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Climate Change and Microfinance

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Table of Contents

Executive Summary	1
1. Introduction	3
2. Earth's Climate System	4
3. Regional Impacts of Climate Change	6
» GDP and Regional Poverty	
» Effects on Millennium Development Goals	
4. Climate Change Impacts on MFIs	10
» Effects of Declining Agricultural Productivity	
» Effects of Increase in Natural Disasters	
» Funding for Disaster Recovery	
» Reconsidering Debt Forgiveness	
4.1. Adapting to Climate Change	16
» Adaptations at Work	
» MFIs Adapting Slowly	
4.2. MFIs' Adaptation Schemes	18
» Climate-proofing Loan Products	
» Focusing on Water Supply	
» Introducing Remittance Services	
» Savings to Mitigate Risks	
» Insurance Products	
» Grameen Bank's Experience with Loan Insurance	
» Index-based Insurance	
» Disaster Plans	
» Disaster Insurance Variables	
» Need for Information Sharing	
4.3. MFIs and the Market for Carbon Trading	34
» Solar Home Systems	
» Obstacles to Expansion of Solar Energy	
» The Voluntary Market	
5. Conclusion and Recommendations	39
References	
Glossary	

Executive Summary

The ongoing emission of greenhouse gases by human activities will continue to increase the temperature of the earth. This global warming will have numerous physical consequences, including the melting of polar ice and major glaciers; a rise in sea level; and a higher incidence and severity of natural disasters, such as floods, cyclones and droughts. The warming of the earth also will increase outbreaks of infectious and vector-borne diseases.

Poor countries in Asia, Africa, and Latin America will bear the worst consequences of climate change. Global warming is projected to lower the level and growth of GDP and thus increase poverty, undermining progress towards achievement of Millennium Development Goals. Within the populations that will be most affected by global warming, the plight of many individuals is linked to the ability of microfinance institutions (MFIs) to adapt to the consequences of climate change. Climate change will impact MFIs in the following ways:

- The increased frequency and intensity of natural disasters and disease outbreaks will adversely affect MFIs and their work. Natural disasters have the potential to cause total or partial destruction of offices, equipment, information systems and records belonging to MFIs. The possible macroeconomic effects, such as inflation or recession, caused by large-scale disasters also could have an indirect impact on MFIs. In addition, increased health care needs and mortality among clients could have both direct and indirect effects on MFIs.
- Due to these multiple consequences of global warming, MFIs are likely to see an increase in default rates, and many MFIs will face repayment crises. They probably will face a run on savings and increased claims on existing insurance products.
- Climate change will decrease the productivity of agriculture and will make investment by MFIs in this sector less profitable.
- Investment in livestock, a significant part of the portfolios of MFIs, will be directly affected by climate change. Climate change-induced increases in droughts, floods, and disease outbreak will increase the mortality of livestock. In addition, fears of imminent drought will cause mass livestock sell-off and lead to a decrease in their market value.
- In the future, climate change will create pressures on MFIs to forgive debt; such action has the potential to destroy the cherished culture of repayment that MFIs have painstakingly built over time.

MFIs will have to adapt to climate change. Their first priority should be to climate-proof their existing products and services by adopting the following recommendations:

- Reconfigure current products—loans, savings, and insurance—to deal with climate change. Change the conditions of loans, introduce flexibility in savings products, and scale up the offering of health and livestock insurance.
- Develop new insurance products, such as weather-based index insurance—to deal exclusively with climate change-related weather fluctuations. MFIs will need external help to launch and scale up these products.
- Introduce and expand the use of renewable energy, such as solar, to relieve energy poverty and help mitigate the threat of climate change.
- Develop a detailed disaster plan for the institution. The plan should be flexible in order to deal with various kinds of disasters, such as natural events and major outbreaks of diseases.
- Develop disaster funds locally as well in the head office. In addition, get a credit line that can be accessed in the case of a liquidity crisis that depletes disaster funds.
- Work with government and civil society in the preparation of a National Adaptation Program of Action (NAPA).
- Work with multilateral institutions and donors to develop concessional funding facilities for dealing with catastrophes.

MFIs are in good position to take advantage of the voluntary market for carbon offsets and carbon trading through the Clean Development Mechanism (CDM). The latter source could become an additional revenue stream for MFIs seeking to lower the cost of introducing and expanding renewable energy and sustainable business practices in agriculture, forestry, and other sectors.

Donor agencies, foundations, and social entrepreneurs will need to help MFIs to adapt to and to take advantage of opportunities that can mitigate the effects of climate change.

1. Introduction

Sahidul Mullah is on the front line of climate change; he just does not know it. He does not even understand what these two words mean. Sahidul, a farmer, lives with his wife and children on a char, or island, in southern Bangladesh. Part of a giant delta, Sahidul's home lies between the Bay of Bengal and the glaciers of the Himalayas. All indications suggest that the Himalayan glaciers are receding at an alarming rate as a consequence of global warming. These glaciers feed all of South Asia's major river systems: the Indus, Ganges, and Brahmaputra. Their melting will initially cause flooding and eventually cause a water shortage in the northern part of South Asia. The melting of ice in the North Pole will cause the sea level to rise. In a few decades, these rising waters will likely wipe out Sahidul's home.

Even though they have contributed very little to it, poor people like Sahidul are already bearing the burden of climate change. Sahidul does not own a car; he does not even have electricity. Journalist Robert Kaplan aptly describes Sahidul's predicament:

Atop the Bay of Bengal, the numberless braids of the Ganges, Brahmaputra, and Meghna rivers have formed the world's largest, youngest estuarine delta and one of its most dynamic. It is, in effect, the world's biggest flush toilet. Once a year, over the space of four months, God yanks the handle. First comes the snowmelt in the Himalayas, swelling the three great rivers. Then, in June, comes the monsoon from the south, up from the Bay of Bengal.

The Sahiduls of the world are suffering now. In the future, all of humanity will face the risk of climate change.¹ Sahidul and his wife are not clients of a microfinance institution, but they would certainly qualify. People like Sahidul are the major consumers of products and services provided to the clients of microfinance institutions (MFIs).² And climate change will require MFIs to address the kinds of challenges faced by Sahidul and his family.

¹ Sahidul's story is based on the reporting by Mattias Gebauer, "On the Front Lines of Climate Change," Spiegel online, May 2007.
² Until recently, MFIs in Bangladesh did not give loans for farming. However, this is changing quite rapidly, according to Dewan Alamgir, an expert on microfinance in Bangladesh. The Apex organization, PKSF, has made agricultural loans one of its main products. The loans come in the form of seasonal and regular funds for crop production.



"Sahidul lives near the Bay of Bengal, an area whose particular geography makes it the front line of climate change."

2. Earth's Climate System³

The earth is provided with energy through radiation generated by the sun nearly 150 million kilometers away.

This energy forms the basis of our climate and makes life possible. Approximately 30 percent of all incoming solar radiation is reflected back to space by the earth's bright surfaces. Greenhouse gases (GHG) in the atmosphere— carbon dioxide, methane, nitrous oxide, halocarbons, ozone, and water vapor—trap much of earth's outgoing thermal radiation and remit this energy back to the planet's surface. This process warms the surface of the earth and its lower atmosphere. Any changes in the concentration of these gases can drastically alter the heat-trapping capabilities of the atmosphere, which has serious consequences for life on earth. Once in the atmosphere, greenhouse gases remain there for a long period, accumulating over time and contributing to future changes in the climate.

Changes in the global climate occurred naturally over time due to continental drift, astronomical cycles, and changes in volcanic activity and solar energy output.

However, the industrial revolution changed the balance of energy in the earth's climate system. Industrial activity increased the amount of anthropogenic, or man-made, greenhouse gases in the atmosphere and changed the natural equilibrium of earth's climate system. All evidence unequivocally suggests that the climate system has been warming and that human activities are responsible for the increase in the earth's temperature. If no attempt is made to reduce greenhouse gas emissions, global temperature is projected to increase between 1.1°C and 6.4°C by 2100.



The glaciers of the Himalayas are melting at an alarming rate, threatening the livelihood of millions of people living in South Asia with floods and subsequent water shortages.”

Credit: USAID

Climate change in Intergovernmental Panel on Climate Change (IPCC) usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity.

(IPCC 2007)

³This section borrows extensively from Abatzoglou et al. (2007).



"The likely decline in safe drinking water will threaten the health of children like this young boy in Ghana, which will undermine the Millennium Development Goal to reduce child mortality."

3. Regional Impacts of Climate Change

In a 2008 lecture in Washington, economist Nick Stern noted that climate change begins and ends with humans.⁴ However, the impact of climate change on humans will occur by means identified by the Fourth Assessment Report of the Inter-governmental Panel on Climate Change (IPCC, 2007):

- Droughts and floods will increase in extent and in frequency. The rapid melting of glaciers and snow cover will decrease the availability of water in regions that are home to more than one sixth of the world's population. At lower altitudes, small increases in temperature will decrease crop productivity, increasing the risk of hunger. Crop production will be adversely affected by more frequent droughts and floods. Climate change and the resulting rise in sea levels will expose coastal areas to a heightened risk of coastal erosion. Rising sea levels will expose millions of people to flooding, particularly those in the mega-deltas of Asia and Africa.
- Climate change will affect the health status of millions of people by: increasing malnutrition and its impact on child growth and development; increasing flood, drought, and heat-related deaths, disease and injury; increasing the burden of diarrhoeal disease; and changing the geographical distribution of some infectious disease vectors.
- These impacts will be felt unevenly across the world, especially affecting Africa, Asia and Latin America, regions that have the least adaptive capacity enduring the worst consequences.

Africa will bear the brunt of the worst effects of climate change. The IPCC predicts that by 2020, climate change will expose 75 to 250 million Africans to water stress. Climate change will decrease the area suitable for agriculture and impact both the length and productivity of the growing seasons. It will also decrease the amount of fish in large lakes. All of these factors will reduce the food supply for a significant number of people in Africa.

Asia is not slated to fare any better. Glacier melt in the Himalayas will initially cause upstream flooding, followed by reduced river flows as glaciers recede. Many countries in the area are expected to face an increased risk of hunger. In addition to more deaths from flood and drought-related diarrhea, South Asia is likely to see an increase in the incidence and toxicity of cholera outbreaks.

