

## **Microfinance and Climate Change: The Case of Agroamigo**

**Autoria:** Rafael Moser, Lauro Emilio Gonzalez Farias

This paper reports an empirical case study of the interface between a Brazilian microfinance institution and climate change strategies. Climate change which until recently seemed a luxury for the microfinance sector, now appears to be crucial for its future. In fact, for their low adaptive capacity, the millions of microfinance clients worldwide happen to be the most vulnerable to a changing climate. However, such an arena is still blurred from an academic viewpoint, and inexistent among Brazilian scholarship. Therefore, applying a case study on Brazil's largest rural microfinance programme, namely Agroamigo, the article aims to provide an empirical contribution to green microfinance.

## 1. INTRODUCTION

Over the last few decades, a great deal has been written about the importance of microfinance (MF) in promoting financial access to the world's poor as well as effective tools in supporting the attainment of the Millennium Development Goals (MDGs) (CGAP, 2002). Such attractive MF attributes, however, could be jeopardised if the predictions of the Intergovernmental Panel on Climate Change (IPCC) about global warming and associated changes in Earth's climate pattern come true. According to the IPCC (2013), by the end of the 21st century, temperatures are projected to range between a best case [low-carbon economy model] of 1°C and a most stringent case scenario [carbon intensive economy model] of 3.8°C, with some climatologists arguing that 1.5°C is the minimum increase we can expect. In spite of such differences in temperature outcomes, scientists do agree that a warmer planet will bring profound transformations in the climate system as we know it today.

As a result, the changing climate “will impact individuals at the most basic level” (USAID, 2009:2), and will fall unevenly among regions, with less-developed countries facing the greatest risks (IPCC, 2001). Therefore, poor countries and persons in the global south, especially in Sub-Saharan Africa, South East and South Asia, as well as Latin America, will bear the worst consequences of climate change and its associated disturbances (BRETSCHEGER and VALENTE, 2011; WORLD BANK, 2013). In addition, ‘global warming is projected to lower the level and growth of GDP and thus increase poverty, undermining progress towards achievement of the MDGs’ (STERN, 2007). “Like everything else, microfinance will not be spared.” (RIPPEY, 2012)

The fusion of both microfinance and climate change realms offers a compelling argument for action. As Rippey (2012) noted, it is no coincidence that a year after Muhammed Yunus was awarded the Nobel Peace Prize for his commitments in fostering socioeconomic development from below, the same happened to the IPCC for its work on climate change. For many decades, climate change seemed a “luxury” that the microfinance industry could not afford or dream of (MCKEE, 2008:35). However, the last decade witnessed a growing perception that “incorporating a climate change lens to microfinance is essential and urgent” [...] “as well as critical to the future of the sector” (MCKEE, 2008:37). In fact, for their poverty status, the millions of microfinance clients globally are the most vulnerable to climate variability and their “plight is linked to the ability of microfinance institutions (MFIs) to adapt to the consequences inflicted by climate change” (DOWLA, 2009:5).

The integration of these two realms is particularly relevant to Brazil. On the one hand, being home to the ‘world's lung’, Brazil is both a major international actor in the fight against climate change and a major victim of its adversities. In fact, the Amazon rainforest plays a central role in the maintenance and conservation of natural ecosystems in the South American continent once it absorbs and recycles nearly half the total rainfalls of the whole region (CHOU et al., 2011:11). As such, any alteration in that system (e.g. land use change, decreased precipitation) would impact weather patterns all over South America. On the other hand, microfinance in Brazil has experienced a big boom over the last decade mainly favoured by governmental actions (see, for instance, GONZALEZ, PIZA, GARCIA, 2009). The sector saw its lending capacity and number of clients served increase considerably, peaking 2.6 million clients in 2012 (MIX MARKET, 2013). In addition, Brazil still offers an enormous potential market for microfinance since about 44 million people still work in the informal sector and some 10 million informal microenterprises still lack credit access (SEBRAE, 2010). Accordingly, when these two realms are combined, they offer an attractive and yet overlooked vehicle to deliver climate change strategies [adaptation and mitigation] to the poorest segments of Brazil's society.

Brazilian scholarship has drawn little attention as to the impact of climate change on Brazilian MFIs and their clients. By combining *a priori* uncorrelated realms, this article aims to contribute to research and awareness raising on such a promising and, contemporarily, underdeveloped field, having Brazil as case study. In order to respond to the following general questions: how does climate change

impact microfinance institutions and their clients?; why should MFIs worry about climate change and environmental sustainability?; and, how can they foster adaptation and mitigation strategies to their clients?, we applied a single-instrumental case study on the largest rural microfinance provider in Brazil, the Agroamigo of the Bank of Northeast of Brazil, which operationalises various lines of credit under the National Programme to Strengthen Family Agriculture family (PRONAF). Founded in 2005, Agroamigo aims to improve the socioeconomic conditions of poor smallholder farmers and their families throughout Brazil's Northeast and northern Minas Gerais, totalling 10 states, by providing them with financial and non-financial services *via* lending methodology which includes, among other things, the constant assistance and monitoring of credit agents. The selected case offers an interesting context for research on such an incipient arena since it finances highly climate-sensitive activities such as agricultural and cattle products and, at the same time, operates in one of Brazil's most vulnerable regions to climate change, i.e. semiarid Northeast.

## 2. LITERATURE REVIEW

Within the climate change arena, there exist two central categories: adaptation and mitigation. The former refers to adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects, with a view of moderating harms or exploiting benefits and opportunities associated with climate change (IPCC, 2001; BROOKE, 2008). In turn, mitigation involves human interventions to reduce greenhouse gases (GHG) emissions by sources and/or enhance their removal from the atmosphere by “sinks” [for instance, forests, oceans, and plants absorbing CO<sub>2</sub>] (UNFCCC, 2009; VIJAYAVENKATARAMANA, INIYAN, GOIC, 2012).

Increasingly, microfinance practitioners have adopted the notion of Microfinance Plus—which links microfinance services to broader development issues such as educational and social services provision. In this light, microfinance providers offer a compelling and overlooked vehicle to deliver such climate change actions to millions of poor people worldwide (AGRAWALA and MAËLIS, 2010).

