# Assessing the Role of Microfinance in Fostering Adaptation to Climate Change

Shardul Agrawala and Maëlis Carraro

Photo © REUTERS/Andrew Biraj

JEL Classification: Q56, Q54, R51

Please cite this paper as:

Agrawala Shardul and Maëlis Carraro (2010), "Assessing the role of microfinance in fostering adaptation to climate change", *OECD Environmental Working Paper No. 15*, 2010, OECD publishing, © OECD.
doi: 10.1787/5kmlcz34fg9v-en

**Unclassified** **ENV/WKP(2010)1**

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development **12-Feb-2010**

**English - Or. English**

**ENVIRONMENT DIRECTORATE**

ENV/WKP(2010)1
Unclassified

**ENVIRONMENT WORKING PAPER NO. 15**

# ASSESSING THE ROLE OF MICROFINANCE IN FOSTERING ADAPTATION TO CLIMATE CHANGE

**By Shardul Agrawala and Maëlis Carraro, OECD Environment Directorate**

*JEL Classification: Q56, Q54, R51*
*Keywords: Microfinance, Climate change, Financing, Adaptation, Bangladesh, Nepal*

All OECD Environment Working Papers are available at www.oecd.org/env/workingpapers

**JT03278592**

**Document complet disponible sur OLIS dans son format d'origine**
**Complete document available on OLIS in its original format**

English - Or. English

## OECD ENVIRONMENT WORKING PAPERS

This series is designed to make available to a wider readership selected studies on environmental issues prepared for use within the OECD. Authorship is usually collective, but principal writers are named.

The papers are generally available only in their original language English or French with a summary in the other if available.

The opinions expressed in these papers are the sole responsibility of the author(s) and do not necessarily reflect those of the OECD or of the governments of its member countries.

Comment on the series is welcome, and should be sent to either env.contact@oecd.org or the Environment Directorate, 2, rue André Pascal, 75775 PARIS CEDEX 16, France.

---

OECD Environment Working Papers are published on
www.oecd.org/env/workingpapers

---

Applications for permission to reproduce or translate all or part of this material should be made to: OECD Publishing, rights@oecd.org or by fax 33 1 45 24 99 30.

Copyright OECD 2010

**ABSTRACT**

Much of the current policy debate on adaptation to climate change has focussed on estimation of adaptation costs, ways to raise and to scale-up funding for adaptation, and the design of the international institutional architecture for adaptation financing. There is however little or no emphasis so far on actual delivery mechanisms to channel these resources at the sub-national level, particularly to target the poor who are also often the most vulnerable to the impacts of climate change. It is in this context that microfinance merits a closer look.

This paper offers the first empirical assessment of the linkages between microfinance supported activities and adaptation to climate change. Specifically, the lending portfolios of the 22 leading microfinance institutions in two climate vulnerable countries – Bangladesh and Nepal - are analysed to assess the synergies and potential conflicts between microfinance and adaptation. The two countries had also been previously examined as part of an earlier OECD report on the links between macro-level Official Development Assistance and adaptation. This analysis provides a complementary "bottom-up" perspective on financing for adaptation. Insights from this analysis also have implications for OECD countries. This is because microfinance is also being increasingly tapped to reduce the vulnerability of the poor in domestic OECD contexts as well and may therefore have the potential to contribute to adaptation.

The paper identifies areas of opportunity where microfinance could be harnessed to play a greater role in fostering adaptation, as well as its limitations in this context. It also explores the linkage between the top-down *macro*-financing for adaptation through international financial mechanisms and the bottom-up activities that can be implemented through microfinance.

**JEL Classification:** Q56, Q54, R51

**Keywords:** Microfinance, Climate change, Financing, Adaptation, Bangladesh, Nepal

Cover photo © REUTERS/Andrew Biraj

## RÉSUMÉ

Une bonne partie du débat sur l'adaptation s'est concentrée sur l'estimation des coûts de l'adaptation, sur les moyens de mobiliser et d'intensifier les ressources financières nécessaires, et sur la conception d'une architecture institutionnelle internationale pour le financement de l'adaptation. Or, les mécanismes existants d'acheminement de ces ressources au niveau infranational, en particulier ceux ciblant les populations démunies qui sont souvent les plus vulnérables aux impacts du changement climatique, n'ont jusqu'à présent guère retenu l'attention. C'est dans ce contexte que la microfinance mérite d'être examinée de plus près.

Le présent rapport offre la première évaluation empirique des liens entre les activités soutenues par la microfinance et l'adaptation au changement climatique. Il comporte une analyse des portefeuilles des 22 institutions principales de microfinance dans deux pays vulnérables au changement climatique – le Bangladesh et le Népal – qui doit permettre d'évaluer les synergies et les conflits éventuels entre la microfinance et l'adaptation. Ces deux pays ont déjà fait l'objet d'un examen préalable dans le cadre d'un autre rapport de l'OCDE sur les liens entre l'aide publique au développement au niveau macro-économique et l'adaptation. La présente analyse aborde le financement de l'adaptation selon une perspective « ascendante » complémentaire. Les pays de l'OCDE peuvent également bénéficier des éclaircissements apportés par cette analyse. En effet, la microfinance est également de plus en plus utilisée pour réduire la vulnérabilité des populations démunies dans le contexte national des pays de l'OCDE et pourrait donc être exploiter pour promouvoir l'adaptation.

Ce rapport identifie également les domaines dans lesquels la microfinance pourrait être mise à profit pour jouer un rôle plus important dans l'adaptation, ainsi que les limites de ce mode de financement dans ce contexte. Enfin, il examine le lien entre l'approche « descendante » du *macro*financement de l'adaptation au moyen d'instruments financiers internationaux, et les activités ascendantes mises en œuvre par le biais de la microfinance.

**Classification JEL:** Q56, Q54, R51

**Mots clés** : microfinance, changement climatiques, financement, adaptation, Bangladesh, Nepal

## FOREWORD

This report on "Assessing the role of microfinance in adaptation" is an output from the OECD project on Economic Aspects of Adaptation. This work has been overseen by the Working Party on Global and Structural Policies (WPGSP).

This report has been authored by Shardul Agrawala and Maëlis Carraro. In addition to WPGSP delegates, the authors would like to thank Cécile Bordier, Jan Corfee-Morlot, Raynald Macher-Poitras, Arnoldo Matus-Kramer, Tamara Levine, Helen Mountford, Remy Paris, Florence Poppe, and Tom Tanner for valuable input and feedback.

This document does not necessarily represent the views of either the OECD or its member countries. It is published under the responsibility of the authors.

This paper is released as part of the OECD Environment Working Papers series [ENV/WKP(2010)1]. It can be downloaded on the OECD website: www.oecd.org/env/workingpapers or www.oecd.org/env/cc/adaptation.

Further enquiries on ongoing work on Adaptation to Climate Change should be directed to Shardul Agrawala, OECD Environment Directorate (Email: Shardul.Agrawala@oecd.org; Tel: +33 1 45 24 16 65).

**TABLE OF CONTENTS**

ABSTRACT ..... 3
RÉSUMÉ ..... 4
FOREWORD ..... 5
EXECUTIVE SUMMARY ..... 8
1. Introduction ..... 12
2. Core Elements of Microfinance ..... 14
3. Microfinance-Adaptation linkages in Bangladesh ..... 16
3.1 Overview of microfinance providers ..... 17
3.2 Products available ..... 19
3.3 Links to climate change adaptation ..... 20
3.4 How microfinance institutions are already promoting adaptation ..... 22
3.5 Opportunities for furthering the role of microfinance in adaptation in Bangladesh ..... 24
4. Examining Microfinance-Adaptation linkages in Nepal ..... 25
4.1 Overview of microfinance providers ..... 26
4.2 Products available ..... 28
4.3 Links to climate change adaptation ..... 29
4.4 How microfinance programs are already promoting adaptation in Nepal ..... 30
4.5 Opportunities for furthering the role of microfinance in adaptation in Nepal ..... 31
5. Towards a Broader Role for Microfinance in Adaptation ..... 32
REFERENCES ..... 34
ANNEX A: MICROFINANCE INSTITUTIONS IN BANGLADESH EXAMINED IN THIS REPORT ..... 36
ANNEX B: MICROFINANCE INSTITUTIONS IN NEPAL EXAMINED IN THIS REPORT ..... 37

**Tables**

Table 1. Priority ranking of climate change risks for Bangladesh ..... 17
Table 2. Priority ranking of climate change impacts for Nepal ..... 25

**Figures**

Figure 1. Assets, Loan Portfolio and Equity of the Big Four MFIs in Bangladesh ..... 18
Figure 2. Assets, Loan Portfolio and Equity of other MFIs in Bangladesh ..... 18
Figure 3. Sectoral focus of programs financed by 22 major MFIs in Bangladesh ..... 20
Figure 4. Categorisation of microfinanced programs in Bangladesh in terms of links to adaptation ..... 21
Figure 5. Growth of microfinance institutions in Nepal ..... 26
Figure 6. Assets, Loan Portfolio and total equity of MFIs in Nepal ..... 28
Figure 7. Sectoral focus of programs financed by 22 major MFIs in Nepal ..... 28
Figure 8. Categorisation of microfinanced programs in Nepal in terms of links to adaptation ..... 29

**Boxes**

Box 1. Microfinance in the OECD Context ..... 13
Box 2. Why do Microfinance Institutions Charge High Interest Rates? ..... 15
Box 3. BRAC Response to Cyclone Sidr ..... 22

## EXECUTIVE SUMMARY

Much of the policy debate on adaptation to climate change has focused on estimation of adaptation costs, ways to raise and to scale-up funding for adaptation, and the design of the international institutional architecture for adaptation financing. There is however little or no emphasis so far on actual delivery mechanisms to channel these resources at the sub-national level, particularly to target the poor who are also often the most vulnerable to the impacts of climate change. It is in this context that microfinance merits a closer look.

This report offers the first empirical assessment of the linkages between microfinance supported activities and adaptation to climate change. Microfinance portfolios in two climate vulnerable countries – Bangladesh and Nepal - are analysed to assess the synergies and potential conflicts between microfinance and adaptation. The two countries had also been previously examined as part of an earlier OECD report on the links between macro-level Official Development Assistance and adaptation. This analysis provides a complementary "bottom-up" perspective on financing for adaptation.

The report also moves the discussion beyond the analysis of specific projects to identify areas of opportunity where microfinance could be harnessed to play a greater role in fostering adaptation, as well as its limitations in this context. Finally, the report explores the linkage between the top-down *macro*-financing for adaptation through international financial mechanisms and the bottom-up activities that can be implemented through microfinance.