⁴"The Economics of a Global Deal on Climate Change," Richard H. Sabot Lecture delivered at the Center for Global Development, Washington D.C on June 26, 2008.

In Latin America, global warming will lead to the gradual replacement of tropical forest by savanna in eastern Amazonia. Semi-arid vegetation will likely be replaced by arid-land vegetation. Declines in the productivity of major crops and livestock will adversely affect food security. Low-lying areas will face increased risk of flooding due to sea-level rise. Disappearance of glaciers and changes in rainfall will adversely affect agriculture, energy generation, and the availability of water safe for human consumption.

There are uncertainties as to when and where the effects of climate change will be felt. There also is the possibility that the consequences could be worse than currently predicted. The current scenario does not take into account the possibility of positive feedback, such as a decrease in the Earth's albedo—surface reflectivity of sun's radiation—due to melting polar ice caps or a decreased uptake of carbon dioxide in forests weakened by climate-related effects. These positive feedback loops could turn small-scale climate change into large-scale climate change.

These predictions are about physical changes that will impact the livelihoods of millions of people. The important question is how these changes will impact the various economic sectors of poor countries and, most importantly, how they will affect the incomes and livelihoods of the poor.

GDP and Regional Poverty

According to the Stern Review, if nothing is done to stem climate change—a situation termed “business as usual” (BAU)—the earth will warm by 2 to 3°C, resulting in the permanent loss of up to 3 percent of global output. The average figure masks the fact that the impact of climate change will vary geographically. The poor countries will suffer greater output reduction because of their geography, and initial economic conditions will hamper their adaptive capacity. Recent research suggests that a 5 to 6°C warming is a real possibility, and such an increase would lead to an average 5 to 10 percent loss in global GDP (Stern, 2008). Under such a scenario, the GDP of poor countries will decrease in excess of 10 percent. The projected loss in global output under BAU will be higher if the following factors apply: appropriate weights to account for unequal burdens on poor regions of the world, the direct impact of climate change on the environment and human health, and the impact of amplifying feedbacks (Stern, 2007).⁵

Researchers also have tried to estimate the economic impact of a specific consequence of climate change such as sea level rise (SLR). A recent World Bank study examined how a 1-5 meter rise in sea level will impact land, population, GDP, urban extent, agricultural extent and wetlands in 84 coastal developing countries. The study found that Vietnam, Egypt and the Bahamas will face catastrophic consequences due to sea level rise. It is predicted that a 1-meter rise in sea level will impact 10 percent of Egypt's population, and will affect 10 percent of Vietnam's population and GDP.

⁵A Swedish expedition has found that methane, a more potent form of GHG, is leaking from the permafrost under the Siberian seabed. http://news.yahoo.com/s/afp/20080830/sc_afp/swedenrussiaclimatewarmingmethane

Research shows that climate change will also affect the levels and growth rate of GDP. A recent paper finds that a 1°C rise in temperature in a given year reduces economic growth in that year by about 1.1 percent. This study finds evidence of a broad set of mechanisms in addition to decline in output through which temperature might affect growth in poor countries. These additional pathways include declines in industrial output and aggregate investment, and an increase in political instability (Dell, Jones, and Olken 2008).

Climate change-related declines in GDP and GDP growth rates will increase the number of poor people in affected countries. According to the Stern Report, “By 2100, in South Asia and sub-Saharan Africa, up to 145-220 million additional people could fall below the \$2-a-day poverty line, and every year an additional 165,000-250,000 children could die compared with a world without climate change” (Stern, 2007). Climate change will increase the variability of the income of the poor, heightening the chance that a shock will hit them when their income is low. Such vulnerability makes it easier for the poor to become trapped in poverty. Climate change will also impact poverty through its adverse effect on disease burden in poor countries. Higher temperatures will cause more people to suffer from diarrhea, malaria, and other water-borne diseases. Increases in health-related expenses are one of the main factors that contribute to a slide back into poverty. According to the Chronic Poverty Report 2008, bad health and the costs of medical treatment are the most significant reasons why households enter into poverty (Chronic Poverty Research Center, 2008.)

The World Bank study concludes on an ominous note: “Within this century, hundreds of millions of people are likely to be displaced by SLR; accompanying economic and ecological damage will be severe for many. The world has not previously faced a crisis on this scale, and planning for adaptation should begin immediately.” (Dasgupta et al, 2007)



Effects on Millennium Development Goals

Climate change will undermine progress toward achieving the Millennium Development Goals (MDGs). Already noted is how it will slow the rate of poverty reduction by slowing the rate of growth. It also will adversely impact the availability of food, especially for the poorest of the poor, increasing the incidence of hunger and malnutrition. According to the Stern Report, a 2 to 3°C rise in temperature will increase the risk of hunger for an additional 30 to 200 million people. Climate change will increase the prevalence of vector-borne diseases, such as malaria and dengue fever. It also will increase the sudden onset of disasters, further impacting mortality, particularly of women and children. The likely decline in the availability of fresh drinking water also will affect child and maternal mortality rates, undermining the MDG goals of reducing child mortality, improving maternal health, and combating malaria and other diseases.

Climate change will undermine work toward the MDG goals of education and gender equality as well. The shortage of fresh water and fuel will force families to take girls out of school to help their mothers collect firewood and water. Declining family income also will increase the need for families to send girls to work. Clearly, climate change will directly impact the goal of ensuring environmental sustainability by reversing loss of biodiversity and environmental resources.

“Africa will be the region that suffers the most from climate change, even as many people already must walk for miles to collect water.”
Credit: USAID

The important question is: what do all these issues mean for MFIs? According to the Microcredit Summit Campaign, at the end of 2006, 3,316 institutions were providing financial services to more than 133 million people around the world (Daley-Harris, 2007). Bangladeshi MFIs alone provided credit to more than 30 million borrowers.⁶ The stated goal of some MFIs is to alleviate poverty; an increase in the number of poor people will make achieving that goal all the more difficult. The early effects of climate change will make it harder to achieve the Microcredit Summit Campaign’s goal of ensuring that 175 million of the world’s poorest families receive credit, and of lifting 100 million families above the US\$1-a-day threshold by 2015. If MFIs want to achieve their goals, they must adapt to climate change.

⁶Source: personal correspondence with Dewan Alamgir on September 27, 2008.

4. Climate Change Impacts on MFIs

Climate change will affect the operations of MFIs through its impact on agriculture. Although MFIs are providing less agricultural credit, they have not been able to completely separate their activities from agriculture. Anecdotal evidence suggests that the repayment rate of these MFIs is highly correlated with crop production.⁷ Most of the customers of microenterprises are farmers, and any change in their income affects MFIs. In South Asia, the mostly female borrowers from MFIs have husbands involved in farming. Increasingly, MFIs are providing leasing loans for agricultural equipment and venturing into agricultural loans, especially in Africa and Latin America and now in South Asia (Dowla, 2004).

⁷A bumper crop after the major flood in 1998 helped MFIs in Bangladesh recoup some of the losses they incurred during and in the immediate aftermath of the flood.



“This Bangladeshi borrower harvesting wheat is one of many MFI clients whose income depends on agricultural performance.”

Effects of Declining Agricultural Productivity

Climate change has the potential to decrease the productivity of agriculture in a number of ways. Temperature increases induced by climate change will reduce crop output by accelerating crop growth—a process that results in less grain. “Evapotranspiration”—a combination of evaporation from the soil and loss of moisture from the leaves of the plant—is expected to increase as the planet warms. This phenomenon will measurably affect crop yield, especially in areas facing water shortages. Africa, in particular, will see disproportionate declines in crop output due to lack of access to water. More frequent extreme events, such as floods and droughts, also will impact agricultural production.

Kline (2007) used a large-scale model to estimate the impact of climate change on agricultural productivity. The following table shows the results of the modeling exercise:

Country	Percent change in agricultural productivity			
	Ricardian Model ¹	Crop Model ¹	Weighted Average	
		Without CF ²	With CF	
Argentina	-4	-18	-11	2
Brazil	-5	-29	-17	-4
India	-49	-27	-38	-29
China	4	-13	-7	7
South Central China	-19	-13	-15	-2
Mexico	-36	-35	-35	-26
Nigeria	-12	-25	-19	-6
South Africa	-47	-20	-33	-23
Ethiopia	-31	-31	-31	-21

¹Ricardian models statistically infer the contribution of temperature and precipitation on agricultural productivity by examining the relationship of land price to climate, whereas crop models relate farm output to land quality, climate, fertilizer input and so on.

²Without carbon fertilization [CF] effects.

The results suggest that agricultural productivity will decline in developing country regions by a greater amount when weighted by population and carbon fertilization—increased crop production due to higher CO₂ in the atmosphere.

Research based on detailed local-level data on Brazilian Municipalities suggests that by 2020, the value of six export crops: rice, coffee, beans, cassava, maize and Soya could fall by 6.5 to 7.1 billion reals if average temperature rises by 1 to 2° C (Wheatley, 2008).

The poor who depend on agriculture for their livelihood will have to bear the full impact of the decline in agricultural productivity—both as producers and consumers. Any decrease in productivity will decrease food production and increase food prices. Both these factors will increase the depth and severity of poverty. Recent estimates from across developing countries suggest that one percentage point of agricultural GDP growth increases the consumption of the three poorest deciles by 4 to 6 percentage points (Ligon and Sadoulet, 2007). All this suggests that the predicted decline in agricultural productivity will increase poverty and adversely impact MFIs and their clients.

Investment in livestock, a significant part of MFI portfolios is related to agriculture and will be directly affected by climate change. Normally, livestock function as a vehicle for saving, or as buffer stock. Borudiu and Cowen aptly explain the benefit of owning livestock:

A cow (or a goat or pig) is a much better medium for saving. It is sturdier than paper money. Friends and relatives can't ask for small pieces of it. If you own a cow, it yields milk, it can plow the fields, it produces dung that can be used as fuel or fertilizer, and in a pinch it can be slaughtered and turned into saleable meat or simply eaten. With a small loan, people in rural areas can buy that cow and use cash that might otherwise be diverted to less useful purposes to pay back the microcredit institution.