Albeit MFIs may not replace national and/or international level mitigation strategies, they do have a significant role to play in delivering mitigation initiatives to the poor (RIPPEY, 2012). To date, MFI programmes and initiatives related to environmental issues have focused primarily on GHGs mitigation via the financing of cleaner/renewable energy [e.g. solar home systems and solar lanterns, improved cooking stoves, and bio-digesters] (MCKEE, 2008; RIPPEY, 2012). SEWA Bank and SELCO-India, for example, offer renewable energy financing to self-employed individuals and microenterprises for agriculture and other livelihoods (MCKEE, 2008; ALLET, 2013). In Bangladesh, Grameen Shakti, a Grameen Bank's affiliate, provides its clients with financing for solar home systems, organic fertilisers, and improved cooking stoves (DOWLA, 2009). Further, several investment funds and banks have established partnership with MFIs to deliver green energy financing to unbanked, low-income households, such as the HSBC, Spandana and MicroEnergy Credits in India (ALLET, 2013).

In addition, under the Kyoto Protocol, governments, companies, and individuals located in the so-called Annex I countries<sup>1</sup> can offset their greenhouse gas emissions by funding mitigation projects in developing countries through the Clean Development Mechanism (CDM). Each carbon offset or carbon credit—a financial unit measurement—traded under the CDM corresponds to one tone of carbon dioxide equivalent (tCO<sub>2</sub>e). This mechanism allows Annex I countries to meet their GHGs emission targets under the Kyoto Protocol (DOWLA, 2009). Accordingly, MFIs can engage in the carbon credit market in order to access funding to bolster mitigation projects.

Climate change is often thought to be something that is likely to occur in a distant future (FORCELLA, 2013). However, there is solid scientific evidence that climate change and associated disturbances are already happening. In this sense, albeit laudable, the role of MFIs in financing clean

energy sources and other mitigation projects seem less effective to protect assets and lives of millions of MFI clients worldwide. As Hammil et al. (2008) argued, ecosystem services and natural resources most MFI clients depend on for their livelihoods will be hit hard by altered climatic conditions, and this will compromise their ability to pay back their loans. Likewise, increased incidence of tropical diseases outbreaks, water scarcity in drought-prone areas, and injuries suffered during climate extremes will affect clients' health, making it harder for them to meet their financial obligations. In the lack of sound adaptation actions and/or coping mechanisms, climate-related asset losses and health issues may cause default rates to rise substantially, and if occurred in larger scales, may lead several MFIs to face liquidity and solvency problems. Therefore, as Dowla (2009) put it: 'how to deal with the consequences of climate change that are happening now?'

The few studies combining microfinance and adaptation (see, for example, HAMMIL et al., 2008; HALL et al., 2008; AGRAWALA and MAËLIS, 2010; FORCELLA, 2011) argue that MFIs can help clients adapt to climate change by reducing their vulnerability and strengthening their economic resilience. HAMMIL et al (2008), for example, highlighted that the powerful case for MFIs in fostering adaptation strategies lies in the combination of both financial and non-financial services that help families accumulate assets and diversify income sources, as well as coping mechanisms over time [e.g. savings and microinsurance] while sharing knowledge and information to influence customer's behaviour. In addition, MFIs can be used as distributional channel for donors to deliver adaptation to millions of poor people worldwide, especially women which are particularly vulnerable to climate change impacts (HAMMIL et al., 2008; AGRAWALA and MAËLIS, 2010).

Also, MFIs may consider relaxing and flexibilising contract terms during weather disaster events or shocks. FIELD and PANDE (2008) showed that more flexible payments or instalments can curb transaction costs without necessarily increasing default rates. Also, management might consider changing their microlending methodology in the wake of natural disasters. The renowned group lending methodology applied by most MFIs worldwide may seem ineffective during natural disasters (HAMMIL et al, 2008). In this sense, MFIs may consider disbursing loans on an individual lending basis in order to provide quicker and readier relief aid to affected clients. They can also offer emergency loans at lower interest rates to help clients sustain their businesses, as was the case of Brazil's Agroamigo during the 2011-2013 large-scale drought. On the other hand, grants and loan write-offs should be avoided so that not to create a culture of debt-forgiveness among clients that may undermine the regular repayments during normal times (DOWLA, 2009).

Moreover, MFIs can apply a climate change lens to their products so that no to enhance the vulnerability of their clients to climate change on the long run (AGRAWALA and MAËLIS, 2010). Added to encouraging crop and income source diversification, for instance, rural MFIs can promote targeted conditional loans for hybrid or more weather resistant crops at lower interest rates. Microfinance institutions can also serve as distributional channel for governments, national and international development agencies, regional and local administration as well as private insurers to deliver index-based insurance programmes to poor smallholder farmers. These are insurance schemes which are triggered according to established local weather thresholds, or indexes, and thus, avoid problems related to individual misbehaviour such as moral hazard, and eliminate the need of costly field loss assessments (see, for example, WANG et al., 2013; and, HAZELL et al., 2010). In Brazil alone, more than one million rural microfinance clients could benefit from such insurance policies, in particular, in areas not covered by the governmental crop insurance (PROAGRO) such as livestock activities.

Increasingly, microfinance providers are starting to foster awareness raising campaigns and/or environmental education about the challenges and threats stemming from climate change as well as on the new opportunities arising from the green economy. Very often MFIs require clients to attend environmental training sessions as pre-requisite to receive microloans. These trainings seek to inform

clients on their impact on local environment as well convey information about more sustainable practices (HALL et al, 2008). Camide in Mali and Ceprodel in Nicaragua, for example, offer training sessions and organise awareness raising campaigns on environmental issues and sustainable techniques (ALLET, 2013), and so Agroamigo in Brazil. Likewise, remittance and savings schemes constitute additional mechanisms to reduce client's vulnerability ahead of climate-related shocks. MFIs can expand the adaptive ability of their clients by simply boosting remittances and voluntary savings—albeit recognising that some countries do not allow MFIs to offer such services—so that clients use these instruments as an informal and unofficial safety net to withstand climate-related shocks, in particular the poorest clients.

