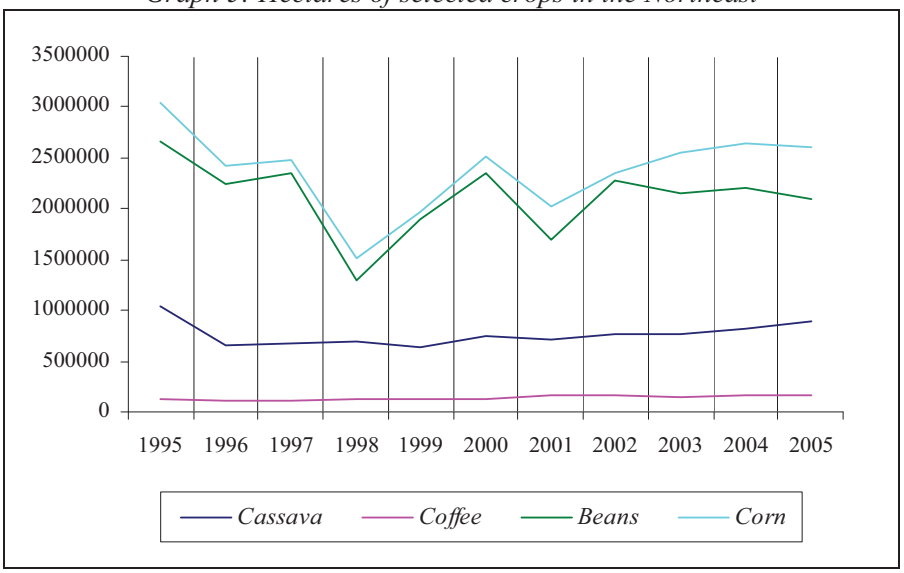
The continuous line in both graphs for coffee is indicative of the higher sustainability of this crop type in the rural economy. The cropping of coffee for commercialisation is a typical big farm activity in the Northeast given the technologically advanced methods (and higher long-term investments) required to carry it out, so that small producers are in general devoted to cultivating other crops. Consequently, coffee fields comprise a smaller share of the total area including in the Northeast aggregates. In addition, the areas devoted to coffee in the selected PCT municipalities are for the most part a result of agricultural activity in major landowner farms. Corn cropping, on the other hand, is a common activity amongst the myriad of small producers in the region, with total outputs exceeding all other crop categories.

Graph 4: Hectares of selected crops in sample of PCT municipalities



Source: IPEADATA

Graph 5: Hectares of selected crops in the Northeast



Source: IPEADATA

Undoubtedly, farm production in hosting municipalities did not improve considerably in the years following the adoption of the Programme, and in all relevant aspects they performed worse in average than the rest of the Northeast. These results by and large fit findings from the literature covering market-based land reform in other developing countries. For instance, Fajardo (2002) found that increments in agricultural output were minimal and the pace of rural development was slow after large-scale subsidised transactions of land in Colombia. In Guatemala, land-attached investments were not sufficient to overcome the absence of strong markets in nearby areas capable of absorbing settlement crop production, as demonstrated by Gould (2006). In the Philippines where the first free-market kind of land reform was implemented in 1988, the agricultural sector performed far below expectations in targeted areas because the most economically productive land remained in the hands of powerful landlords (Borras, 2003). In these countries, as in Brazil, the reforms have not evoked productive investments benefiting the redistributed areas through strategies such as designing and placing infrastructure or other pro-growth activities in the agricultural sector.

Figure 2 ahead compares selected socio-economic indicators considering two different moments in time: 2000, which allows a 3-year period for on-site investments to have any measurable effects on the rural economy, and 2005, with the eventual consolidation of those effects. At the level of the municipalities, not only was farming GDP growth sluggish, but it was even 2 percent lower in 2005 in current prices as compared to 2002. This corroborates with the perception that subsistence farming has no significant correlation with large-scale farm production growth. Total GDP was lower in 2005 as well (down 4 percent), although an increase has been observed in all GDP measures for the Northeast as a whole. The tertiary sector on the other hand, is stronger both in the local and regional economy, with the 2005 GDP from services reaching $50 million and beyond in Brazilian currency, the real, as compared to the GDP from the farming segment ($10-12 million). However, this could hardly be attributed to the economic activities in PCT sites, since the bulk of service businesses in our sample are concentrated in urban centres.