During large-scale drought—a likely climate change induced event—if all livestock owners want to sell their livestock, the price will collapse, as there will be more buyers than sellers. This situation, one that Amartya Sen labeled “entitlement failure,” is what happens to pastoralists in Africa during a drought, and it explains why this group is so vulnerable to famine. Climate change also will increase the possibility of outbreaks of diseases fatal to livestock, such as Bovine Tuberculosis and Rift Valley fever (WCS, 2008). In these ways, climate change will reduce the profitability of MFIs’ investment in livestock.



“Livestock, like these cows in Bangladesh, help till the fields and also serve as a medium for investment.”

Effects of Increase in Natural Disasters

MFI will be affected directly and indirectly by the increased incidence of natural disasters, such as droughts and floods. Disasters have the potential to cause total or partial destruction of offices, equipment, information systems and records belonging to MFIs. Disaster-related losses faced by MFI clients may have indirect consequences for these institutions (Pantoja, 2002). Possible macroeconomic effects such as inflation or recession caused by large-scale disasters can also have a pronounced indirect impact on MFIs.

South Asian MFIs have been dealing with floods for a long time, and some of these organizations have developed elaborate plans to deal with disasters. The experiences of these MFIs can suggest the means—and their possible costs—of dealing with natural disasters.

Grameen Bank in Bangladesh provides an example. The bank has been dealing with floods since 1987, when half its borrowers in a single zone lost important assets like livestock. Many borrowers' houses were damaged or destroyed, and 170 bank members lost their lives. Flood hit the same area again in 1988 and in 1991. The 1988 flood was even worse than the one in 1987; it damaged standing crops that were a major source of income for borrowers and their customers. In 1991, another area sustained damage from a tidal surge.

The biggest blow to the bank, however, occurred in 1998, in the aftermath of an unprecedented flood that inundated two-thirds of Bangladesh for 13 weeks from June to September. Out of 2.3 million members at the time, about 1.2 million were affected by the flood. The bank faced large-scale repayment problems in several areas of its operation. At the height of the crisis, 25 percent of its borrowers were in default. The suspension of repayment and drawing down of compulsory savings drained the bank's liquidity.

The bank was able to recover only because of the special status that enabled it to borrow from the government and from commercial banks (Dowla and Barua, 2006). The funding included a total of \$20.37 million from the central bank at a 10 percent interest rate, and an additional \$40.75 million from commercial banks issuing government-guaranteed bonds of a three-year duration at a 10 percent interest rate. The total amount borrowed from the government and the market was less than the \$100 million requested by the bank (Chazan, 1998). The bank repaid the amount borrowed from the central and commercial banks on time and completely restructured its financial service delivery model into what it now calls Grameen II (Dowla and Barua, 2006).

Other MFIs in Bangladesh faced similar problems during and after the flood of 1998. The Credit and Development Forum, a consortium of NGOs providing microfinance, and the South Asian Network of Microfinance Initiatives completed a rapid assessment of the impact of the flood on the microfinance industry. This assessment, completed during the flood's peak period in September 1998, found that "more than 60 percent of the branch operations of NGOs providing microfinance services were affected, with operations having ceased for over 60 days. As field operations had to be ceased for weeks, many small organizations that had lent out of their loan capital, consisting primarily or solely of members' savings, were almost wiped out." The assessment found that the repayment rate for all surveyed institutions dropped from 92 percent before the flood to only 60 percent in its aftermath. Because of the unavailability of data, portfolio-at-risk could not be calculated for the sector as a whole. But the assessment estimated that 30 percent of the portfolio of the three largest institutions, BRAC, Proshika and Grameen, was at risk (Nayar and Faisal, 1999). The sector needed a US \$200 million cash infusion to continue its operation (Pantoja, 2002).

As in Bangladesh, Hurricane Mitch and the flood in Mozambique adversely affected MFIs in Central America. These institutions faced liquidity problems due to the erosion of capital and high default rates. In both cases, MFIs needed donor funds to recoup from the crisis. A GTZ funded survey of Sri Lankan MFIs found that the 2004 tsunami inflicted significant financial losses on MFIs (Sri Lanka Business Development Center, 2005).

Funding for Disaster Recovery

This brief overview of the effects of natural disasters on MFIs points out that they are vulnerable to such events. In every case examined, MFIs in the affected region needed outside funding from within and outside the country to deal with direct and indirect damages suffered by their institutions. In most cases, funds were available, as these disasters were one-time events, and MFIs and their clients were able to survive by using internal and external resources.

All predictions suggest that climate change will increase the frequency and extent of floods, droughts, cyclones and tidal surges. When disasters occur repeatedly and over wide geographical space, there may not be enough internal and external funds to deal with such events. Moreover, governments and external donors will be faced with more immediate demands for funds to save lives, deliver food supplies, and provide relief. Funds may not be available to meet the disaster mitigation needs of MFIs. Grameen Bank's experience dealing with the 1998 flood illustrates the challenges MFIs are likely to face from natural disasters caused by climate change. Unexpected major flooding almost destroyed the flagship microfinance institution as it revealed the underlying weakness and rigidity of its financial service delivery model. Credit-granting NGOs, especially smaller ones dependent on client savings and grants from donors, will face hard times when a major disaster strikes. Clearly, MFIs need to have a plan in place outlining strategies for dealing with and adapting to the natural disasters that will be caused by climate change.

Reconsidering Debt Forgiveness As an Option

In the future, climate change will place pressure on MFIs to forgive debt. After the recent cyclone Sidr in Bangladesh, a storm that affected ecologically vulnerable delta areas in the southern part of the country, MFIs faced pressure to write off loans. According to news reports, MFIs operating in the area, such as Grameen Bank, BRAC and ASA, along with partner organizations of the apex organization PKSF, were considering writing off close to \$8.6 million worth of loans for 75,000 borrowers (BangladeshNews.com.bd, 2007). During its early days, the first serious threat faced by Grameen Bank was when a newly elected government decided to forgive all agricultural loans disbursed by nationalized banks that were less than 5000 Taka (\$125 at the prevailing exchange rate). Since most loans issued by Grameen Bank at the time were less than 5000 Taka, borrowers thought that their Grameen loans were forgiven as well (Yunus, 99).

This year, the Indian Government has launched a major loan forgiveness program for bankrupt farmers owning less than five acres of land. Created in response to high suicide rates in several Indian states among rural farmers heavily indebted to moneylenders from whom they borrowed at high interest rates, this current debt forgiveness program falls short of its goal. It does not reduce debt owed to moneylenders and thus provides little benefit to the small farmers it was designed to help. The major fallout of such large-scale debt forgiveness is that MFIs in India also may face pressure to forgive debt (The Economist, 2008).

Climate change-related disasters will create even more pressures for MFIs to forgive loans-especially if governments forgive agricultural loans to small and medium farmers. From a humanitarian perspective, it may seem that MFIs should write off loans in areas that are routinely hit the hardest by natural disaster. The reality, however, is that MFIs should avoid loan write-offs as much as possible. Such write-offs have the potential to destroy the cherished culture of repayment that MFIs have painstakingly built over time. Instead of forgiving loans, MFIs should respond to disaster by extending payment periods, or by offering low-interest or interest-free loans.

Clearly, the physical, economic and social consequences of climate change will impact MFIs and their clients. The remaining question is: what can MFIs and their clients do to adapt to climate change?

4.1. Adapting to Climate Change

According to one IPCC report, adaptation is any adjustment in natural or human systems, in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities (McCarthy et al., 2001). Adaptation includes reducing the costs of climate change and strengthening the capacity to respond to it. Adaptation, however, will only lessen the impact of climate change—it will not solve the problem. In contrast, mitigation is human intervention to reduce greenhouse emissions. To successfully deal with the consequences of climate change, affected countries need to have a mitigation plan in place. Such a plan must be developed and implemented by the governments of these countries to reduce the emission of greenhouse gases. But while mitigation plans are necessary, MFIs cannot afford to wait for governments to create them and for the plans to take hold. As organizations serving the poor, MFIs have to start adapting to climate change to at least partially protect the resources and assets of their members and themselves.

Adaptation is different from mitigation; adaptation provides local benefits without a long delay (Stern, 2007). Adaptation involves costs, such as building infrastructure. The IMF's World Economic Outlook Report estimates the costs of adaptation to be in the range of \$3 billion to \$37 billion each year—a very wide range. The higher figure is roughly one-third of total Official Development Assistance and concessional finance (IMF, 2008).

Adaptation should not be viewed as separate from other development interventions. As Nick Stern (2007) points out, “Rather than treating adaptation as separate from development, it should be seen as an additional cost and complexity to delivering standard development goals.” He continues:

The most effective way of achieving this is to integrate climate risk, and the additional resources required to tackle it, into planning and budgeting for and delivering these development goals. This requires a portfolio of adaptation responses, from changing planning, policy and institutions (based on better investment in and access to climate information), to improved access to markets (particularly insurance) and technologies (such as crop varieties) and ensuring climate sensitive investments are climate resilient. Adaptation should be understood as the impacts of climate change on standard development outcomes, not whether the response to these impacts can be defined as separable from ‘standard’ development activities.



*“An employee of Grameen Shakti, a Grameen Bank sister organization, installs a solar panel on the home of a client in Bangladesh. Solar energy represents a promising tool to combat global warming, but only if undertaken on a large scale.”
Credit: Grameen Shakti*

Adaptations at Work

Adaptation is already happening in both rich and poor countries. The diverse response of countries to climate change is revealing inequalities in capacity to adapt. As the Human Development Report 2007/2008 points out, for the richer part of the world, adaptation is a matter of erecting sea walls financed by public funds. In poor countries, adaptation is largely a matter of self-help. Rich countries are building homes that float in water. In poor countries, people are learning to float in water (UNDP, 2007). MFIs will not be able to bridge this chasm, but they can help to narrow it.

MFIs Adapting Slowly

Despite the enormity of the problem, the microfinance community has been almost silent about climate change and its impact. There are some initiatives dealing with green microfinance—trying to persuade MFIs and their clients to adopt practices aimed at reducing carbon emissions. While such initiatives are laudable, as anything and everything to reduce dependence on fossil fuels will help, they are not addressing the most important issue—how to deal with the consequences of climate change that are happening already.

Even if the global community agrees to cut emissions now and in the future, the slow speed of its response to such a reduction means that climate change will still occur. Estimates suggest that even if CO2 is stabilized at 450-550 ppm, there will still be a warming of 2-40C by the end of this century. As such, adaptation must be considered even under the most optimistic scenario of global warming.