Also, at the MFI/institutional level there exist several ways in which microfinance providers can promote both adaptation and mitigation. For instance, management can assess a MFI's carbon footprint in order to estimate its impact in terms of GHGs emissions and, upon that, devise carbon offsetting strategies, e.g. reduce waste and/or use of paper (HALL et al., 2008). MFIs can also promote risk assessment plans in order to better respond to and benefit from climate change. Further, they can strengthen personnel capacity to deal with climate change through training activities (RIPPEY, 2012).

Nonetheless, there remain tradeoffs to be considered in microfinance actions in the climate change arena. While microfinance seems to thrive in the provision of financial and non-financial services to the active poor, it struggles to reach the poorest of the poor (CULL, DERMIGÜÇ-KUNT, MORDUCH, 2009:179), which are, after all, the most vulnerable to climate change. Also, MFIs will need to weigh up the balance between short-term microfinance and development needs and the long-term actions needed for adaptation and mitigation (HAMMIL et al., 2008; RIPPEY, 2012). Additionally, as the 2010 indebtedness crisis in India's southern state of Andhra Pradesh revealed, microcredit may end up increasing the debt burden of customers (TAYLOR, 2012), placing added pressure on their adaptive ability (HAMMIL et al., 2008). Besides, climate change actions at the customer and MFI/institutional level may also entail risks for MFIs' portfolio as they seek to adapt products and forge new competencies in terms of adaptation and/or mitigation (RIPPEY, 2012). Lastly, a "climate-proof" MFI would require additional skills and capacities that many MFIs, especially the smallest ones, simply lack. Therefore, MFIs in responding to climate change will need to balance between costs and benefits entailed in fostering adaptation and mitigation strategies.

### **3. METHODOLOGICAL APPROACH**

This empirical study is part of series of pilot-case studies on green microfinance in Brazil launched by the Centre for Microfinance Studies of the Fundação Getúlio Vargas in Sao Paulo. To address the proposed research questions, this study relied on a qualitative approach which according to Lazzarini (1995) is preferable when the overall research aim is to learn about facts rather than their actual measurement. Also, various evidence sources converging in a triangulating manner were used to offset eventual biases (BERG, 2004; MORAN-ELLIS et al., 2006; YIN, 1994). Among these are field observation, documentation, interviewing, and case study.

In order to facilitate understating and provide insight into the subject matter, we relied on the case study design as research method provided by Robert Yin. To the author, 'a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, in particular when the boundaries between phenomenon and context are not clearly evident' (YIN, 1994: 13)...and may provide a distinct advantage when 'a how or why question is being asked about a contemporary set of events over which the investigator has little or no control' (YIN, 1994: 9). In this light, we believe our research project fits in such Yin's case study method conception once 1) green microfinance is a contemporary event in which 2) we have little or no control on it and 3) the research questions have a "how" and "why" nature.

### 3.1. Data Collection

This article draws on a variety of information and data stemming from different sources: financial reports, semi-structured interviews, and field observation. We have identified five main social Agroamigo groups considered relevant for the investigation. These include: national and regional programme managers, coordinators, credit agents and clients. National programme managers are responsible for the general supervision of Agroamigo's branches in all states it operates in, as well as for setting up business strategies. Regional programme managers are responsible for the supervision of regional and local units. Coordinators are charged with specific areas in the surroundings of an Agroamigo's branch and also supervise local credit agents. Credit agents, in turn, are the point of contact between clients and Agroamigo, as well as responsible for credit information, contract analysis, and so forth. Lastly, clients are smallholder farmers, often very poor, that benefit from rural microlending.

This process was followed by an on-site field research at Agroamigo's headquarters and also in inland/coastal Ceará whereby we have carried out interviews and field observation as well as collected further documents. Three localities in the State of Ceará were chosen for the interviews: Poço da Pedra located in inland Ceará, a rural community within the municipality of Canindé, one of the most arid regions of the state; on the coastal area, the municipality of Icapuí, a poor rural village; and, the Agroamigo's headquarters in Fortaleza, the capital of the State. During the field research, we also had the opportunity to attend an informative session held by credit agents and dedicated to prospective clients in the rural community of Poço da Pedra as well as the event "Tribute to Nature" hosted by Agroamigo's staff in the village of Icapuí.

Twenty-one respondents were selected *in loco* according to their belongings to specific social groups and availability to participate in the interviews. Accordingly, two national managers, one regional manager, two coordinators; six credit agents, and twelve clients were interviewed. For each social group we applied a specific questionnaire commensurate with its activities, experiences and contextual perception of the subject under scrutiny. For instance, national and regional programme managers were questioned about the overall design, administration, and performance of products and programmes offered by Agroamigo as well as the performance of such products during hazardous weather events. In turn, coordinators and credit agents were asked about the exposure of clients to drought events and how Agroamigo usually reacts to such events in terms of actions and programmes. Lastly, we asked clients about their own experiences *vis-à-vis* actual impacts of climatic events on their rural activities, for example, whether they have already suffered drought-related losses; how they usually deal with such shocks and whether they received disaster relief aid from Agroamigo. Interviews' length varied from fifteen minutes, as for clients, to one hour for managers.