Conversely, subsistence agriculture was predominant in the sampled sites on account of this being a strong aspect of the areas in which PCT families were settled. In fact, production on PCT sites is representative of a traditional mode of production in the Northeast according to which farming decisions are made based on having enough food for the kids rather than market prices. This was almost invariably reflected on the situation of the rural communities, insomuch as that these people rely on agriculture for a living. In any case, a higher GDP from the farming sector, relative to the municipalities or the region as a whole, would hide the enormous inequality of income between small producers and big commercial farmers. As a result, its use to measure progress in increasing the standard of living on the sites should be looked at with caution.

Availability of funds through the Land Bill Programme was expected to significantly enhance beneficiaries' income through family farm production, irrespective of the government further spending public resources on the sites. In theory (e.g. Le and Suruga, 2005), the allocation of public resources within the private sector can have strong linkages with the growth of economic outputs. For instance, public spending in roads serving land reform sites would be expected to favour the transport of outputs between settlements and adjacent urban centres. According to our statistical tests, farm production growth was also strongly associated with suitable transportation systems. Availability and good state of conservation of primary and secondary roads in some of the visited sites were an important factor influencing income growth in the short term by allowing settlers to promptly send their produces to the markets. Nevertheless, the 2005 figures demonstrate a fall in the proportion of local roads spending (construction and repair works). In fact, as seen from Table 2, many of the roads and highways serving the hosting towns were in precarious conditions. On the other hand, the majority of PCT sites were separated by remarkable distance from important consumer markets. As a result, the difficulties involving the interchange of goods and services between the sites and nearby towns were not easy to overcome. Similarly, energy spending (mostly electricity supply) suffered a significant decrease in the municipalities of our sample, in sharp contrast with the rest of the Northeast. This was also an impediment to the development of the sites, since, as seen in Graph

2, less then 30% of the settled families could rely on electricity for indoor illumination and production.

In line with the theory, the 2005 increase in government spending in the Northeast has apparently influenced the GDP growth positively, probably by creating benefits for the productive sectors of the regional economy. To the extent that this is true, the farming sector in the region does not seem to have benefited from the rise in public expenditures, in terms of a higher demand or increased consumption of rural outputs. By the same token, the 2005 local level decrease in farming spending should have exacerbated the negative effects on the GDP of the harsh conditions faced by farmers in our sample, which does not seem to have happened. In spite of the fact that rural outputs were higher in some sites as compared to others including production in family farms and small rural producers, this was more a result of higher agricultural productivity due to better soil attributes, in conjunction with better infrastructure and closer proximity to marketplaces. Consequently, the monthly per capita income that includes sources of income other than rural wage labour also varied a lot across our study area. Yet at least one thing is for certain, changes in the level of public investments in the farming sector were not sufficiently big to cause any perceptible changes in the growth of rural outputs in our sampled municipalities.

On the other hand, as predicted by the statistical results, the effects of PRONAF financial support were not easily perceived by means of an increase in cultivation. In fact, combining investments in agriculture with supplying fundamental services and facilities for the community was outside the possibilities of settlers in our sample. Consequently, PRONAF post-purchase funds were not enough to increase family farm productivity – probably the most serious disadvantage PCT beneficiaries faced in the agricultural business. In quite few cases rural cooperatives were organised with the support of PRONAF credit line and an improvement was effectively seen in their production and commercialisation capacity especially through mechanisation and organisation of joint farming activities. This is clearly in line with what we discussed in the precedent sections, in the sense that a lack of on-site investments was a central factor contributing to the low standards of living observed in the visited settings.