It is not surprising that MFIs have ignored the issue of climate change. To begin with, MFIs and their clients' operations have much smaller carbon footprints than institutions in rich countries, and the majority of their lending funds businesses that operate with minimal carbon emission.

In addition, many practitioners lack the information necessary to incorporate adaptation into their day-to-day operations and strategic planning. They are involved in solving immediate problems, such as deteriorating quality of loans, expanding outreach, and developing new products to achieve the long-term goal of poverty alleviation. But the hard-earned reduction in poverty achieved through microfinance will not be sustainable if the current predictions about climate change prove accurate.

MFIs do have some experience in dealing with one of the consequences of climate change: natural disasters like floods and droughts. But with the exception of a few South Asian MFIs, these institutions have developed a reactive approach; that is, they deal with the current year's disaster and move on instead of planning to manage recurring disasters.

One notable climate change-related MFI initiative is the financing of solar energy. Solar energy will reduce carbon emissions. However, for it to be an effective weapon in the fight against global warming, solar energy has to be widely adopted in rich and poor countries alike. More importantly, solar energy will not protect the assets of MFIs and their clients from the adverse consequences of global warming.

4.2 MFIs' Adaptation Schemes

Climate change will create new challenges for MFIs and their clients. Even though the worst consequences of climate change are predicted to happen around the years 2030-2050, some of these consequences are already being felt. Maddison (2007) conducted a large-scale survey of agriculturists in 11 African countries to determine whether they could detect climate change. He found that a significant number of farmers believe temperatures have already increased, and that they have observed a decrease in rainfall. For example, Gbetibouo (2009) found that farmers in the Limpopo River Basin of South Africa believe that the climate has changed, and their perceptions are in line with climate data recorded at meteorological stations in the area. The Kenyan capital Nairobi, situated in the country's highland area, is noticing a greater incidence of malaria. The increase in temperature caused by climate change is responsible for the spread of this disease to areas previously protected from the parasite by cooler temperatures (Alsop, 2007). New evidence points out that climate change might actually accelerate through feedbacks-meaning that predicted impacts could occur earlier than suggested and that the IPCC report has underestimated the likely increase in temperature and sea level (The Economist, 2009).

Accordingly, MFIs must begin the process of climate-proofing their institutions sooner rather than later. Without question, adaptation will be costly for MFIs and their clients. However, these expenses should be considered an investment rather than a cost: money spent today will help MFIs avoid worse consequences in the future. To minimize costs, MFIs should use 'no-regret' adaptation schemes that will be useful even if the direst predicted consequences of climate change do not materialize.

Promoting development is one of the most effective means of adapting to climate change. Underdevelopment turns the risks of climate change into very real vulnerabilities. Microfinance is considered one of the most important development interventions. Some of the things that MFIs currently do can be reconfigured to deal with climate changes. The top priority for MFIs should be to climate-proof their existing products: credit, savings and insurance.



"Many have already reported higher temperatures and decreased rainfall in many parts of Africa, which is troubling news for this farmer in Uganda."

Climate-proofing Loan Products

Microfinance makes it possible for people to build up assets and, in this sense, MFIs are already helping their clients adapt. Loans, savings products and, in some cases, insurance, have all been shown to increase the income of the poor and allow them to build assets (Zaman, 1999). These products allow borrowers to diversify their sources

of income and build adaptive capacity against shocks.

Granted, a borrower has to go through several rounds of loan utilization and accumulation of savings before he or she sees an increase in income and the build-up of an asset base. This also assumes that the borrower does not face a significant shock, such as the chronic illness of the family's major income earner or a flood that destroys the house and the household's major assets. It also assumes that the investment does not yield a negative return. The borrower's vulnerability to such events suggests it will be difficult for MFIs' clients to increase and sustain income when climate change begins to have an impact. Credit provided by MFIs has helped borrowers increase their income and assets and smooth consumption and, in the process, increase their adaptive capacity (Menon, 2006). Farmers in South Africa reported that lack of access to credit was preventing them from adapting to increased temperature and variability of rainfall (Gbetibouo, 2009). Research based on the experience of MFIs in Bangladesh shows that borrowers value credit highly as an instrument for reducing vulnerability, as it allows them to adopt risk-mitigating strategies. For example, during and after a major flood in 1998, clients continued to repay loans so that credit sources remained open for them in case the situation were to get even worse. And in some cases, clients did not want to draw down their savings after the flood, as that would reduce the size of their loans (Zaman, 1999).

The destructive effects of climate change have the capacity to wipe out the assets laboriously built up over time by the poor. MFIs and their clients need to take appropriate action to adapt to climate change so that clients are able to maintain income and assets despite climate change.



"Houses that incorporate corrugated sheets, like this one in Bangladesh, are more resistant to natural disasters."

To climate-proof loan products, MFIs have to change the terms and maybe even the delivery method of loans. A common refrain is that microfinance is too rigid. Most loan repayment schedules entail fixed installments over the duration of the loan. There are valid and practical reasons why MFIs use such fixed-debt contracts (Karlan and Mullianathan, 2007). But a rigid repayment system makes it extremely difficult for borrowers to repay loans when they lose their income-earning opportunities during natural disasters like floods. They may have to borrow from a moneylender at a high interest rate to repay the agreed-upon installment and, in some cases, families skip meals so that they can make regular repayments.

Most MFIs in Bangladesh allow their members to reschedule installments during times of flood. Empirical work based on data collected during the flood of 2004 suggests that the rescheduling of loans reduces borrowing from moneylenders and serves as a safety net to prevent the borrower from sliding further into poverty (Shoji, 2007 and 2008).

Grameen Bank now allows its borrowers to renegotiate their loan contracts whenever they face repayment problems. The bank discovered that the rigidity and conditionality built into the system were the reasons for large-scale repayment problems after the major flood of 1998. The bank found centers where all borrowers repaid on time next to centers where a majority of borrowers were in arrears, even though these centers were in the same flood-affected area. Management realized that the rigidity of the system did not allow the borrowers to cope with the debt burden after the flood, and that the loan conditions were ignored, costly to enforce, and may have even been counter-productive. Under Grameen II, the bank allows an exit option for borrowers. If a borrower faces problems in meeting the repayment, she can renegotiate her contract to extend the repayment period and lower the installment amount. Borrowers can also vary the amount and number of repayments (Dowla and Barua, 2006).

All these experiences suggest that MFIs have to introduce flexibility into their loan contracts if they wish to successfully adapt to climate change. This flexibility can be introduced by allowing variable installment payments as well as the option to reschedule loans.



“At Grameen centers like this one in Bangladesh, flexibility in loan contracts has helped MFIs and borrowers navigate natural disasters.”

MFIs also can change the loan contract to make it climate-proof. For example, a housing loan is an important offering for many institutions in the world, and a house is an important investment for the poor. When floods, cyclones and tidal surges destroy their houses, the poor need immediate funding to rebuild. Anything that MFIs can do to make houses less susceptible to natural disasters will be of immense help to their clients. As a condition for a housing loan, MFIs can suggest that clients use a design that lends itself to easy reconstruction. In the Mekong Delta, for example, the Vietnamese Red Cross helped install houses carefully designed to be easily restored in the aftermath of disasters, such as floods and typhoons (UNDP, 2007). And Grameen Bank borrowers are required to follow a specific building design that incorporates concrete pillars and corrugated sheets. Another example of this concept would be to make housing loans conditional upon the borrowers building their houses above flood level by placing them on stilts, raised beds, or raised embankments. They could also be required to plant trees around their houses to provide protection from high winds and receding floodwaters.



*“Floating gardens built with water hyacinths are encouraged, because the technique is highly adaptable to climate change challenges.”
Credit: National Biological Information Infrastructure digital image library*



*“MFIs can play a part in encouraging the conservation of mangrove forests to protect communities from tidal waves.”
Credit: National Oceanic and Atmospheric Science photo gallery*

Focusing on Water Supply

Too much water during a flood and too little during a drought will be the norm under climate change. MFIs could facilitate a continuing supply of fresh water to their clients by changing loan conditions. Many MFIs provide loans for tube wells that give clients access to fresh water rather than contaminated surface water. MFIs could require that tube wells constructed with loan money be raised to protect against contamination by floodwater. Using the example of SEWA, MFIs could require that borrowers harvest rainwater from the roof. Alternatively, MFIs could make a housing loan condition that borrowers build catchments to collect rainwater.

A World Bank report on drought in the Indian Province of Andhra Pradesh recommends giving credit for adapting to drought. Such credit would provide initial capital for shifting to a long-term viable business that would be less affected by drought. For example, based on modeling at the district level, the report suggests that climate change would increase the benefits of shifting from rice to less water-intensive crops. Rice requires 1,200 millimeters of water during its growth period, with any shortage of rainfall being made up through irrigation. By comparison, rain-fed crops, such as maize, jowar, groundnut and sunflower, require only 400-600 millimeters of water to complete their lifecycle (World Bank, 2006). MFIs could give credit for growing less water-intensive crops. Another common consequence of drought is loss of employment. To mitigate unemployment, MFIs can provide credit to create new businesses for people who lose their jobs due to drought. Livestock and the agro-industry are less vulnerable to drought and could be encouraged.

Following the example of the Vietnamese Red Cross, MFIs also can help protect natural capital that will build the adaptive capacity of their clients and the community in which they live. With the help of the Red Cross, people living in the northern coastal provinces of Vietnam planted 12,000 hectares of mangrove trees. These trees were used to protect the sea dike and act as a barrier to high sea waves associated with typhoons. The plantation created jobs for the 7,750 families involved in the replanting and protection of the trees, and became an additional source of food and income for these families, as they were able to harvest shellfish among the mangroves (Sperling, 2003). Following this example, MFIs can give loans to farmers in coastal areas for pisciculture with the condition that they must grow the fish in the mangrove forest. If the clients do not own the land rights for the coastal area, the MFIs could lease the land from the government and re-lease it to their clients—an example of a private-public partnership to adapt to climate change. MFIs could make as a condition that the borrower would have to use a saline-resistant variety of rice in the coastal region. Governments could include planting mangroves in their National Adaptation Programmes of Actions (NAPAs) and outsource this task to MFIs.⁸

⁸Under the provisions of United Nations Framework Convention on Climate Change (UNFCCC), NAPAs provide a process for Least Developed countries to identify priority activities that respond to their urgent and immediate needs with regard to adaptation to climate change.