Insights from this analysis also have broader implications for OECD countries, beyond their role as contributors to international development and adaptation financing. This is because microfinance is being increasingly tapped to reduce the vulnerability of the poor in domestic OECD contexts as well. For example, microfinance initiatives have been recently launched on a limited basis in Mexico, United States, and Korea, often building upon business models that have been applied successfully in developing countries such as Bangladesh. There may therefore also be some potential to harness microfinance to promote adaptation among vulnerable populations within OECD countries as well.

**Core elements of microfinance, a priori, make it attractive for facilitating adaptation by the poor**

Microfinance provides access to basic financial services to the poor. Through small loans with compulsory, frequent repayments to groups or individuals, microfinance helps the poor build up their assets, establish or develop a business, and protect against risks. Microfinance institutions (MFIs) are now spread all over the world (including in developed countries), and count over 100 million of the world's poor among their clients. Almost 90% of the clients of MFIs are women. The scope of microfinance services, meanwhile, not only includes the provision of credit for income generation, but also savings, insurance, money transfer, and educational and health loans. Many MFI's also provide "credit plus" complementary services such as skills education and training, health and nutrition workshops, and advice on agricultural practices.

These elements of microfinance make it an attractive vehicle for facilitating adaptation. MFI's already have pre-existing networks of access to the poor – especially women – who are also particularly vulnerable to climate change. Meanwhile, the nature of microfinance lending, consisting of high volume,

limited value loans, is also consistent with the fundamental nature of a majority of adaptation actions that will ultimately consist of thousands of decentralised actions by individuals, households and communities, as they continuously seek to internalise climate risks in their activities.

**Despite its theoretical potential, very little is actually known about how microfinance interacts with adaptation in practice**

Through the provision of credit and other financial services microfinance helps the poor develop alternate livelihood opportunities, build assets and spread risks. These actions would also – in most cases - automatically reduce vulnerability to climate risk even if there is no explicit consideration of such risks. From this perspective climate change might simply be one more reason to scale up microfinance. However, what is perhaps more critical from an adaptation perspective are more specific issues like how microfinance could be tapped for more targeted climate risk reduction and adaptation, for building adaptive capacity for climate change, and for reducing incentives for *mal*-adaptation. Very little is currently known about these latter, more specific, linkages which can only be examined through detailed analysis of actual microfinance portfolios in regions that are also particularly vulnerable to the impacts of climate change. The analysis of Bangladesh and Nepal in this report has been undertaken within this context. Not only are the two countries particularly vulnerable to the impacts of climate change, but they also have a vibrant microfinance industry to make such an examination possible.

**Empirical analysis of existing portfolios in Bangladesh and Nepal reveals that close overlaps already exist between ongoing microfinanced activities and key climate change vulnerabilities**

Analyses of existing microfinance portfolios of the 22 leading MFIs each in Bangladesh and Nepal reveal that many existing projects are already directed at sectors and activities that would also be vulnerable to climate change. This overlap is particularly strong for Bangladesh where agriculture, disaster relief and preparedness, and water and sanitation – which are all particularly affected by climate change – constitute almost 70% of the existing microfinance portfolio. For Nepal, meanwhile, the degree of overlap between the orientation of existing microfinance programs and climate change vulnerabilities is more limited. The dominant climate change risk in Nepal is in water resources and hydropower, whereas the related category of microfinance programs, water and sanitation, is a relatively small part of the overall portfolio. Collectively, the programs related to water, agriculture, health, and disasters (which are all vulnerable to climate change) constitute slightly less than 47% of the existing portfolio. However, even if programmatic priorities are closely intertwined with sectors and activities that might be vulnerable to climate change, not all microfinance activities within these areas might be relevant for adaptation. A more in-depth analysis of specific loan programs and projects is therefore required for this purpose.

**Microfinance is already promoting some adaptation to reduce vulnerability to current climate risks in these countries and, in some isolated cases, also to climate change**

A more detailed analysis of the credit programs and projects reveals that a number of existing microfinance lending programs and projects already offer adaptation "win-wins". In fact, 43% of the portfolio that was examined in Bangladesh and 37% in Nepal could be classified as win-wins[1], i.e. synergistic with adaptation. These include, for example, lending programs that support disaster relief and preparedness, crop diversification, improving access to irrigation, and provision of better sanitation facilities that reduce the risks of water borne diseases. They also include at least a few programs that go beyond coping or adapting to current climate risks. For example, lending programs to support construction of weather resistant housing or the adoption of drought and salt tolerant seeds in Bangladesh would also

[1] These percentages exclude a variety of other microcredit programs that reduce baseline vulnerabilities through promotion of income generation activities, but are not directly tied to weather and climate risks.

theoretically facilitate adaptation to longer term climate change. These latter examples, however, remain isolated at this stage in the case of Bangladesh, and absent almost entirely in Nepal.

**At the same time, climate change also requires adjustment of existing microfinance programs and practices, as well as harnessing of new opportunities**

Beyond harnessing existing "win-wins", there are nevertheless other areas where microcredit activities might need to be done differently in order to facilitate adaptation to climate change. This includes at least three kinds of activities: (i) changes in the technical design of existing projects; (ii) modification of financing modalities; and (iii) inclusion of activities that are not currently part of existing microcredit portfolios – all with a view to facilitating adaptation to the impacts of long term climate change.

With regard to existing projects, it is important to bear in mind that microfinanced projects are typically very small scale and short-term. Unlike many large-scale projects financed by other channels (such as Official Development Assistance) most microfinance funded projects do not have a long-term footprint. Therefore, they cannot explicitly incorporate considerations of longer term climate change. Some exceptions however include the construction of disaster resistant housing through microfinance where exposure to future climatic risks might also need to be a consideration in their design. Likewise, projects relating to pond excavations for aquaculture may need to consider any anticipated changes in the location and vulnerability of the land to flooding and saline intrusion.

There are also cases where there might be a conflict between short term development and income generation needs which microfinance might fund, and responses that might be needed to enhance resilience to the impacts of climate change. In such cases, microfinance institutions need to ensure that their projects do not end up enhancing vulnerability to climate change over the longer term.

Climate change may also require changes in microfinance lending practices, such as flexibility in repayment schedules. At the same time it is critical not to compromise fiscal discipline that is required for the long term sustainability of such programs. Finally, there is potential to undertake new projects or to scale up existing activities that can help promote adaptation to climate change. For example, education loans and training programs could be offered to target groups on community level adaptation strategies. Loans for promotion and use of flood, drought, and salt resistant crops may also be scaled-up.

**Financing microfinance for adaptation is a critical challenge, and better linkage with international adaptation funding can play an important role**

Start-up funding – usually from governments and international donors – is critical for microfinance. Indeed, without this at least initial support many microfinance institutions would be unsustainable. They would have to charge excessively high interest rates to be able to survive, thus the products would be unaffordable for the clients. At the same time, these external subsidies make MFIs vulnerable to changes in government policy or in development priorities that might affect funding flows. Donor funding is also often project-based with a set time frame, which also creates financial insecurity and may prevent microfinance from taking hold.

In the context of adaptation, predictable financing could be possible if a portion of the resources from international funds for adaptation could be dedicated to start, or scale-up, microfinance for adaptation purposes. This need not, of course, replace other adaptation investments from these international funds at the project or programmatic level. But microfinance could offer an effective additional delivery channel for the global funds to operationalise adaptation among the poor and the vulnerable. Private investors could also increase the scale of financing directed to MFIs, and direct it for adaptation purposes. A large number of international banks are already engaged in microfinance funding. With increasing awareness and the

realisation of the market opportunity presented by microfinance in the face of climate risk, it is possible that banks would venture further making larger investments in microfinance.

Microcredit whole sale funds – perhaps even a dedicated wholesale fund for adaptation - could serve as a viable intermediary between any international financing and grassroots MFIs. While start-up public financing is clearly critical, it is also important to eventually scale down such support and incentivise microfinance institutions to competitively attract private investment and to cover the costs of their services over the long term. This is critical for the long term financial viability of MFIs, and will need to be true for any microfinanced supported adaptation activities as well.

**Any scaling up of microfinance for adaptation should also keep expectations realistic**

In exploring and potentially scaling-up the role of microfinance for adaptation, it is quite critical to keep expectations realistic. Despite its promise and several successful examples of MFIs worldwide, the overall record of microfinance remains somewhat mixed in terms of their end results and financial viability over the long-term. In applying microfinance for adaptation, it is therefore important not to repeat the mistakes that were made in the context of applying this instrument for poverty alleviation.

Microfinance also has some specific limitations with regard to its viability as a tool to promote adaptation to climate change. For example, while microfinance successfully targets the poor, its clients are primarily the “economically active” poor and not the poorest of the poor who do not even have recourse to economic activity. For the very bottom of the social pyramid other mechanisms might clearly be needed. Microfinance has also not taken hold in all developing countries. While it has been relatively successful in many countries in South Asia and Latin America, comparable success is lacking in Africa which also happens to be particularly vulnerable to the impacts of climate change.

Further, microfinance is, by definition, not suited for adaptation interventions that are either long-term or require considerable investment. For example, microfinance cannot fund the scale of investment required for building dams, seawalls, or for draining dangerous glacial lakes. Small microfinance institutions without recourse to reinsurance may also not have adequate reserve funds to insure against weather and climate risks.

Lastly, like in the case of development, adaption to climate change would require a multi-pronged approach. This paper makes the case that microfinance is an important and overlooked tool in such an adaptation arsenal but it is, by no means, a panacea.

## 1. Introduction

While financing of adaptation is currently a high international priority, the policy discussions on this issue have focused primarily on estimation of aggregate adaptation costs and financial needs, mechanisms to raise these financial resources, and the design of the international institutional architecture for adaptation financing. There is little or no emphasis so far on actual delivery channels for adaptation financing at the sub-national level, particularly to reach the poor who are also often most vulnerable to the impacts of climate change. It is in this context that microfinance merits a closer look.

The role of microfinance in adaptation also has broader implications for OECD countries, beyond their role as contributors to international development and adaptation financing. This is because microfinance is also being increasingly tapped to reduce the vulnerability of the poor in domestic OECD contexts as well. For example, microfinance initiatives have been recently launched on a limited basis in Mexico, United States, and Korea, often building upon business models that have been applied successfully in developing countries such as Bangladesh.