It is worth recalling that earlier quantitative findings in the literature (Buainain et al, 2000; Heredia et al, 2002; etc) have indicated that the level of outputs in land reform settings is influenced by elements such as soil fertility, rainfall incidence and water supply. Those results are confirmed in our sample of settlements in the sense that water resources like rivers, streams and lakes, including irrigation potential had a big influence on crop production. There could also have been an association between those factors and the intensity of poverty, insofar as those resources generated benefits in the form of higher agricultural yields and as a consequence higher income for the impoverished families. In other words, the availability of natural resources could be admitted as a rough proxy of the economic feasibility of the sites. For instance, prosperous land reform sites located in the Mata Sul sub-region were privileged sites in terms of natural resources, giving settlers the opportunity to produce sugarcane. Conversely, prolonged shortages of rainfall imposed a severe constraint in the semi-arid zone. In fact, many families we interviewed in the semi-arid claimed that on-site production would quite often be harmed by the loss of harvest, since the occurrence of long periods of droughts inhibited the cultivation of permanent crops. As a consequence, a common activity found in settlements located in the dryer areas was the cultivation of palm cactus plants – an animal feed plant adapted to dry environments. This activity was regarded as a low-profit activity and consequently not sufficient for settlers to derive their livelihoods from. However, low productivity was also observed in sites located in more favourable areas, such as Engenho Coepe and Novo Horizonte, which indicates a confluence of factors other than agro-climatic conditions only.

Figure 2 compares changes over time in social and economic indicators as well. Our sampled PCT municipalities are amidst the poorest municipalities in the Northeast. Labour income is low and nearly 60% of their population is believed to live below the country's official poverty line. For a comparison, the poverty rate in Belo Horizonte, the Minas Gerais state capital, is 5.4%. Also, the cities are ranked very low on the municipal Human Development Index (.50 in average).[21] In terms of educational facilities, most of these cities count on primary schools, secondary schools and preschools. The gross students' enrolment rate is 0.75 in average and the

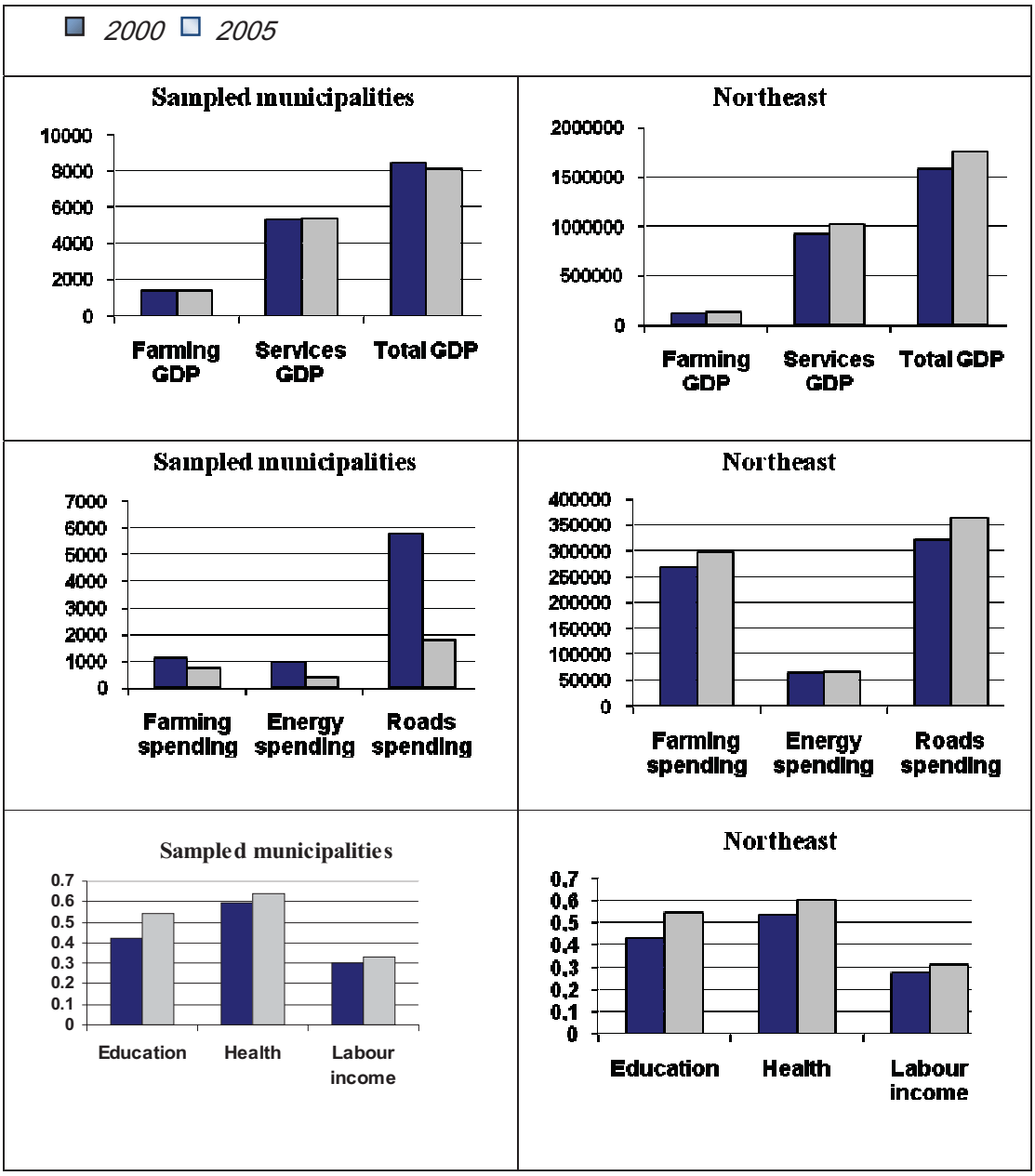
[21] Here we consider the average for the three main components of the index, namely education, health and income.