## 4. ANALYSIS AND DISCUSSION OF RESULTS

### 4.1. Climate Change Impacts

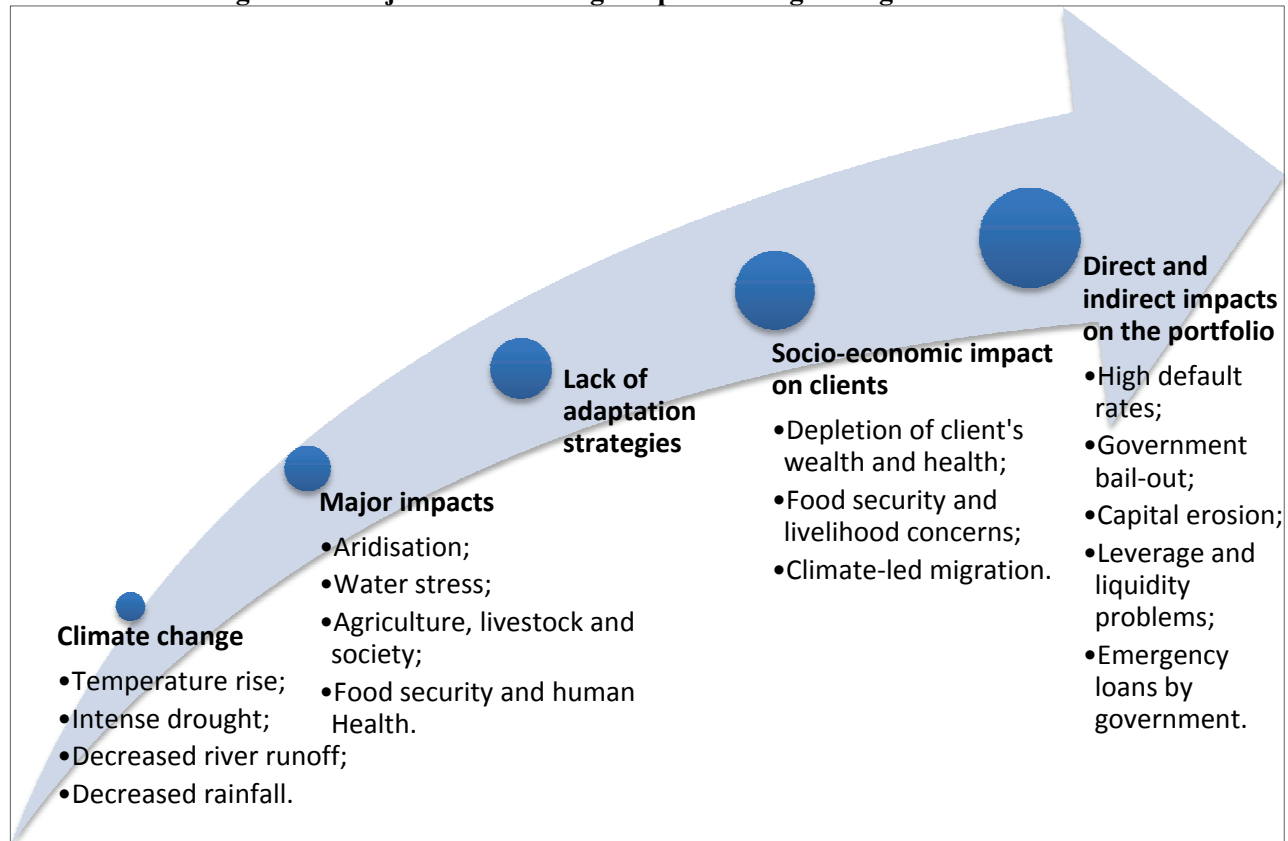
The Brazilian Panel on Climate Change (PBMC, 2013) claims that surface air temperatures in Brazil's Northeast, area in which Agroamigo operates in, are projected to increase and rainfalls to decrease significantly over the century compared to past trends. Accordingly, temperatures are likely to increase by 0,5°C and 1°C and rainfalls to decrease by 10% to 20% until 2040. Between 2041 and 2070, the climate in the region will get even warmer, up 1,5°C to 2,5°C, and way drier as rainfalls are expected to decline by between 25% and 35%. In the last three decades of the century, temperatures are likely to increase by as much as 3,5°C to 4,5°C whereas rainfall to decrease markedly by 40% to 50% (PBMC, 2013:27).

Such projected warmer and drier climate and associated runoff decline in the *São Francisco* basins will likely place greater stress on the livelihood of the about 800,000 Agroamigo's clients and their families. Operating in a climate change hotspot and financing primarily rural activities, Agroamigo is exceptionally exposed to impacts arising from climate change. As extreme events such as drought occur with more frequency, intensity and in wider geographic scale in the future, crop and livestock productivity (the bulk of Agroamigo's financing) is expected to decrease sharply, adversely affecting its borrowers and their families (mostly composed of poor smallholder farmers). As the climate gets warmer, Agroamigo's borrowers, due to decreased crop productivity, will find it increasingly hard to pay off their microloans, causing significant solvency and liquidity problems to the Programme. This is precisely what happened during the 2011-2013 large-scale drought where the BNB, following a government's directive, allocated about R\$3.5 billion (US\$ 1.49 billion) in emergency loans as an attempt to mitigate default tides and sustain clients' activities (MOSER and GONZALEZ, 2013). At least three interviewed clients argued that they had difficulties in paying off loan amortisations in the aftermath of climate shocks due to reduced crop production. If such instances occur with more frequency in the future, the government itself will find it difficult to cover loan defaults and climate-related losses suffered by clients on a sustainable and regular basis, and ultimately, this situation will lead to solvency issues. Furthermore, as Dowla (2009) argued, a reduced agricultural production also would entail falling food supply which, in turn, would increase local market prices, affecting even further Agroamigo's clients both as producers and consumers.

Another issue to be taken into consideration is related to the market value of the asset base owned by Agroamigo's clients. Traditionally, various smallholder farmers have used livestock as a means of savings or buffer against losses in bad times. More specifically, farmers sell part of their livestock in order to alleviate and/or cope with eventual shocks. With climate extremes on the rise, if all farmers sell their livestock investments contemporarily there will be more sellers than buyers and this will cause prices to collapse, affecting the market value of farmers' asset base (DOWLA, 2009). During the recent drought the livestock market value in Northeast Brazil fell by 28%, and in certain villages the reduction reached 50% (DIARIO DO NORDESTE, 2012). Being livestock the main income source for most Agroamigo's clients (81% of clients were engaged in livestock activities as of 31 December 2013<sup>ii</sup>), such wealth depreciation would compromise their ability to repay loans and would then indirectly affect Agroamigo's portfolio.

In addition, decline in quality and quantity of water sources compounded with projected increase in the incidence of vector-borne diseases may affect directly the health of Agroamigo's clients. Greater stresses on natural resources in the North-eastern region may also lead to forced migration and perhaps impact several clients. In fact, harsh weather conditions in semiarid Northeast has traditionally forced millions of persons to flee towards major urban centres and this could be exacerbated in the future, placing greater burden on socioeconomic conditions in major urban areas, such as Fortaleza, Salvador, and even Sao Paulo. Ultimately, if no adaptation strategy and/or coping mechanism is put in place, climate change may well affect, both directly and indirectly, Agroamigo's portfolio (see Figure 1).