Microfinance, so far, has received very limited attention within the context of climate change. The information and initiatives that currently exist on this subject are both very recent and primarily geared towards greenhouse gas mitigation, specifically with regard to financing low income households to acquire access to cleaner/renewable energy[2] (McKee, 2008; Rippey, 2009), and towards micro-insurance schemes. Indeed, MFIs and larger insurance companies, initially providing merely life, loan and property insurance, are now looking at the linkages between micro-insurance delivery to the poor and natural weather disasters. Only one published analysis (Hammill et al, 2008) has as its primary focus the potential for microfinance within the context of adaptation. The authors point out that the strongest case for employing microfinance for adaptation is its ability to help low income households build and diversify assets, and thereby expand their range of coping strategies.

This, however, raises a broader and more fundamental set of policy relevant questions: how can one assess the exposure of microfinance portfolios to the risks of climate change?; to what extent do microfinance activities already contribute directly to reducing vulnerability to climate change?; if reducing vulnerability to risks (including climate risks) is already a focus of such projects, would climate change really require anything different in operational terms?; what are the strengths and limitations of a scaled-up role for microfinance in operationalising adaptation?; and how can better linkages be forged between the top down, macro-financing for adaptation from the international climate change regime and the bottom-up activities that might get implemented through microfinance?

This report seeks to address these questions at the interface between microfinance and development. The analysis is anchored in existing microfinance portfolios in Bangladesh and Nepal. Both countries have well developed microfinance programmes and are also particularly vulnerable to the impacts of climate change. These two countries were also examined in a previous OECD project that analysed the role of Official Development Assistance in the context of adaptation (OECD, 2005). A focus on microfinance this time around, therefore, offers a useful comparison to the previous analysis for these two countries that focused on financing at the macro level.

The report also moves the discussion beyond the analysis of specific cases to identify areas of opportunity where microfinance could be harnessed to play a greater role in fostering adaptation, as well as

[2] Microfinance Institutions have already started engaging in programs promoting environmentally friendly products or renewable energies. Notable examples are: Grameen Shakti (provides solar home systems, biogas and improved cooking stoves, organic fertilizers and wind turbines), ACCION and BASIX in India, Equity Bank in Kenya, Banco Solidario in Ecuador. Partnerships between MFIs, commercial banks and international organisations have also been explored for delivering renewable energy loans to clients to finance clean energy products (e.g. Citigroup, USAID and SEEP, SEWA Bank and SELCO India, E&Co).

its limitations in this context. It also explores the linkage between the top-down *macro*-financing for adaptation through international financial mechanisms and the bottom-up activities that can be implemented through microfinance. Insights from this analysis also have broader implications for OECD countries, beyond their role as contributors to international development and adaptation financing. This is because microfinance is also being increasingly tapped to reduce the vulnerability of the poor in domestic OECD contexts. Thus, there may also be some potential to harness microfinance to promote adaptation among vulnerable populations within OECD countries as well (Box 1).

**Box 1. Microfinance in the OECD Context**

While traditionally a tool for delivery of financial services to the poor in developing countries, microfinance has considerable relevance for OECD countries as well. From a *development co-operation perspective*, microfinance helps reach a key target group in ways that more conventional aid delivery channels cannot. Indeed, OECD donors provide considerable support for microfinance institutions in developing countries. Likewise, from an *adaptation financing* perspective, microfinance holds promise as a delivery vehicle for fostering adaptation to climate change among some of the most vulnerable groups in developing countries.

Microfinance has broader implications for OECD countries, beyond their role as contributors to international development and adaptation financing. This is because it is also being increasingly tapped to reduce the vulnerability of the poor in certain *domestic OECD contexts* as well. The domestic microfinance sector in OECD countries is less developed and more fragmented compared to its developing country counterparts, but has witnessed recent growth in a number of countries.

In September 2009, Korea announced the scaling up of its microfinance effort through the creation of the "Miso Credit Foundation" which aims to provide micro credit lending totaling 2 trillion[3] Korean Won to 200,000 – 250,000 low income households over the next ten years. Half of this projected lending is expected to come from the private sector (Ro, 2009). Microfinance is also witnessing considerable growth in Mexico in terms of the institutions providing the services and the number of clients. There has also been significant growth in private sector engagement in the provision of microfinance services in Mexico. In 2007 around 1.6 million people, of which 80% were women and 62% were living in rural areas, were using microfinance services (ProDesarrollo, 2007). Microcredit programs are also being employed to promote entrepreneurship among low income communities in the United States. As of 2001 microcredit programs had granted USD160 million in loans in the US, with funding derived from both public and private sources (Bhatt and Tang, 2001).

While not explicitly targeted at adaptation, microcredit is already being used to help low income households recover from catastrophic weather events. For example, microcredit loans were extended at concessional interest rates to help small businesses recover from the devastating floods in Tabasco, Mexico in 2007.

Also in Mexico, the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) offers micro insurance for subsistence farmers, the so called Fund to Attend Damaged Population due to Climatic Contingencies (FAPRACC). FAPRACC is a fund designed for rebuilding, disaster mitigation and insurance to the poorest farmers (Saldaña 2006). Microcredit was also advanced as a means to foster post Hurricane Katrina economic recovery in the United States by none other than Mohammad Yunus, the father of modern microfinance. Writing in the Wall Street Journal a day after winning the Nobel Peace Prize, Yunus argued that microfinance could be just as successful in helping the poor in developed countries in coping with extreme weather events, as it has been in the developing world. This is because small loans packaged with practical business and social advice had proved more effective than free handouts in helping rebuild businesses in the wake of natural disasters. Yunus concludes: "it might be time to think about another type of support for Katrina's victims: the microloan… Giving someone a hand up doesn't always require a handout. The important thing is to help people get back to work while letting them hold on to their self respect. Microloans do just that" (Yunus, 2006).

[3] 2 trillion South Korean Won are equivalent to approximately USD 1,722,074,410.

The rest of the report is organised as follows. Section 2 provides an overview of microfinance and its key elements. Next, Sections 3 and 4 examine the specific experiences to date with microfinance in Bangladesh and Nepal and the relationship between these activities and adaptation to climate change. These case studies provide the basis for a more nuanced and concrete discussion of the full range of linkages between microfinance and adaptation in Section 5. These include: whether the success of some currently funded microfinanced projects might be at risk from climate change, the extent to which existing microfinance funded activities already contribute to adaptation, and some of the limitations of microfinance in the context of adaptation.

## 2. Core Elements of Microfinance

Microfinance involves the delivery of small loans and other financial services which the poor can use to build up their assets, establish or further develop a business, increase their wealth, and protect against risks. Pioneered by Mohammad Yunus who founded the Grameen Bank in Bangladesh in the 1970s, microfinance institutions today are spread all over the world (including in developed countries such as the United States) and count over 100 million of the world's poor among their clients. This segment of the population has often not had access to traditional banks. Subsidised government lending schemes, meanwhile, which have tried to reach the poorest have often proved inefficient to overcome the screening, monitoring and enforcement problems that restrict the access of the poor to the formal financial sector (Hulme and Moore, 2006).

Microfinance, on the other hand, offers the promise to overcome these hurdles through innovations that include group lending that takes advantage of peer monitoring and joint liability, very small loan amounts, frequent repayments, and the establishment of compulsory savings accounts by loan recipients. In the model pioneered by the Grameen Bank loans are given to groups of five, with one member being the head of the group. The first loan goes to the first two members of the group, the second to the next two members, and the third loan goes to the group leader. If one member fails to repay then the whole group is denied a loan. This model thus makes use of private information, peer support, peer pressure and joint liability to overcome the challenge of asymmetric information that typically exists between borrowers and lenders. The lending starts usually with very small loans, typically less than USD100. This is also because the system is based on frequent (usually weekly) repayments. A week after the lending, the clients start to repay the loan. Only for loans such as education loans, housing loans, or disaster relief loans, the repayment schedule is more flexible. Interest rates are usually very high both due to the high transaction costs involved in processing high volume, low value loans and to protect the bank from risky borrowers. Allowing members to form their own groups clearly also has benefits for the banks, because safe borrowers will form groups with other safe borrowers and risky borrowers will be put with risky borrowers. Hence the bank can charge lower interest rates to safe borrowers groups and higher interest rates to risky ones. The interest rate also diminishes according to a client or group reliability and punctuality in repayments for more than one year.

Another key feature of microfinance programs is that they are mostly directed towards women. On average, 90% of the clients of microfinance institutions (MFIs) are women. Women make up a large section of informal businesses and microfinance very often involves self-employment in the informal sector (Armendariz and Murdoch, 2007). Moreover, it has been noted that women, being more credit constrained than men, are more likely to engage in microfinance programs and participate regularly in related training sessions and weekly meetings. They have also been viewed as more conservative in their investment strategy, more responsive to peer pressure for repayments, and therefore ultimately more responsible in repaying loans. Targeting loans to women also fosters their empowerment.

**Box 2. Why do Microfinance Institutions Charge High Interest Rates?**

According to the Consultative Group to Assist the Poor (CGAP) the interest rates charged by microfinance institutions (MFIs) averaged about 28 percent in 2006, declining by 2.3 percent a year since 2003. These rates, while higher than lending rates charged by banks, are lower than consumer and credit card rates in most countries, and usually far lower than rates charged by informal moneylenders. Lending out a million dollars in 100,000 loans of USD100 each will obviously require a lot more in staff salaries than making a single loan for the total amount. As a result, interest rates in sustainable microfinance institutions (MFIs) are substantially higher than the rates charged on normal bank loans.

Over the past two decades, institutions that make microloans to low-income borrowers in developing and transition economies have focused increasingly on making their operations financially sustainable by charging interest rates that are high enough to cover all their costs. They argue that this policy will best insure the permanence and expansion of the services they provide. Sustainable (i.e., profitable) microfinance providers can continue to serve their clients without needing ongoing infusions of subsidies, and can fund exponential growth of services for new clients by tapping commercial sources such as deposits from the public.

This does not mean that all high interest charges by MFIs are justifiable. Sometimes MFIs are not aggressive enough in containing transaction costs. The result is that they pass on unnecessarily high transaction costs to their borrowers. Sustainability should be pursued by cutting costs as much as possible, not just by raising interest rates to whatever the market will bear. Interest rates, while still too high in some places, are dropping on average 2.3 percent a year. The microfinance industry has placed a lot of emphasis on improving efficiency in order to bring down these costs, so that poor clients are not paying unnecessarily high rates. New technology also offers to help reduce costs, so we expect rates to continue dropping as institutions become increasingly efficient at delivering services to poor people.

Source: Excerpt from CGAP, http://www.cgap.org/p/site/c/template.rc/1.26.1309/, last accessed January 20, 2010.