literacy rate for the adult population (older than 15 years of age) is low: 65 %. The education component of the Index (HDI-education) increased even by a higher rate in our sample than the whole Northeast between 2000 and 2005. As for the HDI-health, the index is also higher in these towns due to the presence of health clinics and public as well as private hospitals (life expectancy is 67 years, according to the Ministry of Health SUS system), which gives a reasonable proportion of physicians and nurses per 1,000 people. On the other hand, sewerage systems were only observed in some parts of the urban areas.

Since the situation of the visited settlements varied considerably as relative to access to infrastructure and basic goods and services, there is no pattern whatsoever by means of which one could determine whether the standard of living amongst the PCT population had an impact in the overall indicators of their municipalities. Yet the quality of life of PCT beneficiaries serves as the basis for the analysis of how the Programme contributed to the socio-economic development in the case study area. Also, the pattern of the analysed expenditures in the selected sites is representative of the universe of PCT sites for 2000 and 2005 and their socio-economic performance is in line with econometric analyses. For instance, our comparison between different sites largely confirms the results that the rate of income rise significantly correlates with rural GDP and increases in the Human Development Index. Likewise, evidence is provided that the level of production is positively and strongly correlated with proximity to major markets and rural GDP. Also as predicted by the statistics, the introduction of the Land Bill Programme did not induce significant increases in the area devoted to the cultivation of crops, nor did it contribute to the growth of the regional economy.

Overall, the results observed in the Brazilian Northeast are somewhat similar to those following the land restitution and redistribution programmes in Africa in the 80s and 90s, in the sense that a decrease in poverty was restricted to settlements where good quality land was obtained (Hoogeveen and Kinsey, 2001. Finally, although higher crop revenues were noticed in PCT sites where the conditions were met as previously outlined for group 3, the predicted benefits of the Programme could not be ascertained from a regional perspective.