Figure 1 – Major climate change impacts on Agroamigo and its clients



Source: authors

#### 4.2. Why Should Agroamigo Care about Climate Change?

Having shown potential impacts of climate change on the fate of Agroamigo and its clients, there remains to be answered the following question: why should Agroamigo take into account climate change concerns in its provision of financial and non-financial services? Collins et al. (2008) suggest that a MFI has at least eight sound reasons to anticipate and plan for future changes in climate as well as incorporate climate change considerations into their programmes, services, products and operations. They are: scale, risk, regulation, access to funding, competition, market opportunities, reputation, as well as ethical responsibility. Figure 2 shows that these eight elements can also be contextualised to the Agroamigo case.

##### *Scale*

Climate change will undermine the goal of Agroamigo of scaling up financial services to millions of unbanked and poor smallholder farmers. As natural disasters and climate extremes occur more and more frequently and in larger spatial scales, Agroamigo will likely face liquidity shortage due to high default rates and also capital erosion as a result of climate-related losses. Accordingly, Agroamigo's efforts to scale up financial services will need to be reconsidered, and in some cases, redirected toward disaster recovery/relief programmes, as the 2011-2013 drought event showed.

##### *Risk*

Climate change will impact both directly and indirectly Agroamigo's portfolio. As highlighted in the previous section, natural resource degradation will put great stress on inputs used by clients—livestock, water, land—and thus on their ability to repay loans. If occurred frequently and in large scales,



Agroamigo's loan portfolio will be increasingly at risk, with direct consequences on its profitability and financial sustainability, and will increasingly need to call on the government for financial leverage. Increased incidence of vector-borne diseases and pests will inflict further risks on the ability of clients to repay their loans, and thus will indirectly affect Agroamigo's loan portfolio. In a nutshell, declining wealth and deteriorating health of clients will force Agroamigo to refinance, reschedule, restructure or even write off loans, and if occurred repeatedly and in wider scales, will pose substantial threats to its financial performance, leading the Programme to increasingly resort to governmental funds for financial leverage.

#### *Regulation*

The great bulk of Brazilian MF clients (about 95%) work in the informal sector (MINISTÉRIO DO TRABALHO E DO EMPREGO, 2012) and therefore outside the country's regulatory framework. As Brazil seeks to close up the gap between informal and formal sector, MF clients, and therefore Agroamigo's borrowers, that are engaged in environmentally-protected activities or are located in environment-sensitive areas [such as the favelas] will be asked to comply with environmental standards and regulations in order to keep their activities operational. The compliance costs in conforming with such governmental requirements may affect significantly their ability and means to do business. As such, Brazilian MFIs, including Agroamigo, will have to redesign and/or offer new products and services to meet the needs of such a new clientele profile.

#### *Access to funding*

Most Brazilian MFIs rely heavily on government funds to cover large fixed costs implied in operating small and micro loans (KUMAR, 2005), or operationalise public programmes such as the Pronaf lines of credit. As environmental concerns continue to be incorporated in the policy agenda, MFIs in Brazil, and so Agroamigo, will increasingly be evaluated in accordance with their environmental impact to remain eligible for funding. Worldwide, many governments, international donors and investment funds have already included environmental sustainability as fundamental criteria for microfinance programme financing (see, for instance, ALLET and HUDON, 2013). Ex-ante agricultural zoning is already a pre-requisite and compulsory for crop lines disbursements under PRONAF lines (the totality of Agroamigo's lending).

#### *Competition, Market Opportunities and Reputation*

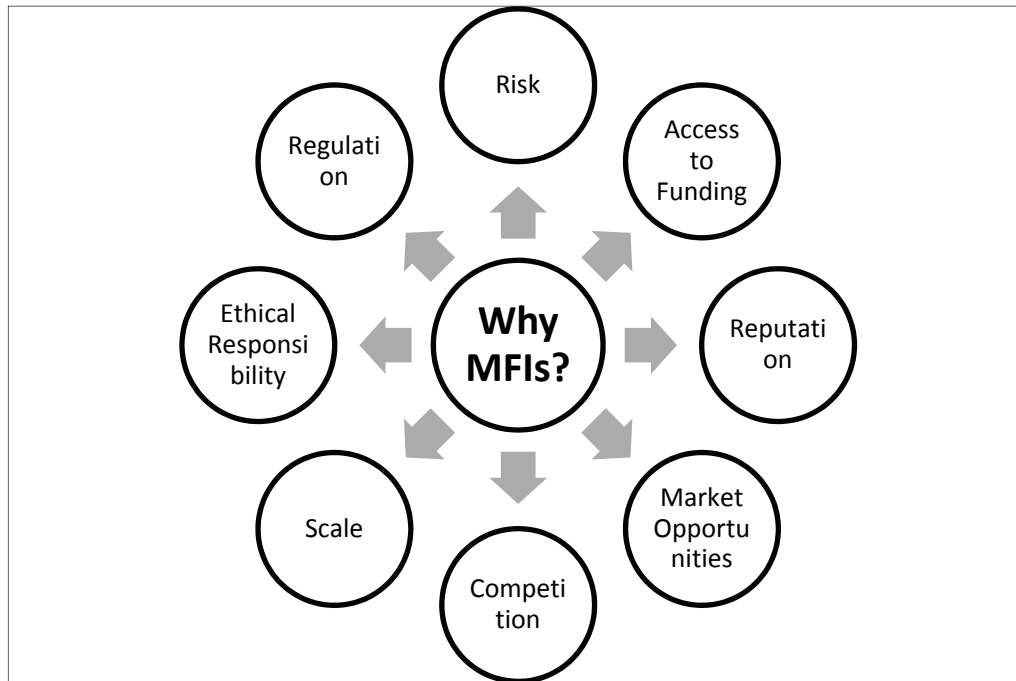
Offering environmentally-friendly products, practices and technologies that help curb costs to microbusiness can give a comparative advantage to MFIs while offering new market opportunities. For instance, MFIs are in key position to leveraging local knowledge and social trust that allow them to play central role in value chains toward financing of green energy and more efficient irrigation infrastructures, and so are microfinance credit agents. As such, a green microfinance institution would differentiate from the competition while providing valuable and profitable services to clients and communities (HALL et al., 2008). A green MFI also would enhance its reputation and thus further attract investors interested in its environmental approach to financial services. Being an important microfinance player, Agroamigo has great potentials to become the first Brazilian MFI to engage in the carbon credit market and thus serve as demonstration effect to other MFIs, expanding its market opportunity and also reputation, for instance.