There are of course a number of variants to the microfinance model depending upon specific regional and local contexts. Further, microfinance modalities and products have evolved considerably over time. For example, some MFIs have also introduced individual loans for very successful clients who preferred individual accountability. Grameen Bank for example, understood the concern of such clients and set up Grameen Bank II system which gives loans also to individuals, is more flexible on the duration of loans (from 3 months to 3 years) and on instalments, the size of which varies according to season and the situation of the borrower. Other developments in microfinance include the establishment of compulsory savings in the banks when taking the loan. Every borrower is required to put a percentage of the loan or a fixed starting amount in a savings program offered by the lending institution. These savings offer a cushion and can help reduce default on loan payments in the event of an emergency.

The range of financial services that microfinance offers has also diversified over time and now includes credit, savings, insurance, money transfers, education loans, health loans, and social services. Indeed, when providing credit to the poor they often provide other complementary services such as skills training, teaching of literacy and numeracy, health nutrition workshops, family planning advice. This diversification, which now goes beyond financial products, makes microfinance an efficient platform for the delivery of pro-poor services to its clients.

Many of these core characteristics of microfinance, *a priori*, also make them particularly attractive vehicles for facilitating adaptation. Microfinance institutions already have pre-existing networks of access to the rural poor – especially women – who are also particularly vulnerable to the impacts of climate change. The nature of microfinance lending, meanwhile, consisting of high volume, limited value loans is also consistent with the fundamental nature of a majority of adaptation actions that will ultimately consist of thousands of decentralized actions by households, communities and private actors as they continuously seek to internalize current and anticipated climate risks in their various activities. Finally, the focus of

microfinance lending, meanwhile, aimed as it is towards helping the poor build assets and reduce their overall vulnerability, should in principle also enhance their capacity to cope with some of the impacts of climate change.

At the same time, however, a number of questions remain unanswered. What is currently the degree of synergy between actual projects that are being funded by microfinance and adaptation needs? Is the success of some microfinance projects at risk of being compromised by climate change? Is there a risk that in meeting urgent, short term priorities of the most vulnerable microfinance might inadvertently promote actions that might exacerbate vulnerabilities over the longer term?

Questions such as these can only be answered by examining actual microfinance project portfolios in specific contexts. This is the objective of the following two sections that examine the experiences of two low income countries: Bangladesh – the home of microfinance - and neighbouring Nepal, both of which are also extremely vulnerable to the impacts of climate change.

## 3. Microfinance-Adaptation linkages in Bangladesh

Bangladesh is a low-lying country located in the deltaic plan of a river basin, bordered on the West, North and East by India, on the South-East by Myanmar, and on the South by the Bay of Bengal. Bangladesh ranks low on practically all measures of economic development. It has a population of over 133 million people in a small area, a population density of more than 1,209 persons per $km^2$, and 75% of the population lives in rural areas (World Bank, 2002).

Climate change poses significant risks for Bangladesh, yet the core elements of its vulnerability are primarily contextual. Between 30-70% of the country is normally flooded each year. The huge sediment loads brought by three Himalayan rivers, coupled with a negligible flow gradient add to drainage congestion problems and exacerbate the extent of flooding. Frequent flooding is already the main cause of losses of livelihoods and assets in Bangladesh. Moreover, the societal exposure to such risks is further enhanced by Bangladesh's very high population and population density. Many projected climate change impacts including sea level rise, higher temperatures (mean temperature increases of 1.4°C and 2.4°C are projected by 2050 and 2100 respectively), evapo-transpiration losses, enhanced monsoon precipitation and run-off, potentially reduced dry season precipitation, and increase in cyclone intensity would indeed reinforce many of these baseline stresses that already pose a serious impediment to the economic development of Bangladesh (Agrawala et al, 2003a).

A subjective ranking of key climate change impacts and vulnerabilities for Bangladesh previously conducted by the OECD identified water and coastal resources as being of the highest priority for adaptation in terms of certainty, urgency, and severity of impact, as well as the importance of the resources being affected. Human health is ranked next, in particular because increased flooding could threaten human health through spread of disease. This is followed by agriculture where declines in yield are projected for moderate to high levels of climate change (Table 1).

From a microfinance perspective, meanwhile, Bangladesh is not only a pioneer but also home to the largest microfinance industry in the world. It has more than 1200 certified microfinance institutions with over 13 million clients, of which 80% are below the poverty line (CDF, 2002). The high population density and relative ethnic, social and cultural homogeneity in Bangladesh have made it possible to design appropriate programs for most of the populations, meeting the needs of the rural poor and driving down the costs of service delivery (Hulme, 2006; Zaman, 2004). The four largest microfinance providers experienced a growth rate of 70 -75% between 2003 and 2006 and, as a general trend, smaller providers too have significantly increased their loan portfolios and outreach in recent years. The following

subsections present further detail on the microfinance providers and products in Bangladesh, before examining the interface between microfinance funded activities and adaptation to climate change.

**Table 1. Priority ranking of climate change risks for Bangladesh [4]**

| Resource/ranking | Certainty of impact | Timing of impact | Severity of impact[a] | Importance of resource |
|---|---|---|---|---|
| Water resources (flooding) | Medium-high | High | High | High |
| Coastal resources | High | Low | High | High |
| Human health | Low-medium | Medium | Medium-high | High |
| Agriculture | Medium | Low-medium | Low-medium | High |

a. Note that scoring is relative; significance is a function of severity of impact and importance of resource.

### *3.1 Overview of microfinance providers*

Microfinance institutions can be of different types. In Bangladesh, non-governmental organisations are the most common providers of microfinance to the poor. However, there are also a number of government-sponsored MFIs, Cooperatives and Credit Unions, Rotating Savings and Credit Associations (ROSCAs), as well as statutory banks, commercial banks, development banks, involved in micro-lending. Furthermore, institutions that act as intermediaries between banks and borrowers also play an important role in Bangladesh both for regulations and for the provision of loans to the small microfinance institutions.

At present, the Bangladesh microfinance industry is dominated by four large MFIs: Grameen Bank, Bangladesh Rural Advancement Committee (BRAC), Association for Social Advancement (ASA), and Proshika. These four institutions combined have over USD800 million in outstanding loans and around USD380 million in savings (Zaman, 2004). The Grameen Bank was started as a majority government-owned bank established under a special Grameen Bank Act and has different status vis-a-vis the government that can help the bank in case of unpredictable liquidity crunch due, for example, to floods. Other microfinance institutions were set up under the Societies Act without government participation and most depend to some degree on grants or low-cost funds from international donors (Hoek-Smit, 1998). The top twenty-two MFIs in Bangladesh have been examined for the purposes of this analysis.

Grameen Bank has 7.67 million borrowers and provides services through its 2,539 branches, in 83,566 villages, covering more than 99 percent of the total villages in Bangladesh. ASA has 7.13 million clients in 72,204 villages. BRAC has 6.37 million borrowers covering 38 districts in Bangladesh and Proshika targets a smaller number of poor, as it has nearly 2 million borrowers, but spread across 24,139 villages in all Bangladesh. After the four main microfinance institutions, known as the "big four", other microcredit programs are rather small. In fact they have approximately between 543,000 borrowers with TMSS to as little as 25,000 borrowers with VERC Foundation, one of the smallest in the country. In terms of total assets they have from USD 50 million to 2 million.[5] The smaller institutions usually serve specific areas of the country instead of covering the whole country. Nonetheless, some smaller institutions have become national organisations, such as TMSS that was first established in 1964 as a local organisation in Thengamara village but has then been proclaimed national organisation. The total assets, loan portfolio and

[4] Source: Agrawala *et al.* (2003a)

[5] Information based on data available at the Microfinance Information eXchange (MIX market) - a global web-based microfinance information platform http://www.mixmarket.org/ (last accessed in September 2009). Additional information was obtained from annual reports, audit reports, financial statements, or other relevant documentation provided by microfinance institutions.

equity of the Big Four, as well as other MFIs for the year 2007 are shown in Figures 1 and 2. The total assets reflect what the MFI owns or what is owed to it, while equity represents the difference between total assets and liabilities. Meanwhile the size of the gross loan portfolio, which includes all outstanding client loans, is an indicator of the institution's current outreach.

**Figure 1. Assets, Loan Portfolio and Equity of the Big Four MFIs in Bangladesh** [6]

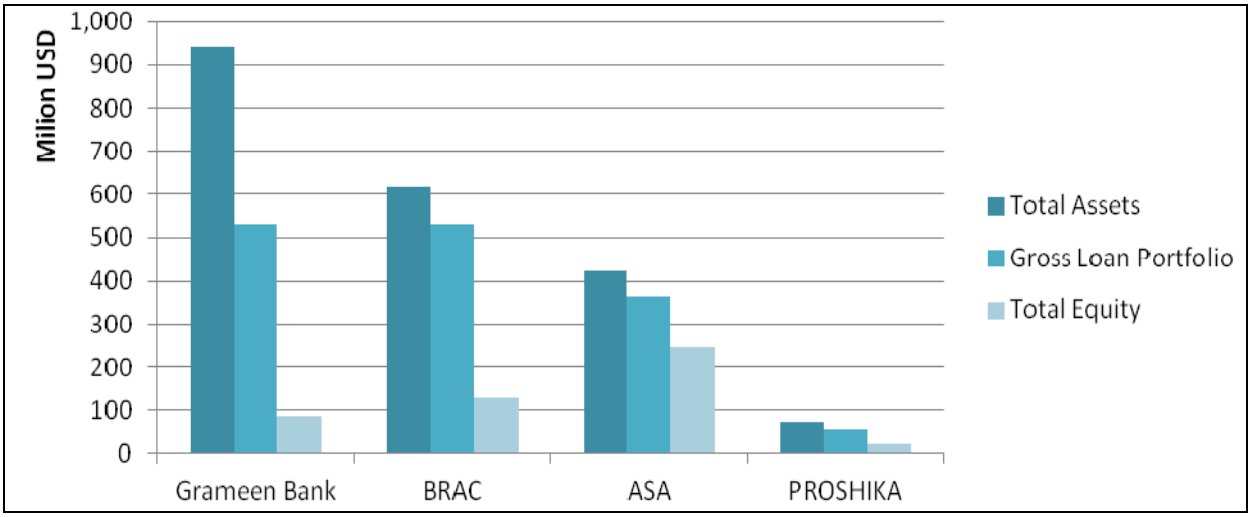
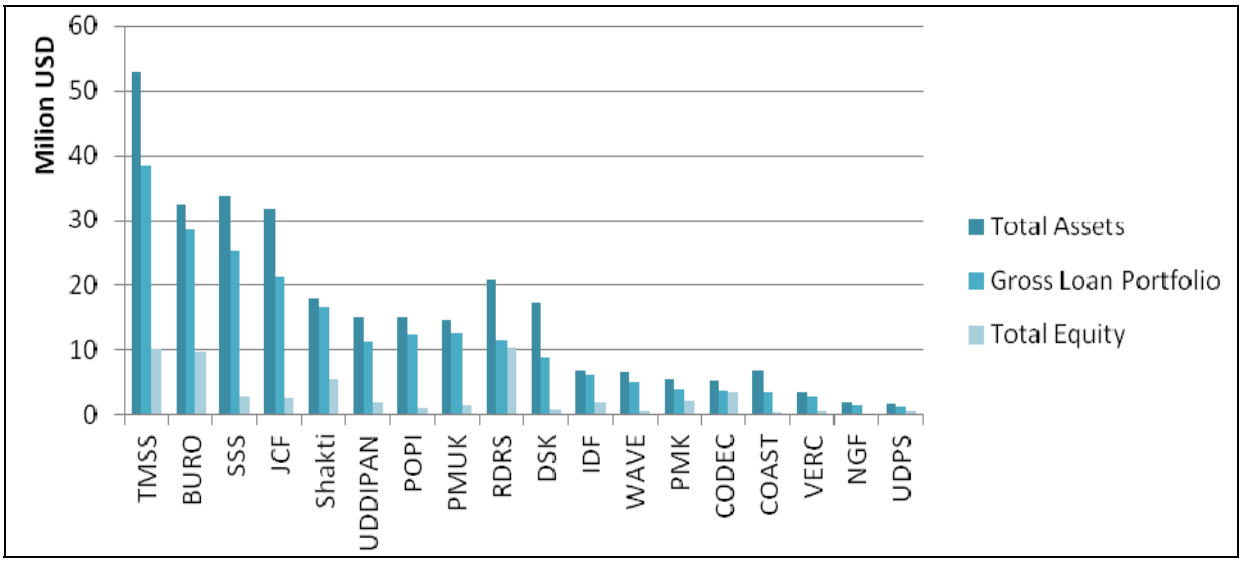