Figure 2: PCT municipalities and Northeast selected indicators



Source: IPEADATA

8 Closing remarks

For most of the rural communities in the Brazilian Northeast, land is the foremost means for securing a livelihood, as owning a plot of land makes households less dependant upon wage labour, thereby reducing their susceptibility to unemployment. Moreover rural poverty and inequality in the distribution of arable land are closely linked in the region. In view of these facts, past land reforms in the Northeast were often intended for combating poverty by redistributing land through land expropriation irrespective of the economic viability of the sites. As opposed to these traditional state-led schemes, the PCT market-based approach to land reform made an attempt to address those twin issues by stimulating land transactions through the provision of land loans. Notwithstanding the schemes suffered from infrastructure flaws and a lack of planning at the local and regional scales, resulting that the level of production was regarded marginal and did not impact positively settlers' welfare in the majority of sites.

In general, the data from our sample was consistent with findings from the land reform literature in Brazil. The combination of on-site information and survey data showed the predominance of subsistence agriculture in the majority of sites, as an indication that the quality of life did not improve significantly for loans recipients. Also, settlers on most sites had to commit a substantial part of their income on subsistence items, in many cases putting pressure on local/state government to provide foodstuff baskets or other basic living supplies. A very small proportion of their income was thus destined to improving production. As a matter of fact, the unfavourable situation within those places was a function of a variety of complex factors, and the level of productive investments was just one of them. A shortage of natural resources was apparently imposing restrictions on agricultural production, and this fact was a major bottleneck to the socio-economic upgrade of the sitting families as well. This was the case of settlements in group 1 and, to a lesser extent, group 2. On the other hand, production in settlements of group 3 was able to generate surpluses that were relevant to support households' decisions to stay and further invest in the land. The viability of these projects relied to a large extent on the combination of two main factors: the presence of natural resources and/or adequate infrastructure to overcome unfavourable agro-climatic circumstances and higher accessibility to the

marketplace. Consequently, loan beneficiaries in this group had more incentives or the financial capacity to invest and organise collectively to drive production towards commercialisation.

It became manifest in our study that the loans-based scheme, by itself, was not a sustainable solution to the issue of rural deprivation amongst the landless population in the majority of the sites, for at least four main reasons: 1) the amount of loans at the beneficiaries' disposal was not sufficient to consolidate viable agriculture enterprises based on the family-farm system across the most deprived areas of the region; 2) in average, the income of settled families turned out below the minimum necessary to perform pro-growth investments on their land; 3) this was particularly true for settlers in areas requiring substantial investment to face insufficient natural resources and inadequate infrastructure; and, perhaps more significantly, 4) the implementation of the Programme lacked coordinated strategies to attract good land and, ultimately, promote the growth of the regional economy. As a result, the INCRA records did not point toward a lower incidence of land invasions in these areas than in other areas of the Northeast during the PCT period, suggesting that the Programme did not manage to inhibit the ideological dimension of land reform in the region. Clearly, more effective solutions were needed.

The aforesaid elements made incurring loan obligations barely rewarding for the striking majority of families, resulting in negative implications on the extent to which the Land Bill Programme served its poverty alleviation intents. An aspect of uttermost relevance for the assessment of the Programme is thus that the level of profits plus consumption of own produced goods were not sufficient to lift the families out of poverty, even in the settlements of group 3. Yet as mentioned before, this condition of poverty is not exclusive to the PCT population but a characteristic featured in the sub-regions of Programme implementation. As a natural consequence of the scarcity of natural resources in the semi-arid, the majority of PCT projects turned out implemented in rainforest or transitional zones, and the Land Bill Programme didn't manage to establish a more homogenous spatial distribution of settlements benefiting all Northeast. Altogether, socio-economic differences between PCT sites across agro-climatic zones were not clear cut. Such a confluence of PCT populations in poorly serviced exurban areas – a geographical distribution pattern resulting to a large extent from the SAT ceiling limiting the price of

purchased lands – gave rise to an urgent need for roads, health facilities and all sorts infrastructure under the responsibility of the state.