#### *Ethical Responsibility*

The mission of most MFIs worldwide, and so Agroamigo's, is anchored in social and ethical values (see, for instance, SCHMIDT, 2010). Environmental protection has been increasingly presented as a moral obligation and as fundamental ethical duty in the attainment of wellbeing and development of

communities and societies [e.g. the notion of sustainable development and the triple bottom line approach: people, planet and profit]. A quantitative study conducted by Allet and Hudon (2013) with 160 MFIs worldwide showed, in fact, that the most proactive in environmental management among them were primarily motivated by social and ethical responsibilities. The promotion of sustainable crop practices and environmental sustainability is already imbued in Agroamigo’s mission as core ethical responsibility towards clients.

**Figure 2 – Why should Agroamigo care about climate change?**



Source: adapted from Collins et al. (2008)

### 4.3. Fostering Adaptation and Mitigation Strategies to Climate Change

There already exist important overlaps between Agroamigo’s product envelope and localised climate change strategies. For example, through PRONAF, Agroamigo provides smallholder farmers with productive microcredit that help them build up their asset base and diversify sources of income. Under PRONAF Eco Agroamigo finances techniques that minimise impact of rural activities on local environment; *via* the PRONAF Agroindustry, it provides loans for investments in micro agro-industries; through PRONAF Forest, Agroamigo finances tree planting and silviculture systems; and, with PRONAF Agroecology, it already finances agro-ecological production and/or organic systems. Plus, the promotion of sustainable development, imbued in Agroamigo’s mission, represents an important step towards the adoption of a triple bottom line approach [people, planet, profit] (MOSER and GONZALEZ, 2013).

Also, disaster relief loans, flexible repayments and bonus on outstanding debt during drought episodes were considered very satisfactory by both clients and credit agents interviewed during the field research. During initial sessions with prospective clients, Agroamigo also performs environmental training on how to best employ and practice sustainable agriculture and farming production such as the use of organic fertilisers and on measures to limit soil degradation. Such initiatives can promote greater environmental responsibility among clients and as such constitute an additional and cheap tool in terms of climate change actions. In addition, under PRONAF credit lines, Agroamigo has free access to agricultural zoning calendar on more adapted crops for specific geographic areas and harvest cycles.

All these programmes and products contribute to enhance resilience and adaptive capacity of clients ahead of natural and weather-related disasters. Besides, at the institutional level, Agroamigo also endeavours to reduce its carbon and ecological footprint by reducing waste and paper use, for example.

Nevertheless, some of its programmes and products can be enhanced so that to take better considerations of localised climate change vulnerabilities and to aid clients better respond to climate change impacts. As it is structured today, Agroamigo appears to be very reactive to weather shocks, meaning that it limits the scope of actions to respond to specific events and restore previous conditions. Agroamigo's reaction amidst the 2011-2013 intense drought is but a salutary example.

However, if Agroamigo is to secure and protect its assets and borrowers from the adversities arising from a changing climate it needs to adopt a proactive approach to climate change. Agrawala and Maëlis (2010) refer to this approach as a "climate-proof" strategy. According to the authors, climate-proofing microfinance products is imperative for MFIs to withstand environmental/weather risks as weather conditions worsen. MFIs can, for example, take forward plans and perform risk management assessments on their product envelope in light of localised climate change vulnerabilities and risks. In other words, a proactive approach allows MFIs to set up *ex-ante* risk management plans in view of eventual future losses stemming from increased climatic variability and weather shocks. It also allows MFIs to devise targeted adaptation initiatives perceived as most relevant and urgent to their contexts. Albeit this process may seem costly to many MFIs, management might consider it as an investment measure to avoid worst and more expensive consequences in the future (DOWLA, 2009).

Putting this into an Agroamigo's perspective, for example, greater effort towards portfolio diversification—currently 81% of total portfolio is indexed in livestock activities—could be enhanced in particular towards non-agricultural lending and drought-tolerant crops. Albeit managers interviewed argued that there is a strong culture of livestock production among clients, Agroamigo's credit agents are placed in a strategic position to circumvent such a tradition and nudge clients towards diversification of income sources (MOSER and GONZALEZ, 2013). AGIER (2012), for example, showed the potentials of credit agents' abilities in the microcredit cycle, in particular at the screening stage.

Moreover, loans for acquisition of more efficient irrigation/water technologies were considered by clients and credit agents insufficient to cover the full cost and this can decrease client's adaptive capacity. In fact, one of the major identified climate change impacts for Brazil's Northeast is associated with water access and resources, and therefore, Agroamigo could boost and/or revise such lending programmes in order to fully grasp their potentials. There also exists room for improvements in technical assistance provision, considered by interviewed managers poor and deficient. Also, Agroamigo can avail itself of EMBRAPA<sup>iii</sup>'s extensive body of study on adapted and more tolerant crops to set up targeted conditional loans.

Insurance schemes can also be put in place particularly in areas not covered by the government's crop insurance, the Programme for Guaranteeing Agricultural Activity, or simply PROAGRO. Interviewed managers argued that, at present, roughly 2% of Agroamigo's outstanding loans are insured against losses stemming from climate shocks. This is because most Agroamigo's lending is channelled to livestock investment purposes which are not covered by the PROAGRO. A solution could be implementing index-based insurance schemes, considered a prominent tool in the green microfinance sector, to serve as complement to the government's Proagro, especially in not-covered areas such as livestock production. This could also involve partnerships with external actors such as the government, international agencies/NGOs, and/or insurers (see Hazell et al., 2010)

If Agroamigo is to embark on a more proactive role in the climate change front it also will need more room for manoeuvre in the design and planning of products and programmes. This is because the Programme has institutional and legal constraints in planning and designing programmes, services and products. More specifically, the programme operationalises various public credit lines and thus acts

upon governmental instructions and directives. If extreme weather events occur with more frequency and intensity in the future, such excessive reliance on the government may hinder Agroamigo's ability to deliver ready and quick disaster relief responses, and thus, may exacerbate the climate change burdensome on the business performance of clients. In fact, interviewed managers and clients voiced concerns regarding the lengthy delivery of disaster relief programmes.