**Figure 2. Assets, Loan Portfolio and Equity of other MFIs in Bangladesh** [7]




[6] Data on the Microfinance institutions in Bangladesh were taken from MIX market.

[7] Ibid

### *3.2 Products available*

The institutional mission of microfinance providers is to support and strengthen the economy at the bottom of the socio-economic pyramid by facilitating access to financial services for the poor and disadvantaged and improve the quality of their lives. Different microfinance institutions in Bangladesh however employ different approaches to accomplish this overall mission. In particular, while some MFIs concentrate only on the provision of financial products, others try to combine credit provision with the delivery of social services. Grameen Bank and ASA tend to prefer the former approach, while BRAC and Proshika prefer the more holistic approach. The distinction, however, is not yet as clear as the institutions that privilege pure-financial products also provide - although to a lesser extent - social and physical infrastructure projects such as for housing, sanitation, drinking water, education, and family planning.

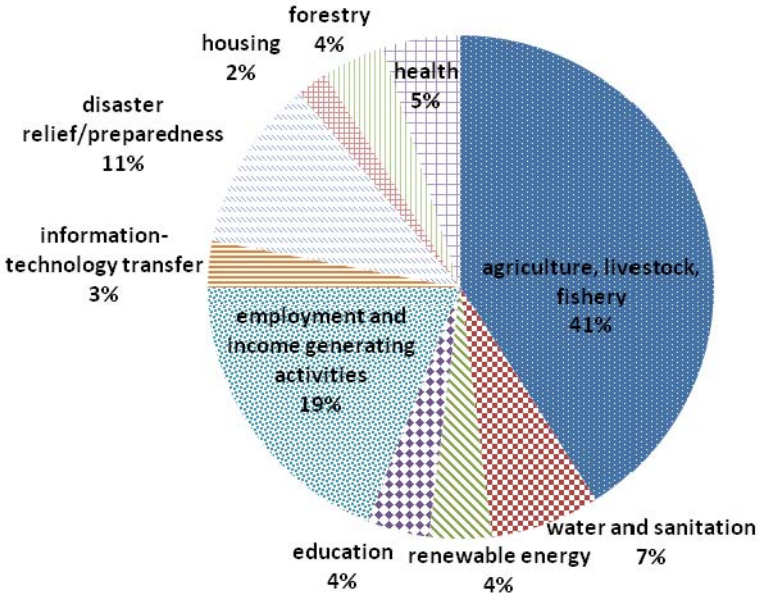
The most common products offered by Bangladesh MFIs are financing for employment and income generating activities often coupled with skills development and training programs. The institutions prioritise those activities and encourage the business development plans of their clients in order to empower them and move them out of poverty and vulnerability.

The activities for income raising purposes and job creation focus on the development of small enterprises. Other activities or job opportunities created, especially for the rural poor, fall into agricultural, livestock and fishery sectors. On the other hand, social focused programs provide usually education loans, housing loans, technology transfer, insurance[8] and savings schemes, water and sanitation facilities or disaster relief operations.

This analysis has reviewed 226 microfinance lending programs in recent years (usually for the period 2006-2008) by over 22 major MFIs in Bangladesh. Each lending program contains a large number of microloans, with beneficiaries that can run into the thousands. The programs examined here constitute a bulk of the lending portfolios of the 22 top MFI's over the period of analysis. For the purpose of this analysis, the programs were clustered into the following categories: employment generating activities; agriculture, livestock and fisheries; water and sanitation, health, housing, forestry, disaster relief and preparedness, information and technology transfer, education, and renewable energy. Slightly less than half of the programs are in agriculture, livestock and fisheries. Employment and income generating activities are next, followed by disaster relief and preparedness, water and sanitation, and health. The share of programs in each of these categories is shown in Figure 3.

[8] Micro-insurance is gaining importance in Bangladesh and the demand among poor communities is largely increasing. Both MFIs (BRAC, Proshika, ASA, DSK, IDF, SSS) and formal insurance companies (Delta Life Insurance Ltd) are providing insurance schemes to the poor. However, insurance for weather related disasters is still very limited.

**Figure 3. Sectoral focus of programs financed by 22 major MFIs in Bangladesh**[9]




### *3.3 Links to climate change adaptation*

There are clearly significant overlaps between the priority categories for microfinance programs illustrated in Figure 3, and the key climate change vulnerabilities for Bangladesh that have been identified in Table 1. In particular agriculture, disaster relief and preparedness, water and sanitation, as well as health that are key climate change vulnerabilities, all feature prominently among microfinance project priorities. The linkages between microfinance and adaptation, however, are more nuanced than this rather preliminary mapping. Many activities, which *a priori* may not appear to be linked to climate change may in fact contribute to improving the asset base of the poor and therefore contribute to reducing vulnerability to climate change impacts. On the other hand, many programs in climate sensitive sectors may, in fact, end up having little link to adaptation or promoting climate resilience. Finally, there might be other microfinanced activities which may not contribute to adaptation, but whose success might be affected if the impacts of climate change are not adequately taken into account. A more nuanced approach is therefore needed.

This study has therefore carefully examined available documents such as MFI annual reports and related material for the 226 programs funded by the 22[10] major MFIs. Financial statements and audit reports for the years 2006-2008 were also collected directly from some MFIs. Specific empirical data on the performance of specific MFIs is based upon the Microfinance Information eXchange online platform, which provides data for all active MFIs in the world.

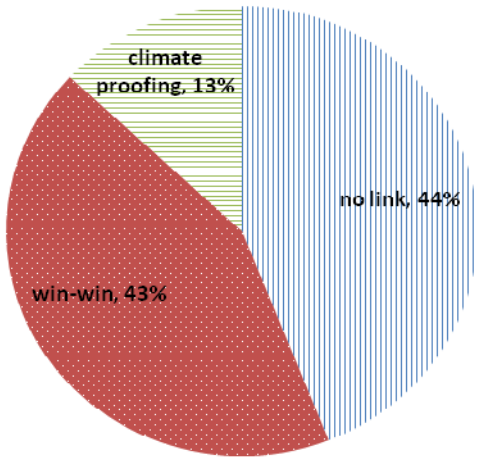
[9] Source: Analysis by the authors

[10] Grameen Bank, Association for Social Advancement (ASA), Bangladesh Rural Advancement Committee (BRAC), PROSHIKA, Thengamara Mohila Sabuj Sangha (TMSS), BURO Tangail, Society for Social Services (SSS), Jagorani Chakra Foundation (JCF), Shakti Foundation, UDDIPAN, People's Oriented Program Implementation (POPI), Padakhep Manabik Unnayan Kendra (PMUK), Rangpur Dinajpur Rural Service (RDRS), Dushtha Shasthya Kendra (DSK), Integrated Development Foundation (IDF), WAVE Foundation, Palli Mongal Karmosuchi (PMK), Community Development Centre (CODEC), Coastal Association for Social Transformation Trust (COAST), Village Education Resource Centre (VERC), Nowabenki Gonomukhi Foundation (NGF), Uttara Development Program Society (UDPS).

In some cases, however, the information available is very limited for a comprehensive evaluation of the extent to which specific loans and projects might contribute to adaptation. In fact, a comprehensive analysis would require a detailed assessment of all projects and consideration of site-specific climate change impacts, which, considering the lack of detailed information available on many programs and projects, is beyond the scope of this analysis. Given these complexities, this report provides only an indicative assessment of the link between microfinance and adaptation to climate change and what may need to be done differently by the MFIs to better integrate climate change considerations in their activities.

The programs analysed here are clustered into three categories: "no-link", "win-win"; and "climate proofing". As the name implies, "no link" programs have no direct connection to adaptation. They include, among others, all programs that are solely devoted for income generation purposes and business development. Such programs have an immediate positive impact on the livelihoods of the clients as they reduce their vulnerability to climate change by diversifying their assets and giving them more means to cope. However, since a direct link with adaptation is absent, the majority of these projects fall into the "no link" category. "Win-win", meanwhile, refers to those microfinance programs, which, as currently structured, would automatically also contribute to adaptation to climate change. This category includes programs in climate sensitive areas, such as agriculture, water resources that are implementing good practices for both development and adaptation. It also includes disaster preparedness and relief activities that can also be viewed as proactive and reactive adaptation. The "climate-proofing" category, meanwhile, refers to activities that might need to be adjusted to take better account of the risks posed by climate change and/or to facilitate adaptation. These include activities that could eventually lead to maladaptation to future climatic conditions as well as activities that may require adjustments in order to be more resilient to climate change. The results of this clustering are shown in Figure 4.