However, since the policy did not establish spending responsibilities for local governments, a series of coordination inefficiencies between state land agencies and the municipalities deprived the settlers of an integrated network of support services. We saw in our review of the literature that the European experience sets a good example in that sense (e.g., the Netherlands: Van Lier, 1998, Aarst *et al.*, 2007; Scotland: Bryden and Hart, 2000; Slovakia: Smith, 2006), by presenting land-use planning as a strategic governance tool for the creation of effective collaborative networks intent on obtaining sustainable rural systems. Decentralisation to combat poverty has also been emphasised in some developing countries, such as in Uganda, with their Plan for Modernisation of Agriculture. Bahiigwa *et al* (2005), however, agreed that better socio-economic outcomes would have achieved if the reform had been handled in conjunction with other public sector reforms to ensure that existing priorities, such as health services or education, reached all settled households. This is clearly the case in Northeast Brazil too, where the Programme was introduced at odds with reforms of the health and education systems.

Albeit it might have been the settlers' intent to exploit their allotment according to the highest possible profit, due to limitation of financing as well as the low quality of the natural endowments plus the absence of adequate infrastructure that determined the stagnant economy the sites. Therefore, direct federal/local action to tackle those problems would have played a decisive part in conducing the settlements to higher ratios of output. The literature clearly emphasises that local government efforts are quintessential to supplement central level rural development strategies (Douglas, 2005). Smith (2006) corroborates with this idea and adds that for strategic planning to become an effective tool where bottom-up approaches predominate, there must be a will to reconcile local and national interests. In our study, however, a fall was noticed in local-level farming expenditures, which is indicative that the hosting municipalities may not have pursued the same policy priorities as the federal government's. Since policy coordination and monitoring systems were missing, the Programme did little to "facilitate initiatives from below" (Dale, 2000).

Still taking the surveyed literature as a baseline for appraising the scheme's potential to mitigating rural poverty, a number of deficiencies might be identified involving the implementation of the policy. For instance, a lack of specialised knowledge to assist poor land-buyers over the negotiation with landlords (Viratkapan *et al.*, 2004); better organisational interfaces were needed between land reform agencies and PCT associations (Parnell, 2004); there was a virtual absence of non-farm productive opportunities to supplement settlers' earnings from farming (Deininger *et al.*, 2007); no socially inclusive networks of production and consumption were made available to stimulate the commercialisation of settlement output (Haggblade *et al.,* 1989); the policy was detached from other poverty-reducing programmes such as the construction of affordable housing (Portnov, 2002); an institutional capacity wasn't created to conciliate the need for natural resources on the settings with the goal of sustainable growth (Alston *et al.*, 2000; Barrett *et al.*, 2005); and so forth.

A justification might be there already for a degree of state intervention combining public policy and private sector efforts to attract higher pro-growth investments to the mentioned sites. If that is the case, the optimal structure of incentives need be identified (and implemented) to the benefit of all stakeholders, namely landowners and the landless, as well as strategic players both in the public and private sectors. Consideration must thus be given to the role of regional planning in the policy-making process, bearing in mind the benefits (and possibly costs) of the policy not only to individual settlements, but also to the whole economy of the region. The need has thus been identified of a suited space for planned conjunct actions to map out the actual situation and specify the goals and means required for achieving rural development. Possible courses of action under the perspective of regional planning should be explored further.

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Annex A-1

LAND BILL PROGRAMME - QUESTIONNAIRE 1

Target population: PCT settled families

Site details

PCT association:
Location/municipality:
State:

Interviewee's details (optional)

Name in full:
Gender:
Main occupation:
Contact details:
Signature:

Interview details

Date:
Starting time:
Finishing time:

1. Your former local of residence
( ) Same land
( ) Nearby farm
( ) Same locality/town
( ) Nearby locality/town
( ) Locality off by more than 100km
( ) A different state

2. Your past occupations
( ) Urban wage labour
( ) Rural wage labour
( ) Temporary urban labour
( ) Temporary rural labour
( ) Domestic duties (servant/ maid)
( ) Small farmer (agriculture/ cattle-raising)
( ) Small business owner
( ) Student
( ) Unemployed
( ) Other: _____