There also exists room for improvement in the delivery of mitigation strategies, which, at present, remain virtually unexplored. Abramovay et al. (2013) claims that albeit most clients have access to electric power, 40% of them use coal or wood burning stoves. Therefore, renewable energy sources such as biodigesters and improved cooking stoves in addition to constituting a new market opportunity for Agroamigo can be financed through existing tools such as the PRONAF Eco. To this regard, the campaign Agroamigo Sustentável, which aims at promoting on a more pronounced basis green lines of credits and knowledge on more adapted and sustainable crop practices among clients, may work in that direction. In addition, Agroamigo may consider entering the Brazilian Carbon Market held by Brazil's major Stock Exchange, BM&FBovespa, and/or establishing partnerships with strategic stakeholders such as renewable energy suppliers, to finance mitigation initiatives. It could also call on supporting institutions such as the MicroEnergy Credits to help launch tailored clean energy lending programmes (see, DOWLA, 2009).

Nevertheless, there also exist tradeoffs in the promotion of a green microfinance industry by Agroamigo. For example, finding the balance between short-term microfinance needs of Agroamigo's clients and the long-term actions needed for adaptation and mitigation may represent a major constraint in fostering climate change actions, e.g. financing improved irrigation systems versus lending for productive activities that generate extra income for clients. Moreover, in some cases microcredit may increase the debt burden of borrowers, placing added pressure on their adaptive ability, this is what revealed the 2010 indebtednesses crisis in India's southern state of Andhra Pradesh (TAYLOR, 2012). Also climate change actions at the customer/institutional level may entail risks for Agroamigo's portfolio. Lastly, "climateproofing" Agroamigo would require additional employee skills, in particular to coordinators and credit agents, that may increase administration costs. Therefore, Agroamigo in responding to climate change will need to weigh up the balance between costs and benefits entailed in fostering adaptation and mitigation strategies, and also be cognisant that microfinance actions are certainly no panacea.

## 5. CONCLUSION

The article sought to show that climate change will impact both directly and indirectly the portfolio of the largest rural microfinance provider in Brazil, i.e. Agroamigo. Decline in quality and quantity of water sources compounded with increased incidence of vector-borne diseases as a result of climate change may affect directly the health of millions of clients, compromising their ability to service their microloans. Plus, greater stress on natural resources, in particular arable land and water, may bring about socioeconomic hardship to several clients, making it hard for them to sustain their agricultural activities, and this may perhaps lead to forced migration. Ultimately, if no adaptation strategy or risk management mechanisms is put in place, climate change may indeed affect, both directly and indirectly, Agroamigo's portfolio.

The study also showed that Agroamigo has various reasons to worry about climate change. Some examples are risk, regulation, ethical responsibility, scale, competition, market opportunities, reputation, and, access to funding. Also, we emphasised that Agroamigo provides various elements which appear rather attractive from a climate change adaptation and mitigation perspective. The focus on the rural poor, which happen to be extremely vulnerable to climate change impacts, its distributional channel covering 10 Brazilian states and serving more than 800,000 clients, the local knowledge it

possesses, in particular through its credit agents, as well as its ability to help the rural poor build their asset base and diversify their income sources are all elements that reinforce the broader idea of microfinance as potential instrument to deliver adaptation and mitigation strategies to the poorest segments of society.

In addition, existing green lines of credit such as the PRONAF Eco, PRONAF Agroindustry, PRONAF Forest, and PRONAF Agroecology offer clients the possibility to finance improved water systems and more sustainable agricultural practices, which ultimately will help them increase their adaptive capacity to cope with adversities arising from climate change. Plus, the promotion of sustainable development is also imbued in Agroamigo's mission, making environmental sustainability an ethical obligation to its activities. Moreover, disaster relief loans, flexible repayments and bonus on outstanding debt during drought episodes are already in place. Environmental training and agricultural zoning calendar on more adapted crops for specific geographic areas and harvest cycles also constitute laudable adaptation initiatives in hand of Agroamigo. All these programmes and products contribute to enhance resilience and adaptive capacity of clients ahead of natural and weather-related disasters. Besides, at the institutional level, Agroamigo also endeavour to reduce its carbon and ecological footprint by reducing waste and paper use, for example.

Nevertheless, there remains room for realising greater synergies between Agroamigo's product envelope and climate change initiatives so that to aid both clients and the portfolio itself better respond to climate change impacts. In particular, Agroamigo could pose greater efforts towards portfolio diversification; implement insurance schemes in areas not covered by the governmental cop insurance, the PROAGRO; migrate from a reactive to a proactive approach in terms of climate change actions; be given more room for manoeuvre from the government so that it is able to deliver quicker and readier disaster relief actions; and, lastly, bolster existing green lending programmes and perhaps engage in the credit carbon market and/or partnering to finance mitigation projects to its clients.

At last, tradeoffs in the promotion of green microfinance products by Agroamigo also need to be considered, in particular the balance between client's short-term livelihood needs and the long-term financial commitments needed for adaptation and mitigation initiatives. Moreover, in some cases microcredit may increase the debt burden of Agroamigo's borrowers, placing added pressure on their adaptive ability. Forging climate change actions at the customer/institutional level may also entail additional costs and technical skills for the Programme. Therefore, Agroamigo in responding to climate change will need to balance between costs and benefits entailed in fostering adaptation and mitigation strategies, and also be cognisant that its actions are certainly no panacea.

## REFERENCES

- ABRAMOVAY et al. Cinco anos de Agroamigo: Retrato público e efeitos do programa. Banco do Nordeste, 2013.
- AGIER, I. "The role of credit officers in the performance of micro loans: evidence from Brazil", *Economics of Transition*, v. 20(2), p. 271–297, 2012.
- AGRAWALA, S; MAËLIS, C (org). Assessing the role of microfinance in fostering adaptation to climate change. Paris, OECD Environmental Working Paper No. 15, OECD publishing, 2010.
- ALLET, Marion, Why do microfinance institutions go green?. *Working Papers CEB*, 2013.
- ALLET, Marion; HUDON, Marek, Green Microfinance. Characteristics of microfinance institutions involved in environmental management. *Working Papers CEB*, 2013.