**Figure 4. Categorisation of microfinanced programs in Bangladesh in terms of links to adaptation** [11]




Slightly less than half (44%) of all programs examined have no link with adaptation or vulnerability reduction. This is not surprising, given that microfinance addresses a diverse array of pressing and urgent financial needs of the poor. What is, however, surprising is that almost the same percentage (43%) of existing microfinance programs in Bangladesh are already automatic "win-wins" from a climate change adaptation perspective. Not only does it reinforce the close synergy between the development and adaptation needs, it also shows the tremendous potential of microfinance for enhancing the climate resilience of some of the most vulnerable sections of the society which have been hard to target through

[11] Source: Analysis by the authors.

international financing on adaptation as well as official development assistance. Also surprising is the relatively low percentage (13%) of existing programs that might need to be adjusted to reflect the implications of climate change and to facilitate adaptation. The figure is likely to be significantly higher for development projects financed through other modalities. However, this is not surprising. Unlike "macro" financed investments such as for infrastructure and land-use planning that might engender long term irreversibilities and might therefore need to adequately incorporate climate change considerations, microfinance only targets very small, short term lending to meet urgent needs. Therefore, it might be hard in many cases to identify what, if anything, might need to be done differently in light of climate change. Nevertheless, this study did identify at least some microfinance projects that could better reflect the longer term implications of climate change. Specific details on the "win-win" activities, as well as those that might need to be climate proofed are provided in the next sub-section.

### *3.4 How microfinance institutions are already promoting adaptation*

Microfinance lending in Bangladesh contributes to adaptation both by providing the poor with means of accumulating and managing assets (thereby reducing their overall vulnerability), and as well by financing activities that are more specifically targeted at reducing vulnerability to weather and climate risks, especially in the areas of water management, agriculture and fishery, forestry, health, and housing.

There are now a small set of examples where microfinance is taking the longer term perspective and helping reduce vulnerability to evolving risks posed by climate change. One such shift has been in recognizing the importance of disaster preparedness (and not just disaster relief), and the implications of climate change in this regard. BRAC, the second largest MFI in Bangladesh, for example has recently established a permanent disaster preparedness and climate change department. This department aims at fostering community level adaptation to climate change and will train staff and update training modules to have a better focus on disaster preparedness. The operational activities of most MFIs, however, are still focused more on disaster relief than preparedness. A particularly effective response in this context was in the immediate aftermath of cyclone Sidr which was one of the strongest storms to develop in the Bay of Bengal (Box 3).

**Box 3. BRAC Response to Cyclone Sidr**

BRAC operated one of the largest non-governmental responses to cyclone Sidr, which was the equivalent of a category 5 tropical storm that made landfall in Bangladesh on November 15 2007. BRAC successfully raised USD 6 million for the immediate relief operation, with USD 1 million released from its own reserves. As part of a multi-pronged response BRAC provided food aid to almost a million people, had health workers treating thousands of affected patients, while its water and sanitation teams cleaned and disinfected close to two thousand five hundred ponds contaminated by the cyclone. From a microfinance perspective, meanwhile, BRAC suspended all loan repayments in the cyclone affected areas until March 2008 and provided full access to borrower's own emergency savings accounts - an average of USD 260 (BDT 18,000) for each person. It also announced that microfinance loans of up to USD 14.5 million would be written off in the cyclone affected areas. In addition, to ensure long term rehabilitation, BRAC subsequently invested in rebuilding educational infrastructure, re-establishing social forestry, replacing poultry and livestock, agricultural rehabilitation, replacing fishing boats, repairing water filters, constructing additional cyclone shelters and long term livelihood creation.

Source: BRAC Annual Report 2007

Microfinance institutions are also contributing to enhancing longer term resilience to the impacts of climate change through loans to support building of housing that is more resistant to storm surges and floods. The Integrated Development Foundation (IDF) – a mid-size microfinance institution in Bangladesh - has a specific housing program under which it provides loans to disaster affected clients so that they are able to build safer houses with more resilient materials. These loans are provided for a "long" term

perspective [relative to typical microfinance loans] of 8 years with flexible repayment procedures. The Grameen Bank also provides housing loans. Following devastating floods in 1987 the Grameen Bank developed its own design that its borrowers could use to build houses that are resilient to floods and strong monsoon winds. The houses vary in appearance throughout the country but have the same basic structural components. There are four reinforced concrete pillars on brick foundations at the corners of the house and six intermediary bamboo posts, with bamboo tie beams, wooden rafters and purlins supporting corrugated iron roofing sheets (Grameen Bank, 1999). This provides stability in the flood and strong monsoon wind and protection from the heavy rain during the monsoon season.

Another initiative that may go towards facilitating longer term adaptation is the promotion of hybrid crop varieties that are tolerant to salt and water related stresses. BRAC has been a pioneer in this area as it views varieties such as hybrid rice and saline resilient crops as critical to boosting crop production and incomes. Such varieties can also enhance resilience to the impacts of climate change such as saline intrusion, as well as enhanced drought and flooding risks. This initiative has received severe criticism in many quarters as it is viewed as promoting genetically modified organisms. BRAC has also been criticised for making some of its lending conditional on adoption of hybrid varieties, although the organisation insists that borrowers are under no such pressure. This also highlights the central dilemma in terms of the extent to which microfinance can be used as leverage to encourage the adoption of technologies and practices that may, on the one hand, enhance resilience but, on the other hand, run into concerns about their viability and ancillary effects.

Beyond these examples of microfinance initiatives that can build capacity for anticipatory adaptation to climate change, there are a large number of examples of more reactive actions to current weather and climate risks that might also be synergistic with adaptation to climate change. Disaster relief activities for those affected by frequent floods and cyclones clearly fall in this category, and several microfinance institutions in Bangladesh are actively engaged in this area. Microfinance institutions also offer a number of products aimed at improved water management and helping the poor have better access to irrigation and ground water. Given that some of the most serious impacts of climate change are related to freshwater resources and water availability, projects that implement efficient water management practices are particularly relevant from an adaptation perspective. Microfinance is also supporting a number of crop and income diversification projects that protect yields and incomes under variable weather and climatic conditions. MFIs such as Proshika, RDRS[12] and TMSS[13] have crop and income diversification initiatives that offer training and credit in new cropping patterns, innovative practices such as joint rice and fish cultivation, and satellite activities such as poultry farming and garment making. Finally, microcredit is playing an important role in fostering the growth of aquaculture in Bangladesh. Aquaculture is the fastest growing food-producing sector in the world, especially in Least Developed Countries. It helps the poor adapt to the impacts of both floods and drought, while ensuring food production to the poor farmers and boosting incomes, especially if integrated with agriculture[14]. Grameen Fisheries and Livestock Foundation have several programs to rehabilitate ponds for aquaculture. The bank excavated 432 ponds with over 400 hectares of water area, trained beneficiary groups, provided fertilizers, nets, boats and other inputs, thereby enrolling many poor and creating job opportunities. All these activities contribute to enhancing the resilience of the poor to the impacts of weather and climate.

[12] *Rangpur Dinajpur Rural Service*

[13] Thengamara Mohila Sabuj Sangha

[14] At the same time, however, aquaculture itself might be vulnerable to the impacts of climate change. A study led by the World Fish Center underlined the following opportunities for farmers to increasing the resilience of the farming system: i) use of flooded and saline areas no longer suitable for crops to cultivate fish. ii) Using the waste nutrients and water from the reservoirs and ponds used for fish culture to help sustain crops during periods of droughts (The WorldFish Center, 2007).

### *3.5 Opportunities for furthering the role of microfinance in adaptation in Bangladesh*

Beyond harnessing existing "win-wins" identified in the previous section, there are nevertheless other areas where microcredit activities might need to be done differently in order to facilitate adaptation to climate change. This includes at least three kinds of activities: (i) changes in the technical design of existing projects; (ii) modification of financing modalities; and (iii) inclusion of activities that are not currently included in microcredit portfolios – all with a view to facilitating adaptation to the impacts of long term climate change.

With regard to existing projects, it is important to bear in mind that microfinanced loans are typically very small scale and short-term. Therefore, unlike many large-scale projects financed by other channels (such as Official Development Assistance) most microfinance funded projects do not have a long-term footprint and therefore cannot explicitly incorporate considerations of longer term climate change. Some exceptions however include the construction of disaster resistant housing through microfinance where exposure to future climatic risks might also need to be a consideration in their design. Likewise, projects relating to pond excavations for aquaculture may need to consider any anticipated changes in the location and vulnerability of the land to flooding and saline intrusion.

There are also cases where there might be a conflict between short term development and income generation needs which microfinance might fund, and responses that might be needed to enhance resilience to the impacts of climate change. In such cases, microfinance institutions might need to apply a "climate lens" to ensure that the projects they fund might not end up enhancing vulnerability to climate change over the longer term.

Climate change may also require changes in microfinance lending practices. Due to the additional stresses caused by climate change on the livelihoods of the poor, especially natural disasters such as floods and droughts, the clients may not be able to always repay the loans on time. Also, in areas where income activities mostly rely on highly seasonal occupations such as agriculture, regular repayments are more difficult to impose. Taking into account the difficulties that borrowers may encounter, and the long-term effect of climate change, products could be structured in a more flexible manner. For instance, microfinance institutions could program more flexible repayment instalments for the loans in the most vulnerable seasons, instead of asking weekly repayments, and set lower interest rates like they do for some housing programs that do not provide any revenue. Most disaster relief projects are already providing loans for shelters or water tanks at zero interests. Although microfinance practitioners argue that the fiscal discipline imposed by frequent repayment is critical to preventing loan default, several studies suggest that among microfinance clients who are willing to borrow at either weekly or monthly repayment schedules, a more flexible schedule can significantly lower transaction costs without increasing client default (Field and Pande, 2008).