3. Your current occupation
( ) Urban wage labour
( ) Rural wage labour
( ) Temporary urban labour
( ) Temporary rural labour
( ) Domestic duties (servant/ maid)
( ) Small farmer (agriculture/ cattle-raising)
( ) Small business owner
( ) Student
( ) Unemployed
( ) Other: _____

4. Your schooling level
( ) Illiterate (unable to read but unable to write)
( ) Semiliterate (able to read but unable to write)
( ) Attended elementary school
( ) Attended fundamental school
( ) Attended high school
( ) Attended technical school
( ) Attended university

5. Have you been the beneficiary of a land reform programme before?
( ) Yes ( ) No

6. Have you lived/ worked on a settlement before?
( ) No
( ) Yes. Where?_____

7. If you answered "yes" to the previous question, please tell us why you left that settlement
( ) Bad location (far from town, bad roads, etc.)
( ) Land was not good for agriculture (little water, bad soil, etc.)
( ) Defaulted on loan payments
( ) Other: _____

8. Are you a social movement activist (MST, CONTAG, other)?
( ) Yes ( ) No

9. Have you participated in the selection/purchase of the property?
( ) Yes, I talked with the landowner
( ) No, the association did the job
( ) I just occupied/ invaded the land
( ) Other: _____

10. What's your status regarding the property?
( ) I have the definitive title
( ) I have a provisional title
( ) I don't have any title
( ) Don't know

11. Your own assessment of plot's size
( ) Large/ enough ( ) Medium/ just fair ( ) Shot/ not enough

12. Your own assessment of plot's price
( ) Fair ( ) Expensive ( ) Cheap ( ) Don't know

13. Your own assessment of plot's location (close to town, etc)
( ) Good ( ) Average ( ) Bad

14. Do you think your plot is suitable for agriculture?
( ) Yes ( ) No. Why? _____

15. Your own assessment of plot's overall quality
( ) Good ( ) Average ( ) Bad

16. Any past experiences in farming?
( ) Yes ( ) No

17. Have you received any kind of technical support?
( ) Yes ( ) No

18. Do you have your own farm machinery?
( ) Tractor
( ) Draft animals
( ) Irrigation equipments
( ) Other: _____
( ) No, but I borrow them from someone else
( ) No, I don't need them

19. Are you a PRONAF beneficiary?
( ) Yes ( ) No

20. Your own assessment of roads to the settlement
( ) Good ( ) Average ( ) Bad

21. Your own assessment of public transportation to the settlement
( ) Good ( ) Average ( ) Bad ( ) Lacking

22. Your own assessment of schools the settlement
( ) Good ( ) Average ( ) Bad ( ) Lacking

23. Do your kids attend school?
( ) No ( ) Yes. How many of them?: _____

24. If you answered "no" to the previous question, why?
( ) Kids are too young for school
( ) There is no school on the site/ school is too far away
( ) I don't want to send them to school
( ) They don't want to attend school

25. Do you have your own means of transportation (car, bike, etc.)?
( ) Yes ( ) No

26. Do you own a house?
( ) Yes ( ) No

27. Type of housing
( ) Masonry
( ) Wood
( ) Clay and wood
( ) Other: _____

28. Source of indoor illumination
( ) Electricity
( ) Biogas
( ) Diesel generator
( ) Other: _____

29. Appliances in your home
( ) TV set
( ) Refrigerator
( ) Radio
( ) Oven
( ) Other: _____

30. Your own assessment of health services on the settlement
( ) Good ( ) Average ( ) Bad ( ) Lacking

31. Your own assessment of leisure activities on the settlement
( ) Good ( ) Average ( ) Bad ( ) Lacking

32. Overall, how is your life quality since you joined the PCT?
( ) Better
( ) Much Better
( ) Quite the same
( ) Worse
( ) Much worse

33. Main reason to take trips to town
( ) Work
( ) Study
( ) Sale crops in the market
( ) Shopping
( ) Leisure
( ) Other: _____

34. Main source of family income
( ) On-site farming activities
( ) Other activities on the site
( ) Off-site farming activities
( ) Urban jobs
( ) Other: _____