MFIs can develop new loan products that will build the adaptive capacity of borrowers. To find ideas for new loan products, they do not have to conduct expensive marketing surveys. Instead, they could take advantage of local knowledge to find out what people are already doing and provide loans to scale up local initiatives. For example, in southern Bangladesh, farmers use abundantly available water hyacinths to build floating gardens (UNDP, 2007). Water hyacinths, which are a good source of compost and nitrogen, are used as a base for the garden. The base is topped up with silts from the river and locally available compost. The farmers are then able to grow vegetables on the water garden (hydroponics). The cost of building a water garden is nominal (Practical Action, 2007). MFIs in Bangladesh and in other places with similar geography could pilot a loan program for water gardens, and could use the accumulated knowledge to develop a standardized loan product for growing vegetables during the flood season. The loan could be short-term because the whole operation requires only three to four months, and the borrowers could be allowed to repay the loan with interest at the end of the loan period.

Introducing Remittance Services

Some poor rural households receive funds from family members who are working in urban areas of their countries or overseas. This remittance serves as insurance for the households, as it allows them to increase and diversify sources of income, building adaptive capacity. Remittances can help borrowers deal with shocks, such as health issues, crop failures and natural disasters. For example, Mazzucato (2009), based on a matched sample of Ghanaian immigrants and their extended family networks in Ghana, found that migrants send remittances to extended family networks to deal with health emergencies or funerals.

Remittances can be reliable in the context of climate change; they form a source of income unaffected by local disasters. Such funds usually come from countries in the West and the Middle East that have a higher adaptive capacity and where the impact of climate change will be minimal. Remittances can be used not only for dealing with climate change-related shocks, but also for building borrower safety nets.

MFIs could expand this adaptive capacity for their borrowers by introducing remittance services as a product. For example, MFI clients could facilitate the receipt of remittances from family members by providing remittance services at a low cost, or even providing value-adds to the services.

Savings to Mitigate Risks

Savings enable borrowers to deal more effectively with risks. Most MFIs use compulsory savings plans as a prerequisite for membership. Such savings act as a screening device, and provide MFIs with a guaranteed fund for further on-lending. However, unless permitted, borrowers cannot use these funds during a crisis. When withdrawal of compulsory savings is permitted, as it was by MFIs in Bangladesh in 1998, the institutions involved faced a liquidity crisis. MFIs have to introduce voluntary savings that clients can use to deal with shocks so they will no longer be dependent on high-interest loans from moneylenders to pay for essentials. MFIs that provide voluntary savings, however, must develop a line of credit they can access to meet the increased demand for withdrawals during disasters. This is especially true for smaller MFIs.

MFIs in Bangladesh have been switching from compulsory to voluntary savings. Moving away from compulsory saving products, Grameen Bank has ceded greater control to borrowers over management of their savings. In addition, the bank has introduced several contractual savings schemes that are extremely popular with borrowers, and this new source of funds has enabled it to expand outreach at a breakneck speed (Dowla and Barua, 2006).⁹ Other MFIs in Bangladesh also have introduced similar savings products (Meyer, 2002).

The added flexibility and effectiveness of personal savings as a safety net met its first test in Bangladesh during the floods of 2004. Before the onset of the flood season, the bank urged borrowers to place extra money in their personal savings accounts and asked them to take the necessary steps to protect their in-kind savings in livestock and poultry before the onset of the flood season. Borrowers used their savings to withstand the flood, and the bank used the cushion of large internal savings to deal with the flood's impact (Dowla and Barua, 2006).

Salcajá, an MFI based in Guatemala, offers remittance recipients pension funds and various savings and insurance products. Adhikar, an Indian NGO-MFI, has created a vehicle through which migrant workers from the state of Orissa can send remittances to family members from their work place in the State of Gujarat.
(Ghate, 2007)

⁹For a while Grameen Bank opened two branches per day and most of these branches were self-sufficient on day one.

Insurance Products

The poor usually use self-insurance and informal insurance to protect themselves against idiosyncratic risk—events that affect specific households—such as disease. But these mechanisms are insufficient to protect them against covariate risk—events, such as a flood, that affect a large number of households simultaneously. Inability to deal with risks prompts the poor to engage in activities that are low-risk and low-return, such as growing traditional varieties of rice instead of high-yielding varieties that may not be floodwater prone. This lowers their income and



“With the protection of insurance, farmers are more willing to cultivate riskier high-yielding varieties of rice.”

impedes their capacity to lift themselves out of poverty. Some MFIs provide insurance, which can be offered independently or linked to loans and savings (Enarsson et al. 2006). Insurance, it must be noted, does not wipe out losses from adverse events. But it does reduce the financial impacts of these events by allowing the vulnerable to pay small sums so that they can be protected against a small probability of large loss.

Typical products provided by MFIs include life insurance, credit life insurance, health insurance, and funeral insurance. These forms of insurance protect the assets of borrowers and the portfolios of MFIs. Some MFIs, such as Grameen Bank, provide insurance for livestock. The livestock insurance premium is usually a fraction of the value of the loan and has co-insurance as high as 50 percent. The bank requires that the livestock be vaccinated regularly as part of the loan contract. Borrowers also know that this investment is an important one, and take every precaution to protect their assets, such as building stables for the livestock on a bed raised above flood level.

In poor countries, health-related shock is the major crisis faced by the poor. Such shocks impose burdensome medical expenses and loss of income. Some MFIs are currently providing health insurance to reduce the burden of health shocks. But a survey of

microinsurance in 100 poor countries suggests that this health insurance coverage is insignificant. The survey, which included MFIs and other providers of health insurance, reports that only three percent of the population has access to such programs. At the same time, the survey reports that health insurance is the most demanded and sought-after service (Roth et al. 2006). In the future, MFIs should provide health insurance to deal with climate change-related increases in medical expenses. Such insurance can be bundled with loans or offered as a stand-alone product.

Insurance currently provided by MFIs can be reconfigured to deal with the consequences of climate change. Climate change will create covariate risk on a scale never seen before. MFIs will need help from outside sources to deal with this immense challenge. The means used by the poor themselves, such as self-insurance and informal insurance, can inform the development of new insurance products. Products that offer affordable coverage and sliding co-payments to prevent moral hazard and adverse selection will be important tools for adaptation.¹⁰

Lack of familiarity with potential products and slow adoption of known ones has limited the use of insurance by MFIs. Insurance for themselves and their clients can protect both groups from the worst financial consequences of flood, drought and disease. Insurance could become one of the most important tools in MFIs' climate change arsenals. At the same time, the increased burdens of disease and death caused by global warming will strain the insurance funds of MFIs. To continue to honor claims, MFIs will have to resort to higher premiums. Such a premium increase, while guaranteeing that the indemnity will be paid on time, also will increase the financial burden on the poor especially if insurance is a prerequisite for loans.

¹⁰Moral hazard and adverse selection are widely used concepts used in the financial services literature. Moral hazard refers to possibility that the insured will behave differently if the risk is insured. For example, if a farmer has crop insurance, then he/she may not take adequate care of crop because the insurance company will compensate the crop failure. Adverse selection is the situation where only the risky farmers will buy into a crop insurance program. Insurance industry has developed techniques to mitigate the problem of moral hazard and adverse selection.



“This Grameen Bank borrower in Bangladesh has the option of taking out livestock insurance to protect her assets.”

Grameen Bank's Experience with Loan Insurance

To relieve borrower anxiety about leaving behind debt, Grameen Bank introduced a loan insurance program for borrowers.¹¹

At the insistence of female members, their husbands were also covered under this program, even though the men were not bank members. Initially, the insurance program was extremely generous. If borrowers wanted to be covered by the insurance, they were required to pay a fraction of their outstanding loan at end of the year. To cover a borrower's husband, the premium was twice the amount. Several times, shortfalls in the insurance fund forced the bank to change the terms of the insurance program, mainly because the actual death rate exceeded the number used to set the premium.¹²

Index-based Insurance

In the future, MFIs will have to develop new insurance products specifically to deal with climate change. Several organizations are field-testing new types of insurance products known as index-based risk transfer products (IBRTP), which were developed with the aid of the World Bank and donor agencies, such as the Department for International Development (DFID). These products can be important tools for adaptation, especially now that MFIs are offering credit to farmers in South Asia. According to Barnett et al., "IBRTPs are financial instruments that make payments based on realizations of an underlying index relative to a pre-specified threshold. The underlying index is a transparent and objectively measured random variable. Examples include area average crop yields, area average crop revenues, cumulative rainfall, cumulative temperature, flood levels, sustained wind speeds, and Richter-scale measures." Area livestock mortality and satellite imagery can also be used as indices.¹³

Index-based insurance products are different from traditional indemnity-based insurance, such as crop insurance. Under this mechanism, if the crop fails, the insured party will be compensated by the issuer of the insurance. The problem with this type of insurance is that it creates a moral hazard the farmer may not take care of the crop because he is insured. Moreover, the insurance company is required to send someone out to the field to assess the damage. In the case of IBRTPs, in contrast, the realization of the index is unrelated to the behavior of the insured. For this reason, IBRTPs are less expensive for the insurance company to implement.

Consider the following example borrowed from Barnett and Mahul (2007). Suppose a farmer buys insurance of \$1,000 against the risk of crop failure. Since crop failure is correlated with rainfall, the trigger for payout will be the amount of rainfall below 100 milliliters, with the limit set at 50 milliliters. If the actual rainfall is less than 100 milliliters, the policyholder will receive \$20 for each milliliter less than 100. Since the insured amount is \$1,000, the maximum payout for damages will be limited to an actual rainfall of 50 milliliters. One can see why this type of insurance is more attractive than traditional crop insurance. In this case, one does not have to estimate the value of the actual loss; the policyholder cannot game the system by overstating the loss; the operating costs are low; and firms without any experience in agriculture can sell this type of insurance.

¹¹Other MFIs in Bangladesh now offer similar insurance product.

¹²In one case, the premium had to be raised due to a higher-than-expected death rate among husbands caused mostly by riverboats capsizing during the monsoon season. In the delta region on the southern side of the country, motorboats provide the only means of travel between major towns and marketing centers.

¹³For examples of IBRTP schemes in place in developing countries, see Agarwala and Fankhauser (2008), Table 3.2.