Finally, there is potential to undertake programs or to scale up existing activities that can help promote adaptation to climate change. For example, education loans and training could be offered to target groups on community level adaptation strategies. Loans for promotion and use of flood, drought, and salt resistant crops may also be scaled-up, although as noted earlier, this remains a controversial issue in Bangladesh. Finally, there is potential for promoting a number of projects such as cage aquaculture, rice-fish farming, and floating gardens that are more resilient to flooding risks. Cage aquaculture can also increase fishing revenues thereby allowing the poor to sell the extra fish in the market and increase their income. The practice consists of culturing fishes in cages made of metal nets, in open water bodies. Limited investments are required, provided access to water bodies and the potential revenues are quite high. Some incompatibilities may arise between the immediate needs of the poor to have credit and the seasonal income that cage culture can offer. Thus microfinance institutions will have to provide credit for aquaculture activities with flexible, like yearly, repayments instalments. A positive side is that farmers can

utilize this practice in any water body, even in flooded and waterlogged areas and keeping their businesses (Hossain et al, 2005). Producing fish in rice fields can also be a good strategy. Although it doesn't increase fish production, it increases the nutritional status of the households. Therefore in periods of low productivity this could be a valuable source of nutrition for the poor. However rice-fish farming is vulnerable to droughts and floods, thus it is necessary to pay greater attention in implementing the technique in the right season and the right locations (Hossain et al, 2005). Due to the high incidence of floods in Bangladesh much of the land is covered by water for long periods or waterlogged when the flood retires, preventing people from cultivating vegetables. Floating gardens are an excellent response to that. They are inexpensive to build, as they are made of local materials such as hyacinth, a local weed, and the farmers are able to cultivate crops on these rafts also during flood period.

## 4. Examining Microfinance-Adaptation linkages in Nepal

Nestled in the Himalayas between China and India, Nepal is one of the poorest countries in the world with 82.5% of the population living below the international poverty line of 2 USD per day and some 38% of the population surviving on less than 1 USD per day (World Bank, 2003). Nepal has a population of 23 million, of which only 12% lives in urban areas. The rest of the population is concentrated in rural areas, working mainly in the agriculture sector. An observed warming trend over the past several decades is already having discernible and generally adverse impacts on both mountains and water resources that underpin Nepal's economic and energy infrastructure. Many mountain glaciers are in a general state of retreat, and some are expected to disappear entirely in the coming decades (Agrawala et al. 2003b). Glacier retreat and ice melt more generally are also significantly increasing the size and volume of several of Nepal's glacial lakes, making them more prone to glacial lake outburst flooding (GLOF).

Climate change scenarios for Nepal across multiple general circulation models meanwhile show considerable convergence on continued warming, with country averaged mean temperature increases of 1.2°C and 3°C projected by 2050 and 2100. Continued glacier retreat will not only increase the risk of GLOFs but can also reduce dry season flows fed by glacier melt, while there is moderate confidence across climate models that the monsoon might intensify under climate change. This contributes to enhanced variability of river flows. A subjective ranking in a previous OECD analysis of key impacts and vulnerabilities in Nepal identifies water resources and hydropower as being of the highest priority in terms of certainty, urgency, and severity of impact, as well as the importance of the resource being affected (Table 2).

**Table 2. Priority ranking of climate change impacts for Nepal [15]**

| Resource/ranking | Certainty of impact | Timing of impact (urgency) | Severity of impact | Importance of resource |
|---|---|---|---|---|
| Water resources and Hydropower | High | High | High | High |
| Agriculture | Medium-low | Medium-low | Medium | High |
| Human health | Low | Medium | Uncertain | High |
| Ecosystems/Biodiversity | Low | Uncertain | Uncertain | Medium-high |

From a microfinance perspective, meanwhile, Nepal – like Bangladesh – has an active microfinance sector. However, relative to Bangladesh, the microfinance sector in Nepal is smaller, less deep in terms of penetration, and has a more limited portfolio of financial products.

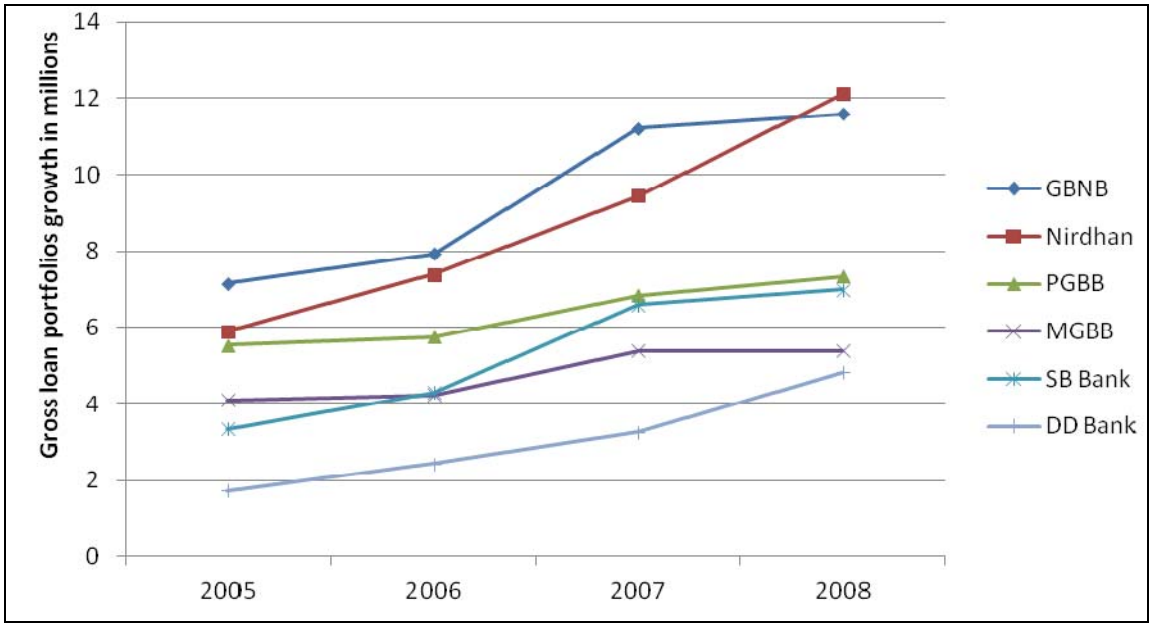
[15] Source: Agrawala *et al*. (2003b)

The first attempt to promote microfinance services in Nepal, in fact, dates back to the 1950s. However, actual development of such institutions is relatively recent. Microfinance was recognized as being integral to poverty alleviation only in the country's sixth five year plan (1980-85). It got a significant boost subsequently when the government established Regional Rural Development Banks (RRDB), modelled on the Grameen Bank, in each of the five development regions of Nepal in 1992. Recent years have witnessed considerable growth in microfinance activities in Nepal. Private microfinance banks and financial intermediary NGOs grew almost four-fold between July 2004 and July 2006. However, only 33% of households below the poverty line in Nepal currently have access to microfinance products, with the poor living in mountainous regions being particularly excluded (Ferrari, 2008).

### *4.1 Overview of microfinance providers*

In Nepal the microfinance sector can be divided into three categories: formal, semi-formal and informal. The formal segment includes commercial banks, development banks, finance companies and rural microfinance banks. The semi formal category comprises of Small Farmers Cooperatives and Savings and Credit Cooperatives (SACCOSs) and NGOs. Finally, the informal segment includes informal savings and credit associations, money lenders and cohort groups. About 38 percent of households in Nepal have an outstanding loan exclusively from the informal sector, 16 percent from both the informal and formal sector, and 15 percent from only the formal sector (Ferrari, 2008). The regulated microfinance sector in Nepal consists of 9 microfinance banks (comprised of 5 publicly owned Regional Rural Development Banks and 4 private microfinance banks), 47 NGOs and 20 financial cooperatives. The microfinance sector in Nepal has experienced considerable growth in recent years, although the sector as a whole is much smaller than in Bangladesh. Figure 5 illustrates the growth in gross loan portfolio of 6 of the largest microfinance institutions in Nepal from 2005 to 2008.

**Figure 5. Growth of microfinance institutions in Nepal**



The five Regional Rural Development Banks are: the Purbanchal Grameen Bikas Bank (eastern region); the Pashchimanchal Grameen Bikas Bank (western region); the Madhyanchal Grameen Bikas Bank (centre); the Madhya-Paschimanchal Grameen Bikas Bank (mid-western region), and the Sudur-Paschimanchal Grameen Bikas Bank (far west region). They have been established in 1992 and played a catalytic role in this sector. However, in order to solve some financial problems under the public ownership the Central Bank of Nepal has now decided to privatize the five RRDBs. The two largest microfinance banks, Nirdhan Utthan Bank Limited and Swalamban Bikas Bank Limited, were created from their respective parent NGOs in 1998 and 2000. Since 2000, two other microfinance rural banks were created from NGOs: Chimek Bikas Bank and Deprosc Development Bank.

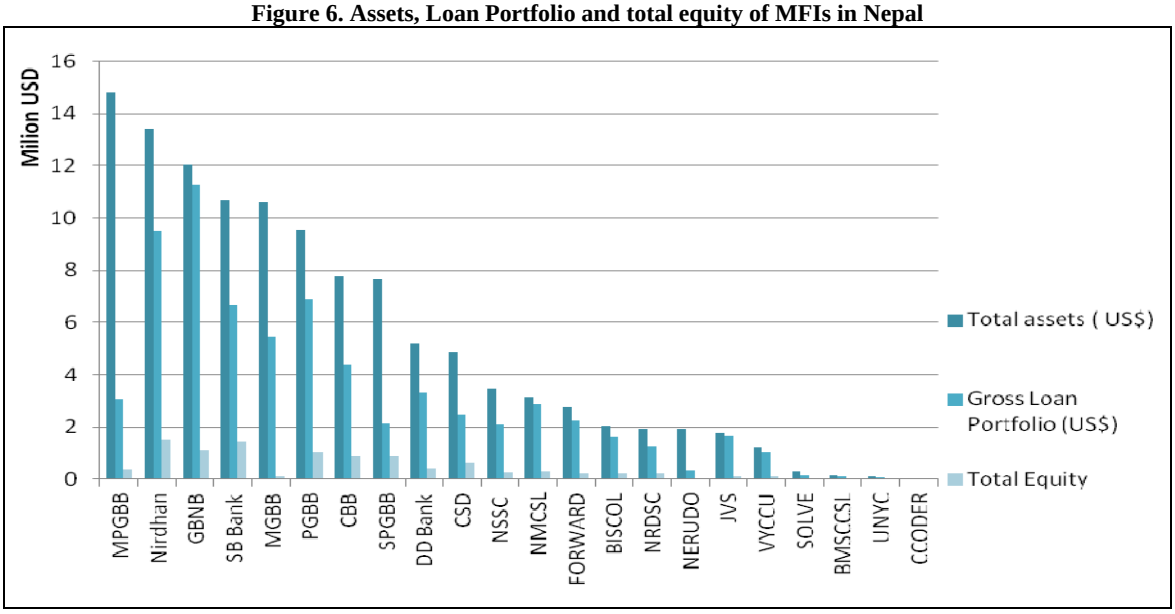
The most important financial NGOs are those at the core of rural microfinance banks: the Center for Self-Help Development, Deprosc Development Bank, and Neighborhood Society Service Center. Prominent cooperatives include the Women's Cooperative Society and Bindabasani Savings Cooperative Society Limited. In addition, Nepal has three apex microfinance institutions, modelled on the PKSF[16] in Bangladesh, that provide wholesale funds to the regulated organisations, as well as to the best performing cooperatives and NGOs.