35. Is your income from work in the settlement enough for the family's subsistence?
( ) Yes ( ) No

36. Are you the beneficiary of a cash transfer programme?
( ) Bolsa Família (Family voucher)
( ) Bolsa Escola (Scholarship programme)
( ) Fome Zero ("Zero Hunger" programme)
( ) Auxílio Gás (Gas voucher)
( ) Other: _____
( ) None

37. How is your income since you joined the PCT?
( ) Higher
( ) Much higher
( ) Quite the same
( ) Lower
( ) Much lower

38. Are you going to be able to payoff the loans?
( ) Yes ( ) No

39. What do you think of the Land Bill Programme?
( ) Good ( ) Very good ( ) Bad ( ) Indifferent

40. Are you making plans to leave the settlement?
( ) No
( ) Yes. Reasons: _____
_____

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Annex A-2

LAND BILL PROGRAMME - QUESTIONNAIRE 2

Target population: PCT association leaders

Site details

PCT association:
Location/municipality:
State:

Interviewee's details (optional)

Name in full:
Main occupation:
Position in the association:
Contact details:
Signature:

Interview details

Date:
Starting time:
Finishing time:

1. Settlement total area: _____

2. Number of plots: _____

3. Number of settled families: _____

4. Physical access to site
( ) Paved road ( ) Unpaved road ( ) Partially paved road

5. Your own assessment of water supply
( ) Enough ( ) Not enough ( ) Lacking

6. Your own assessment of sewage
( ) Enough ( ) Not enough ( ) Lacking

7. Your own assessment of public illumination
( ) Enough ( ) Not enough ( ) Lacking

8. Your own assessment of rubbish collection
( ) Enough ( ) Not enough ( ) Lacking

9. Your own assessment of telephone service
( ) Enough ( ) Not enough ( ) Lacking

10. Your own assessment of internet access
( ) Enough ( ) Not enough ( ) Lacking

11. Your own assessment of public transportation / school bus
( ) Enough ( ) Not enough ( ) Lacking

12. Your own assessment of on-site schools
( ) Enough ( ) Not enough ( ) Lacking

13. Your own assessment of health facilities
( ) Enough ( ) Not enough ( ) Lacking

14. Your own assessment of on-site shops
( ) Enough ( ) Not enough ( ) Lacking

15. Are there on-site vegetable/fruits markets?
( ) No
( ) Yes. Please give details (how often, etc):
_____
_____

16. Where families usually purchase basic goods and services
( ) From on-site shops
( ) Nearby towns
( ) Distant towns

17. Technical support from government agencies
( ) Enough ( ) Not enough ( ) Lacking

18. Main agricultural products on the site (ranked by order of importance):
a) _____
b) _____
c) _____

19. Other farming activities (livestock, fish farming, etc):
a) _____
b) _____
c) _____

20. For-profit non-farm activities on the site
( ) None
( ) Yes. Please give details (souvenir shops, ecotourism, etc):
_____
_____

21. Are on-site productive activities sufficient for the families' subsistence?
( ) Yes ( ) Only partially ( ) No

22. Share of production sold within settlement
( ) All/ almost all ( ) About half ( ) Little ( ) None/ close to none

23. Share of production sold in nearby towns
( ) All/ almost all ( ) About half ( ) Little ( ) None/ close to none

24. Share of production sold in distant towns
( ) All/ almost all ( ) About half ( ) Little ( ) None/ close to none

25. Share of production sold through a cooperative
( ) All/ almost all ( ) About half ( ) Little ( ) None/ close to none

26. Share of production sold to major businesses
( ) All/ almost all ( ) About half ( ) Little ( ) None/ close to none

27. Share of production sold to major shop chains
( ) All/ almost all ( ) About half ( ) Little ( ) None/ close to none

28. Means to transport crops:
a) _____
b) _____
c) _____

29. Importance of loans (SIC/SAT package, PRONAF, etc.) to improve the settlers' livelihoods:
( ) Very important ( ) Important ( ) Not important ( ) Don't know

30. Please describe any other improvements/difficulties in the lives of the families in the settlement.

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