Several microfinance institutions are currently participating in schemes to sell IBRTPs. The most notable example is BASIX in India. BASIX introduced the product after facing a high default rate and financial pressure in its operation in drought-prone districts in the Indian State of Andhra Pradesh. Instead of shutting down operation in these areas, BASIX joined hands with ICICI Lombard, a subsidiary of ICIC Bank, and the Commodity Risk Management Group of the World Bank to develop a weather-based insurance product for small and medium farmers in Andhra Pradesh. Since crop yields depended on rainfall, and default in loan payments was correlated with yields, rainfall was used as an index for the insurance. When the rainfall dropped below a certain level, usually 75 to 80 percent of normal rainfall, farmers received a payout proportional to the amount of rainfall up to a predetermined sum. The amount insured was based on farmers' costs of input, and the premiums were roughly 10 percent of the amount insured. The amount insured and the trigger level for payout varied by types of crop (Hubka, 2004).

In the future, IBRTPs can be used to insure the portfolios of MFIs. MFIs, however, would need technical assistance and reinsurance facilities to be able to implement IBRTP as an adaptation tool against climate change. External assistance would be needed to float a private company to underwrite indexable weather and other natural catastrophe risks in developing countries as index-based insurance itself may become vulnerable to climate change.

IBRTPs are now used in several countries to enable MFI loans to farmers in areas with high weather risk. MFIs in Malawi were once unwilling to loan to farmers, who typically face a high risk of crop failure due to unpredictable rainfall. Now, MFIs in the country are providing loans bundled with index-based insurance to farmers to produce groundnut. A package consists of a loan for groundnut seeds sufficient for one acre, the insurance premium, and tax. The loan includes a higher interest rate to cover the insurance premium paid by the MFI to the insurer, the Insurance Association of Malawi. When shortfalls in rain measured by the rainfall index cause drought, the farmer pays a fraction of the loan due,

and the insurance company pays the rest directly to the MFI. By removing the risk of rainfall deficits, rainfall-based index insurance has given MFIs confidence to disburse loans to farmers, and has in turn enabled farmers to produce a high-performing cash crop. Two microfinance institutions, the Malawi Rural Finance Company and Opportunity International Banking, are participating as loan providers.

Similar products are being developed in Tanzania and Kenya by a consortium of insurance companies, MFIs and government weather services (Hellmuth et al., 2007). In addition, the World Bank has developed index-based insurance for livestock in Mongolia. The insurance pays out indemnities whenever the adult livestock mortality rate exceeds 7 percent for a localized region, such as a country or soum. The risk exposure is layered, with the insurance company paying for losses between 7 percent and 30 percent and the government paying for extreme losses beyond 30 percent (Skees and Barnett, 2006). There is an ongoing attempt to link livestock insurance to loans from MFIs and banks.

Explorations are underway to use IBRTP to facilitate microlending in Peru. In the northern coastal department of Piura, a strong El Niño can cause abnormal rainfall—40 times the average. The ENSO 1+2 index that measures Pacific sea surface temperature off the coast of Peru is a good predictor of excess rainfall and resultant flooding in Piura. This index could be used to develop insurance against defaults faced by the MFIs in the area. The index exceeded 2.5 during El Niño events in 1982 to 1983 and 1997 to 1998. MFIs could buy insurance against the possibility of the index exceeding 2, with a maximum payout when the index reaches 3 (Skees et al. 2007). Similarly, in Vietnam, water level during the harvest period of June 20 to July 10 in specific water stations could be used as a trigger for insurance against defaults caused by flooding.

By considering both climate change and insurance modeling together, researchers at the World Bank examined the potential impact of climate change on the viability of the Malawi rainfall-index insurance program. The authors found that climate change will increase the risk of insolvency of the insurance program unless the premiums and payouts are reduced, and the insurance company holds more back-up capital. Given that the premium, at 6 to 10 percent of the insured amount, is already high, insurance companies will need external help to remain solvent (Hochrainer et al. 2008). Alternatively, donor agencies could provide back-up capital, or subsidize insurance premiums to keep them affordable in the face of increased risk created by climate change. For example, OXFAM UK paid 50 percent of the premium for the first year to help launch a disaster insurance program for coastal areas in Andhra Pradesh (Mechler et al. 2006).

Index-based insurance that reduces risk has other limitations. Significantly, it provides no incentive for farmers to switch from risky to more sustainable products. For example, BASIX rainfall insurance could allow insured farmers to continue to produce a water-intensive crop, such as rice instead of a crop that uses less water. To counter this potential effect, MFIs could nudge their members towards sustainable farming practices by providing insurance for crops that are less susceptible to weather conditions like rainfall. Index-based insurance also suffers from the problem of basis risk, the predetermined payout may not cover the full damage.

Weather-based insurance can have other uses beyond the protection of MFIs' portfolios and clients. It can be used to trigger funding from donors to MFIs. One such example is the insurance bought by the World Food Programme (WFP) to guarantee food aid in cases of severe drought. The WFP paid \$930,000 to guarantee a payout of \$7.1 million if shortages in seasonal rainfall cause drought. Measures of rainfall from 26 stations were used to calculate the rainfall deficit that would trigger a payout (World Food Programme, 2007).

Once weather-based indices are well developed, they can be used to trigger funding to MFIs to deal with climate-related disasters when the value of the indices falls below the threshold level. For example, a consortium of donors could take out a contract to insure the portfolios of MFIs in Bangladesh against the risk of floods. Water levels at various flood stations in the country can be used to develop the index. When the index falls below the threshold level, the consortium will receive the payout, which it can then use to provide disaster funds for the MFIs.

It is clear that there are viable adaptation schemes MFIs and their borrowers can develop to deal with climate-related change. It is undeniable, however, that adaptation by individuals and institutions alone will be insufficient to completely protect against the adverse consequences of climate change. For example, floods regularly destroy infrastructure: roads, telephone lines, railway tracks, etc. Even if MFIs and their clients successfully reduce the financial losses associated with major floods, they will still face problems if governments do not quickly repair damaged infrastructure. Adaptation plans developed and implemented by governments must climate-proof important infrastructure. MFIs can play an important role with government in developing and implementing national adaptation plans. The guidelines for National Adaptation Programmes of Action (NAPA) mandate consultation with stakeholders as an important step in the preparation process of these plans. MFIs should be active in these consultations, and function as representatives of their borrowers to ensure that any adaptation plan includes steps that will protect borrowers' livelihoods and assets. MFIs should form a consortium capable of liaising with governments during the process of mitigating climate-related risk.¹⁴ In spite of large exposure to climate-related risks, Bangladeshi MFIs were not involved in the consultation process for the NAPA.

A major research project by the Overseas Development Institute (ODI) on the efficacy of cash transfer during the Asian tsunami concluded that the large-scale, rapid and efficient disbursement of unconditional cash transfers by the governments of India and Sri Lanka enabled households to meet emergency food and non-food needs (Adams, 2007). The report noted “the World Food Programme (WFP) found cash to be more efficient and reliable than food distribution, and noted that cash transfers were associated with increased joint decision-making and a smaller increase in alcohol consumption than food aid.” Further, cash transfers enabled beneficiaries to buy necessary supplies and provided useful start-up capital for new businesses.

¹⁴ During the flood of 1998, major MFIs in Bangladesh—Grameen, BRAC and Proshika—were members of the civil society initiative “Citizen’s Initiative for Confronting the Disaster” that coordinated the relief and rehabilitation efforts (Zaman, 99).

Disaster Plans

In addition to reconfiguring their existing loans, savings, and insurance products, and developing new insurance products, MFIs should take direct steps to deal with disasters and major disease outbreaks. Every MFI must create a plan for dealing with disaster, which will be more frequent and intense due to climate change. Grameen Bank has a detailed disaster plan that incorporates experiences accumulated over the bank's long history of weathering the floods, cyclones, and tidal surges that are almost annual in Bangladesh. The bank's disaster plan has three phases:

- First, the bank prepares borrowers in July at the onset of flood season. During weekly meetings, the bank staff reminds borrowers to store non-perishable food items and immunize livestock.
- During the flood phase, the top priority of the bank is ensuring borrowers' safety. The staff visit borrowers at home or in shelters, distribute water purification tablets and oral rehydration solution, and even deliver their savings. Local branch managers are authorized to declare their centers disaster centers, a declaration that entails the suspension of repayments. The staff also provides at-cost emergency food aid that must be repaid after the flood.



"A Bangladeshi client receives treatment in a health camp, an integral part of Grameen Bank's disaster plan."

- The post-flood phase includes steps to ensure that borrowers can return to their normal lives as soon as possible. The bank makes cash transfers using geographical targeting of the worst hit areas and uses local knowledge and branch managers to trigger these transfers. The bank disburses money from the center disaster fund. The head office also sends money to the worst affected areas from the bank's Rehabilitation Fund, which was endowed with the imputed tax and undistributed dividends—a condition for maintaining its tax-free status. The bank reschedules loans and offers new loans to resume business and rebuild houses damaged by disasters. The bank also organizes health camps where doctors examine borrowers, their family members, and in some cases the general public for free, and sells medicine at cost (Dowla and Barua, 2006).

Other MFIs in Bangladesh have similar plans and, in general, they are able to deal with disasters more effectively now.¹⁵ Each MFI will have to develop its own disaster plan, but the key thing is that such a plan is in place. Irrespective of the details of the disaster plan, MFIs must develop disaster loan funds. Even though setting aside funds to prepare against disaster is costly to MFIs and additional loans after disasters may add to the debt burden

¹⁵After cyclone Sidr, which affected the southern part of the country, MFIs were in the area within hours, and used their branch network to deal with the aftermath of the cyclone.

of the poor, in the long run, disaster loan funds are beneficial to the institutions and their clients (Pantoja, 2004). Disaster funds allow MFIs to disburse cash to their clients quickly. Cash transfers prevent the poor from using the negative coping mechanisms of borrowing from moneylenders at high interest rates, reducing food intake, and withdrawing children from school to send them to work. With a disaster loan fund available, a temporary shock will not become a source of long-term destitution. Apex organization, PKSF in Bangladesh, for example, requires all their partner organizations to contribute 1 percent of interest income in a Disaster Management Fund. Further, they provide additional funds to partner organizations for dealing with disasters.