- BANCO DO NORDESTE. Relatório 2012 Agroamigo. Fortaleza: Banco do Nordeste, 2013, 15p.
- BERG, Bruce Lawrence. Qualitative research methods for the social sciences. Boston: Pearson, 2004.
- BRETSCHGER, L. and VALENTE, S., Climate Change and Uneven Development. *The Scandinavian Journal of Economics*, v. 113, p. 825–845, 2011.
- BROOKE, C., Conservation and Adaptation to Climate Change. *Conservation Biology Journal*, v. 22, p. 1471–1476, 2008.
- CGAP. *Microfinance and the Millennium Development Goals*. Washington: CGAP, 2002.
- CHOU, S. C. et al. Riscos das mudanças climáticas no Brasil: análise conjunta Brasil-Reino Unido sobre os impactos das mudanças climáticas e do desmatamento na Amazônia. São Paulo: INPE; London: MetOffice, 2011.
- CULL, Robert; DEMIRGÜÇ-KUNT, A.; and MORDUCH, J., Microfinance meets the market. *Journal of Economic Perspectives*, v. 23, n. 1: p. 1-30, 2009.
- DIÁRIO DO NORDESTE, “Crise na pecuária: seca reduz preço do gado em 28%”. Diário Do Nordeste, 2012.
- DOWLA, A. *Climate change and microfinance*. Washington: Grameen Foundation, 2009.
- COLLINS, L. et al. *The missing bottom line: microfinance and the environment*. GreenMicrofinance, 2008.
- FIELD, Erica; PANDE, Rohini, Repayment frequency and default in microfinance: Evidence from india. *Journal of the European Economic Association*, v. 6 (2-3), p. 501-509, 2008.
- FORCELLA, D. Preliminary Assessment microinsurance facility for climate change adaptation, *Save The Earth Cambodia*, 2011.
- FORCELLA, D. Microfinance and adaptation to climate change, in 10TH UMM WORKSHOP, 2013, Frankfurt.
- GONZALEZ, Lauro; PIZA, C. T., and GARCIA, D.B. Sinergia entre microsseguro e microcrédito e o crescimento dos mercados no Brasil. *Revista Brasileira de Risco e Seguro*, 5.10: p. 84, 2009.
- HALL, Joan C., at al., The missing bottom line: Microfinance and the Environment. *Washington, DC., The SEEP Network Social Performance Working Group Social Performance MAP*, 2008.
- HAMMIL, A. et al. Microfinance and Climate Change Adaptation. *IDS Bulletin, Institute of Development Studies*, Vol. 39, No 4, pp. 113-122, 2008.
- HAZELL, J. et al. (eds) Potential for scale and sustainability in weather index insurance for agriculture and rural livelihoods. International Fund for Agricultural Development and World Food Programme, Rome/Italy, 2010.

- IPCC. *Climate change 2001: working group II: impacts, adaptation and vulnerability*. Geneva: IPCC, 2001.
- IPCC, Climate Change 2013: The physical science basis. Contribution of working group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, 2013.
- KUMAR, A. *Access to financial services in Brazil*. Washington, D.C.: The World Bank, 2005.
- MCKEE, K. Microfinance: climate change connections. *Development Outreach*. Washington: The World Bank, 2008.
- MINISTÉRIO DO TRABALHO E DO EMPREGO. *Relatório de Dados do Programa de Microcrédito – 4º. Trimestre de 2012*. Brasília: MTE, 2012.
- MIX MARKET (2013). Microfinance Institutions. Available at <http://www.mixmarket.org/mfi>. Access on 09Dec2013.
- MOSER, Rafael and GONZALEZ, Lauro. Green Microfinance in Brazil: The Case of Agroamigo, A Brazilian MFI. *Working Papers FGV*, 2013.
- MORAN-ELLIS J., et al., Triangulation and integration: Processes, claims and implications. *Qualitative Research*, 6 (1), p. 45-59, 2006.
- PBMC. Sumário executivo do volume 1 – base científica das mudanças climáticas. Contribuição do grupo de trabalho 1 para o 1º relatório de avaliação nacional do painel brasileiro de mudanças climáticas. Volume Especial para a Rio+20. Rio de Janeiro: PBMC, 2013. 34p.
- RIPPEY, Paul, Microfinance and climate change: threats and opportunities. in: *Greening the Financial Sector*. Springer Berlin Heidelberg, p. 215-239, 2012.
- SCHMIDT, R. H. Microfinance, cand ethics. *Poverty & Public Policy*, 2: 99–137, 2010.
- SEBRAE. Inclusão Financeira. Brasília: SEBRAE, 2010. Available at: <http://www.agenciasebrae.com.br/noticia/10965415/economia/para-organizacoes-internacionais-microfinancas-tem-grande-potencial-de-crescimento-no-brasil/>. Access on July.08.2013.
- STERN, N. *The Economics of Climate Change: The Stern Review*. Cambridge: Cambridge University Press, 2007.
- TAYLOR, M., The antinomies of ‘financial inclusion’: debt, distress and the workings of Indian microfinance. *Journal of Agrarian Change*, v. 12, p. 601–610, 2012.
- UNFCCC. *Fact Sheet: The Need for Mitigation*. Bonn: UNFCCC, 2009.
- USAID. Microfinance and climate change: can MFIs promote environmental sustainability? Washington: USAID, 2009.

VIJAYAVENKATARAMAN, S., INIYAN, S. and GOIC, R. "A review of climate change, mitigation and adaptation." *Renewable and Sustainable Energy Reviews*, v. 16, n.1: p. 878-897, 2012.

WANG, H. Holly, et al., Farmers' demand for weather-based crop insurance contracts: the case of maize in South Africa. *Agrekon*, v. 52, n.1: p. 87-110, 2013.

WORLD BANK. *Turn down the heat: climate extremes, regional impacts, and the case for resilience*. Washington: World Bank, 2013.

YIN, R. K., *Case Study Research: Design and Methods*. 2. ed. Newbury Park: Sage, 1994.

---

<sup>i i</sup> Signatories developed countries.

<sup>ii</sup> (Banco do Nordeste do Brasil, 2013)

<sup>iii</sup> Brazilian Agricultural Research Corporation