Disaster Insurance Variables

Despite having a disaster plan, Grameen Bank faced a liquidity crisis in 1998 due to the suspension of repayments for two-thirds of borrowers, depleting the clients' compulsory savings. As a result, Grameen Bank was forced to borrow a substantial amount from the government and private market. This example demonstrates that a well-crafted disaster plan may not be enough to protect MFIs against the consequences of climate change. One solution could be the sale of disaster insurance to its borrowers to protect their principal assets. Using a model developed by

INSTRAT UK, the actuarial and catastrophe services division of Guy Carpenter and Company Inc., Sengupta estimates that Grameen Bank could insure the principal assets of its borrowers by charging less than \$2 a year (Sengupta, 2003). To arrive at this estimate, the author used many heroic assumptions. For example, he assumed that the bank's loan portfolio would remain the same as reported in its December 2002 financial statement. Ideally, he should have used actual data of damages over a long period of time. The key caveat of the study was that Grameen Bank has to find a company willing to reinsure the risk.

Ideally, an MFI should be able to insure its portfolio against natural disasters. Since climate change will cause frequent large-scale disasters, domestic insurance companies may not be able to sell such insurance. Financial markets are not yet developed enough in poor countries to offer such sophisticated products. A domestic insurance company able to sell this kind of insurance will need access to reinsurance in the global market. Even national governments may not have the capacity to provide the necessary funds to deal with a major disaster. The Inter-American Bank estimates that, in the event of a 1-in-100 year event, Colombia, the Dominican Republic and El Salvador would be able to meet only 62 percent, 82 percent and 60 percent respectively of their post-disaster expenses (Freeman et al. 2003).

A consortium between MFIs, governments and donor agencies would be able to develop insurance products with a layering of risk coverage that would be activated depending on the extent of a loss as measured by an index. In the first layer, MFIs would use their own resources to deal with disaster if the extent of the damage were below a threshold level. In the second layer, the government would provide cover for damages above the designated threshold level. The third layer would be coverage provided by multilateral organizations in the case of a catastrophic event. A variant of this type of arrangement is implemented via the Turkish Catastrophe Insurance Pool (TCIP). In the case of TCIP, the various layering is provided by private insurance, the Turkish government, and the World Bank. The World Bank reinsures two layers of the TCIP risk in the form of a contingent loan facility with generous conditions (Linnerooth-Bayer and Mechler, 2007).

Need for Information Sharing

Lack of information will make climate change adaptation in poor countries difficult. There is little understanding among the general population of the potential consequences of climate change and the mechanisms for coping with these consequences. MFIs can increase the adaptive capacity of their clients by building up their human capital. This can be achieved via the dissemination of information about climate change, its likely impact, and suggested remedies. Some of the most needed information relates to weather conditions in particular, the beginning of



seasonal rainfall. Subsistence farmers in Zimbabwe reported they would adjust their farming practices according to long-term weather forecasts if they had the necessary funds to do so. MFIs should use their cell-phone networks to disseminate weather forecasts, particularly about the onset of floods. They could use free software FrontlineSMS to send bulk text messages about weather forecasts and flood warnings to their borrowers and networks. The poor have long experience dealing with climate variability and MFIs should not only take this knowledge into account, but share it widely. An example of the utility of local knowledge is the method Andean farmers developed to forecast El Niño: they use the visibility of constellations (DFID).

Poor people already know how to adapt to natural disasters. MFIs need to institutionalize this knowledge based on local, national and international experiences. MFIs also can help the poor make behavioral changes, as in the case of Grameen Bank's 16 decisions (Dowla and Barua, 2006). Making use of their existing groups and federations of groups, MFIs could spearhead community-based adaptation schemes. These groups do not need to be exclusive. Communities are also an important reservoir of disaster memories. The group setting of an MFI makes it a natural venue

to harvest such memories in preparation for disasters. The community could be organized to create an early warning system for disaster. Members of the community could listen to the radio and pass on the information to other members.

The main objective of MFIs should be to help their clients hold on to assets they have built up through successive rounds of borrowing, and augment these assets to reduce their vulnerability to climate change. Some of these assets are non-monetary, such as social capital. MFIs create social capital by establishing norms, trust, and networks. These non-monetary assets may not work well as a mechanism for dealing with the consequences of climate change. Climate change will cause disasters that will affect everyone at the same time. However, social capital can be harnessed to prepare for and deal with natural disasters like floods and droughts.

"In Bangladesh, the Grameen Phone program has increased cell phone access, introducing the possibility of using SMS services to disseminate weather forecasts and other vital information."

4.3 MFIs and the Market for Carbon Trading

Ratified by all major developed countries excluding the United States and Australia, the Kyoto Protocol is the largest international effort to combat global warming. The signatories of the Protocol, known as Annex 1 countries, are required to reduce their greenhouse gas emissions. To help these countries achieve their emission reduction goals at the lowest possible cost, the Protocol created three flexibility mechanisms. One such mechanism is the Clean Development Mechanism (CDM). The CDM allows Annex 1 countries to earn emission reduction credits, each equal to one ton of CO₂, by investing in projects that reduce greenhouse emissions in developing countries. The owners of these projects can sell their credits to countries to help these countries meet the Kyoto emissions target. The size of the CDM market is estimated at 950 million tons of CO₂ worth €12 billion in 2007 (IMF, WEO 2008). In addition to being a source of income, CDM projects will enable poor countries to achieve sustainable development, reduce emissions, and meet the cost of adaptation.

The current structure of the CDM is biased against small-scale projects that are suitable for financing by MFIs. The high transaction cost and lengthy bureaucratic procedures involved in getting projects approved under the CDM make community-based projects difficult. It takes, on average, 300 days for a project under CDM to be validated and approved, and the whole process can be expensive (Stern 2008). The Human Development Report 2007 notes, “marginal women farmers in Burkina Faso or Ethiopia are not well placed to negotiate with carbon brokers in the City of London—and carbon brokers seeking to minimize transaction costs have an inbuilt preference for large suppliers of mitigation credits” (UNDP, 2007). CDM rules put a 1 percent cap on the share of carbon credit gained through land use, land-use change and forestry. This essentially bypasses the land-based poor. Most CDM projects are in China, and an insignificant credit has been issued for projects in Africa. There are several initiatives by the United Nations and the World Bank to make the CDM market friendlier to the poor, and as the market matures in the future, MFIs may be able to take advantage of this opportunity. The Inter-American Development Bank suggests that MFIs create products that would use future carbon credit as guarantees or collateral for obtaining microfinance loans for start-up or expansion projects (Econergy International Corporation, 2006).



*“This solar home system provided by Grameen Shakti benefits the borrower and the environment.”
Credit: Grameen Shakti*

Solar Home Systems

The only successful example of a CDM project related to microfinance is that of Grameen Shakti—the Grameen Bank sister organization that supplies energy to poor households through an innovative funding and delivery mechanism. Solar systems are used to light homes and businesses. They can also be used to charge cellular phones and run fans and television sets. A consumer can choose from systems with capacities ranging from 10 to 75 watts. A 50-watt system, the most popular choice, costs \$400 and produces enough electricity to power four to six low-energy light bulbs, lamps, a radio, a TV and a mobile phone charger. The 150,000 solar home systems already installed, and the addition of 5,000 systems each month, makes Grameen Shakti the largest SHS provider in the world. Estimates suggest that the SHS has reduced CO₂ by 68,000 tons per year (Ashdan Award, 2008).

Grameen Shakti sells solar home systems in rural Bangladesh on credit. A purchaser makes a down payment of between 15 percent and 25 percent of the system's value, and the remainder is repaid through monthly installments. In addition to interest, the monthly installment includes a service charge.



*"A Grameen Shakti borrower in Bangladesh uses a biogas cooking stove that relies on animal droppings for fuel, thus reducing the emission of harmful greenhouse gases."
Credit: Grameen Shakti*

Last year, Grameen Shakti signed an initial agreement with the World Bank to sell 372,000 tons of carbon credit at €9 per ton of carbon reduction through the planned installation of 161,456 solar home systems by 2013.¹⁶ The project proposal is currently awaiting approval by the CDM Board. A 50-watt unit reduces carbon emissions by half a ton per year and, per the World Bank agreement, will earn €4.5 from each unit. Grameen Shakti plans to use this revenue to lower costs, making SHS more affordable for the poor and ramping up sales (Chhabara, 2008). Recently, the company has introduced a 10-watt system that can power two to three lights. Such a system will be attractive to the poorest among the poor. A reduction in price and an increase in usage will generate more carbon credits in the future.

Grameen Shakti has expanded its product offerings and has been selling biogas systems and improved cooking stoves. Both of these products reduce the need to use wood or kerosene for cooking. It is estimated that biogas systems and stoves are reducing carbon emissions by 8,000 tons of CO₂ per year (Ashdan Award, 2008). The raw materials for biogas are cow dung and droppings from poultry farms. The cow dung and poultry droppings produce methane, a more potent source of greenhouse gas that traps 21 times more greenhouse gas than carbon dioxide, and by using them as input for biogas, the company is reducing the emission of methane in the atmosphere. The company has yet to sell carbon credit from this source.

¹⁶ "E-mail correspondence with Grameen Shakti on August 20, 2008."

Other NGO/MFIs are now providing solar home systems, biogas and improved cooking stove programs with financing from IDCOL—a government-owned, non-bank financial institution. Grameen Shakti is the largest partner organization helping IDCOL to expand the use of solar home systems in rural Bangladesh. IDCOL, with financial assistance from several donors, is subsidizing the expansion of these solar home systems. It offers refinancing, soft loans, and outright grants to partner organizations to reduce the costs of solar home systems and thus facilitate their widespread use to remedy energy poverty (Urmee et al. 2009).

MFIs in other countries have started to provide lights and electricity that use low carbon sources and renewable energy. Al Karama of Morocco has partnered with a solar supplier to provide SHS systems to their clients. SKS in India is piloting a supply of LED lights and Kashf Foundation in Pakistan is in the process of introducing solar energy as part of their housing loan package.¹⁷ SEWA Bank in India, in partnership with solar supplier SELCO, has brought solar power to 100,000 households. The Biogas Support Programme (BSP) in Nepal, with financing from 145 MFIs and 70 construction firms, has installed 172,858 household biogas plants. Like Grameen Shakti, BSP has sold \$1 million worth of carbon credit (Rippey, 2008).

Grameen Shakti is not an MFI, but it uses a similar financing mechanism to sell solar home systems (SHS). Grameen Shakti's success suggests several lessons for MFIs planning to introduce SHS:



*"Women in a Grameen Shakti technology center receive training in marketing, repair, and servicing solar home systems."
Credit: Grameen Shakti*

- First, MFIs can use the same financial service mechanisms and their existing branch networks to deliver clean, renewable energy. Tapping into existing networks will allow them to expand rapidly and take advantage of economies of scale to reduce the cost of SHS so that they are affordable (IFC, 2007). As is the case with credit, solar energy has numerous “co-benefits.” The use of kerosene lamps, regular stoves, and kerosene, wood, and cow dung as fuel for cooking generates small particulates that cause respiratory illness and deaths. Cooking indoor with biofuels such as wood, dung, and crop residue, is an important contributor of black carbon or soot. Recent research (Ramanathan and Carmichael, 2008) suggests that black carbon in the atmosphere over South Asia is increasing the melting of snowpacks and glaciers in the Himalayas and increasing pre-monsoon rainfall and decreasing rainfall during the monsoon. Use of solar energy for lighting, along with the use of clean stoves and biogas, will reduce indoor air pollution and save the lives of children as well as reduce soot or black carbon in the atmosphere. However, the most important benefit is that this clean energy will allow the poor to become agents of change-reducing greenhouse gas emissions even though the poor have the lowest carbon footprint.

¹⁷E-mail correspondence with Jennifer Meehan of Grameen Foundation, October 23, 2008.

- Second, MFIs can take advantage of the market for carbon offsets and use the revenue to fund the expansion of outreach and product lines.
- Third, by choosing a reasonable down payment and installment plan, MFIs can make solar home systems affordable. For example, the average monthly installment of 360 Taka (\$5.50) charged by Grameen Shakti is less than the monthly cost of buying subsidized kerosene, and once the consumer realizes this, the sound economics of buying a solar home system become clear. Because solar home systems use renewable energy and have a life span of 25 years, economic savings from owning an SHS increase over time.
- Fourth, MFIs can create synergy between their traditional products, such as loans for livestock and poultry, and loans for biogas plants. They could become intermediaries where livestock owners and poultry farmers sell their byproducts to the owners of biogas plants.
- Fifth, MFIs also can become sources of job creation. Grameen Shakti has opened technology centers where local women are trained and employed to produce accessories and carry out the marketing, repair and servicing of solar home systems. It is now experimenting with a micro-utility where the electricity produced from a large biogas plant is rented out to small businesses, such as tea stalls, repair shops and pharmacies.

Obstacles to Expansion of Solar Energy

The main obstacle to the expansion of solar energy use is the price of solar panels. As mentioned earlier, Grameen Shakti and other NGO/MFIs in Bangladesh receive subsidies from IDCOL to lower the cost of solar panels and make SHS affordable to the poor. The recent hike in the price of fossil fuels has led to a huge investment in research and development and all projections suggest that, in the future, the price of solar panels will drop precipitously and more efficient panels will become available on the market. This projected decline in the price of solar panels should make it easier for MFIs to adopt solar energy.

Grameen Shakti is the first MFI-related organization to take advantage of the CDM market. The organization was successful because of its brand name and large scale. Lesser-known MFIs with fewer customers will have difficulty breaking into the CDM market; most MFIs will need technical and financial help to participate. International financial institutions and foundations dedicated to microfinance, such as Grameen Foundation, the Bill and Melinda Gates Foundation, the Google Org, and the Omidayer Network, can help MFIs launch solar energy. They could provide soft loans to MFIs to introduce solar units and could act as intermediaries to sell carbon credit on the behalf of these institutions. For example, UNICEF promoted the introduction of solar stoves through Nissa Bank, an MFI in Mauritania (Back and Cameron, 2008). Various UN organizations have launched initiatives to make the carbon market friendlier to the poor. Once the carbon market matures with the likely adoption of a cap-and-trade system in the USA, more companies will get involved in trading in the CDM, and future carbon credit can be used to raise funds for the large-scale use of clean energy by MFIs.

The Voluntary Market

MFIs are in an excellent position to take advantage of the voluntary market for carbon offsets that has emerged parallel to the CDM market. One can “purchase credits generated from projects that either prevent or reduce an amount of carbon entering the atmosphere, or that capture carbon from the atmosphere” (House of Commons Report, 2007). The buyers of such offsets are companies, governments, organizations, organizers of international events, and individuals. The sellers of such offsets are organizations that invest in several offset projects and sell portions of the emissions reductions to customers at a profit (Taiyab, 2005). Consumers can buy offsets from a project directly or through an offset provider. The market for voluntary carbon offset and the CDM puts a price on greenhouse gas emissions and allows institutions and individuals to reduce emissions at the lowest cost.

A voluntary carbon offset project that MFIs may be able to replicate is Plan Vivo—a set of standards, processes and tools used to develop and register payments for ecosystem services projects in developing countries. Under the plan, small holder farmers in developing countries can plant trees on their land and sell the emission reductions at approximately £3.50-6.00 per ton. A deal between the World Bank and Powerguda village in Andhra Pradesh, India offers another example. In 2003, the World Bank purchased an offset for 147 tons of CO₂ for \$650 for participants flying to a conference in Washington D.C. The villagers received this credit for planting Pongamia trees on a wasteland to sequester carbon into biomass. In another tribal village, Chalpadi, the oil extracted from Pongamia seeds, is used to run a 7.5 KVA generator that produces 10 kwh of electricity to light homes. Village women run the power plant, and the Andhra Pradesh government is replicating this successful experiment in another 100 villages. Nine hundred tons of carbon credits earned in this way have been sold to a German group under the CDM (D’Silva, 2006). The market is still emerging. The consultancy ICF International forecasts that global annual offset demand in 2008 through 2012 will be around 26 to 76 million tons of CO₂ and that the market will grow to be worth \$4 billion (Harvey, 2007).

Lately, the voluntary carbon offset market has come under close scrutiny. The Federal Trade Commission in the USA and the House of Commons in the UK have investigated transactions in this market. A special investigation by the Financial Times found that the market is plagued by problems of fraud, lack of “additionality”—the emission reduction that would have happened anyway without the project—and the fact that companies were selling credits several times over. The report also found evidence of people and organizations buying credits that did not yield any reduction in carbon emission (Harvey and Fidler, 2007). Such allegations and associated doubts in the carbon offset market, however, open up opportunities for entities that can guarantee high quality, transparent, and verifiable carbon offsets.

MFIs and their donors and supporters are in an advantageous position to supply verifiable credits in the voluntary market. MFIs can use their international connections with donors such as Grameen Foundation and Oxfam, and, taking a clue from the Fair Trade movement, sell better brand offsets. Already, two friends of microfinance have launched a for-profit social enterprise called the MicroEnergy Credit Corporation (MEC). MEC will allow traditional MFIs to tap into the complex and evolving field of carbon finance. The company will issue credits that will pay MFIs upfront when they lend for solar systems, improved cooking stoves, and biogas digesters. Initially, MEC will operate on the voluntary market, with eventual plans to move into the CDM market.

5. Conclusion and Recommendations

The world has already seen the trailer for the forthcoming movie about the consequences of climate change. When the prices of major food crops doubled within a short span earlier in 2008, food riots erupted in many of the poor parts of the world. The governments of these countries struggled to maintain their budgets due to the pressure of high import prices of food. The World Bank believes that the doubling of food prices in the last three years will push 100 million people in poor countries deeper into poverty.¹⁸ The food price hike is likely to cause famine in parts of Africa this year. The IPCC predicts that a temperature increase of more than 3°C may cause food prices to increase by up to 40 percent. The current increases in food prices and their consequences are merely a curtain raiser. If one thinks that the food price increase was bad enough, just add shortages of firewood and freshwater, increased disease burden, conflict and mass migration to the pot stir it and imagine the likely impact of climate change. Anyone could write the ending of this movie. It will be a disaster of major proportions. MFIs and their clients have no choice but to adapt, and the friends of these institutions can hasten this adaptation by encouraging MFIs to adopt the following recommendations:

- Reconfigure current products: loans, savings and insurance, to deal with climate change. Change the conditions of loans; introduce flexibility in savings products; and scale up the offering of health and livestock insurance.
- Develop new insurance products—weather-based index insurance—to deal exclusively with climate change-related weather fluctuations. MFIs will need external help to launch and scale-up these products.
- Introduce and expand the use of renewable energy, such as solar, to relieve energy poverty and contribute to the mitigation of the threat of climate change.
- Develop a detailed disaster plan for the institution. The plan should be flexible in order to deal with various kinds of disasters, such as natural disasters and the major outbreak of diseases.
- Develop disaster funds locally as well in the head office. In addition, get a credit line that can be accessed in the case of a liquidity crisis that depletes disaster funds.
- Take advantage of the market for carbon offsets and clean development mechanisms and use the revenue to make renewable energy affordable.
- Work with government and civil society in the preparation of NAPA.
- Work with multilateral institutions and donors to develop concessional funding facilities for dealing with catastrophes.

If MFIs, with outside help, implement the aforementioned steps, the Sahiduls of the world will have a fair chance to deal with the ill consequences of climate change. Friends of the microfinance movement must work together with the MFIs to help them to adapt to climate change.

¹⁸<http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21729143~pagePK:64257043~piPK:437376~theSitePK:4607,00.html>



"Recent rises in food prices have pushed millions of people all over the world into poverty."

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GLOSSARY

ASA (Association for Social Advancement)

BRAC (Bangladesh Rural Advancement Committee)

PKSF (Palli Karma-Sahayak Foundation)—an apex microcredit funding and capacity building organization

CDM (Clean Development Mechanism)

GDP (Gross Domestic Products)

GHG (Greenhouse Gases)

GTZ (German Technical Cooperation)

IBRTP (Index-based Risk Transfer Product)

IMF (International Monetary Fund)

IPCC (Intergovernmental Panel on Climate Change)

MDG (Millennium Development Goals)

MEC (MicroEnergy Credit Corporation)

NAPA (National Adaptation Programmes of Action)

NGO (Non-Governmental Organization)

ODI (Overseas Development Institute)

SLR (Sea Level Rise)

SHS (Solar Home Systems)

WCS (World Conservation Society)

WFP (World Food Programme)

UNDP (United Nations Development Programme)



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