Nepal's microfinance sector has grown rapidly in the past decade and has reached 700,000 clients in 2003. The five Rural Development Banks in Nepal serve the majority of the clients and in 2006 they reached 149,225 borrowers, with nearly 2 million Nepal Rupees in outstanding loans. The loans provided by Rural Development Banks and other MFIs usually do not exceed USD 200. Private development banks, meanwhile, collectively reached almost 200,000 borrowers. Outreach of the other microfinance institutions varies from as low as 100 borrowers with CCODER to an average of 30,000 clients. The average loans also varies among cooperatives and NGOs, from as little as USD 46 with SOLVE to USD 802 with VYCCU in 2007. Total assets, gross loan portfolio and total equity for the twenty-two[17] leading MFIs in Nepal are shown below in Figure 6.

[16] Palli Karma-Sahak Foundation

[17] Purmanchal Grameen Bikas Bank (PGBB), Pashchimanchal Grameen Bikas Bank (PGBB), Madhyamanchal Grameen Bikas Bank (MGBB), Madhya-Paschimanchal Grameen Bikas Bank (MPGBB), Sudur-Pashimanchal Grameen Bikas Bank (SPGBB), Grameen Bank Nepal Biratnagar (GBNB), Nirdhan Uthhan Bank, Swalamban Bikas Bank (SB Bank), Chhimek Bikas Bank (CBB Bank), Deprosc Development Bank ( DD Bank), Center for Self-Help Development (CSD), Neighbourhood Society Service Centre (NSSC), Nepal Multipurpose Cooperative Society (NMCSL), Forum for Rural Women Ardency Development (FORWARD), Bindabasani Savings Cooperative Society Ltd ( BISCOL), Nepal Rural Development Society Center (NRDSC), Nepal Rural Development Organisation (NERUDO), Jeevum Vikas Samaj (JVS), VYCCU Savings and Credit Cooperative Society Ltd (VYCCU), Society of Local Volunteers Efforts Nepal (SOLVE), Buddha Mahila Savings and Credit Cooperative (BMSCCSL), United Youth Community (UNYC), Centre for Community Development and Research (CCODER).

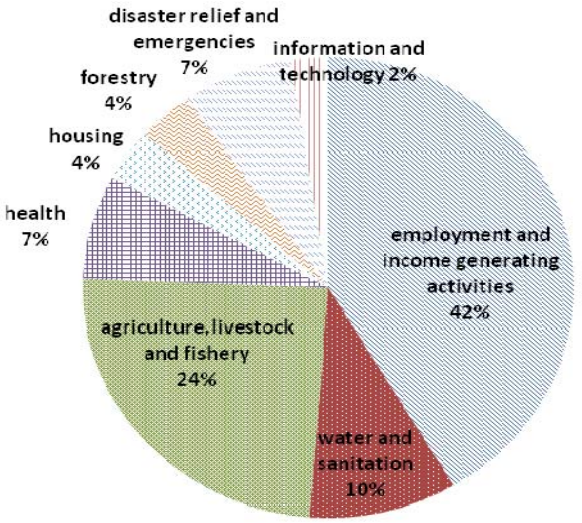
**Figure 6. Assets, Loan Portfolio and total equity of MFIs in Nepal**




### *4.2 Products available*

The products offered by MFIs in Nepal do not differ significantly from those of their counterparts in Bangladesh. However, the products and programs are less varied in Nepal. The most common products and programs are those focusing on business development, and employment generation, thereby boosting the poor's economic activities. These activities are usually agricultural, but fishery and forestry programs are also quite developed. There are also several programs focusing on water management and irrigation. The provision of social services such as sanitation, health and housing loans, disaster relief and information transfer is, on the other hand, both limited and very recent. Figure 7 illustrates the sectoral breakdown of 82 microfinance programs financed in recent years (usually for the period 2006-2008) by 22 top MFIs in Nepal.

**Figure 7. Sectoral focus of programs financed by 22 major MFIs in Nepal [18]**



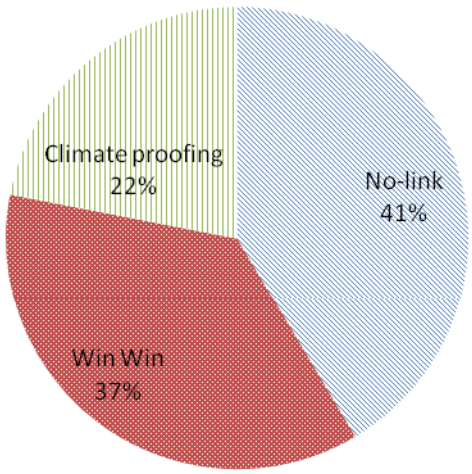

[18] Source: Analysis by the authors.

### *4.3 Links to climate change adaptation*

There is clearly some overlap between the priority categories for microfinance programs shown in Figure 6, and the key climate change vulnerabilities for Nepal that have been identified in Table 2. However, compared to Bangladesh, the degree of overlap between the orientation of microfinance programs and climate change vulnerabilities is more limited. The dominant climate change vulnerability in Nepal is in water resources and hydropower whereas the related category of microfinance projects – water and sanitation – represents a relatively small part of the overall portfolio. Agriculture, health and forestry are other priority areas for microfinance that also map closely to climate change vulnerabilities. The lion's share of microfinance programs, however, relates to employment and income generating activities that are not directly linked to climate change. They may, however, contribute to improving the asset base of the poor and therefore contribute to reducing vulnerability to climate change impacts. On the other hand, many programs in climate sensitive sectors such as agriculture and health may, in fact, have little link to adaptation or climate resilience. Finally, there might be other programs which may not contribute to adaptation, but whose success might be affected if the impacts of climate change are not adequately taken into account.

Like in the case of Bangladesh, this analysis clusters microfinanced programs of the 22 MFIs into three categories: "win-win", "climate proofing", and "no link". As noted previously, each program includes several – often hundreds or thousands – of specific microloans. The results of this categorisation are provided in Figure 8 below. Some programs are sometimes mapped onto two categories, often because of the lack of detailed information, which made the interpretation subjective.

**Figure 8. Categorisation of microfinanced programs in Nepal in terms of links to adaptation [19]**




41% of the programs in Nepal appear to have no link with adaptation. This is not necessarily a surprise, given that microfinance seeks to address the full range of immediate needs and vulnerabilities of the poor. Of the microfinanced programmes examined for Nepal, the so called "win-wins" that are automatically beneficial for adaptation, constitute a much smaller share (37%) compared to Bangladesh. This is because fewer activities are oriented specifically to reducing exposure to weather and climate risks and almost none explicitly take into account longer term implications of climate change. There are however other projects that are oriented towards reducing overall vulnerabilities, for example through income and employment generation, which will also contribute to reducing vulnerability to the impacts of

[19] Source: Analysis by the authors

climate change. The remaining 22% of projects that were analysed appear to need some changes in the project design, or in the products they offer, in order to better reflect considerations of adaptation.

The following sub-sections provide further detail on how existing microfinance programs may be already contributing to adaptation, as well as identifying activities that might require adjustments in view of climate change.

### *4.4 How microfinance programs are already promoting adaptation in Nepal*

While climate related hazards – particularly flood risks – are a large component of both current and future climate change vulnerabilities in Nepal, microfinance is virtually absent in the management of such hazards. This is quite different from the case of Bangladesh where disaster relief and preparedness were an integral part of microfinance activities. Nevertheless there are a few MFI programs in Nepal in this area. DEPROSC Development Bank is the only institution in the sample that has a disaster management program. With the financial support of Oxfam GB, it carried out a River Basin Program in the Sindhuli district that is prone to flash flood hazards. The major objectives of the program were i) to increase the awareness and capacity of the communities to prepare and mitigate the impact of disasters through preparedness ii) to enhance livelihoods resilience and sanitation condition of the poor iii) to promote coordination between the stakeholders and flood affected people (DEPROSC, 2007). Another MFI program that can also contribute to disaster relief is the Emergency Loan program offered by the Credit Co-operative VYVVU Savings and credit Cooperative Society.

MFIs in Nepal are also testing the delivery of insurance products – including microlife insurance, livestock insurance, and emergency funds against death, illness, destruction of assets and severe injuries that could be beneficial to clients seeking to secure their assets in case of natural hazards, assuming they also cover covariant risks. However, the scale of such products is still very limited and their effectiveness is also uncertain. Weather-based microinsurance ultimately targets relatively better off parts of the population and have high monitoring and administrative costs that could make this tool unsuitable for the poorest (Pierro and Desai, 2008).

Beyond the above examples, the only adaptation related MFI programs are in fact “bread and butter” development activities which happen to be in climate sensitive sectors. Climate change is likely to enhance the variability of dry season flows, increase the risk of water borne diseases, and also put crop production at risk. Therefore, loans for irrigation, healthcare and sanitation, purchase of agricultural inputs can also be viewed through the lens of adaptation.

Nirdhan Bank, for example, provides tube-well and sanitary loans to improve the health of its clients and decrease the default rate related to high mortality and poor health. It is available to clients after one year of successful repayments and amounts to a maximum of Rs. 6,000. Other programs deal with irrigation facilities, as the country lacks of efficient irrigation structure, which has a severe impact on agriculture and therefore on business activities of the poor. Another MFI - NeRuDO - in agreement with the Canadian Cooperation Office started a rural development community irrigation project in the Kathmandu district with the aim of rehabilitating a 1.5 km canal, providing drinking water, sanitation and irrigation to the poor and income generating activities. DEPROSC Bank, meanwhile, with financial assistance from the Asian Development Bank and in cooperation with the Department of Irrigation of Government of Nepal implemented two irrigation projects in 16 districts to provide a full-package service to the small and marginal farmers. It was aimed at increasing agricultural productivity through the expansion of groundwater-irrigated agriculture, mainly through community-managed shallow tube wells. DEPROSC has also provided social mobilisation and credit services to Water User Groups for the installation of shallow tube wells.

MFIs also provide credit for purchase of agricultural inputs and for crop diversification. Nirdhan has a Seasonal Agricultural Loan for purchasing chemical fertilizers, seeds and agricultural inputs and a Seasonal Business Loan used for purchasing or selling agricultural products and animals. FORWARD, meanwhile, carries out on farm diversification involving skill development activities, and crop and small livestock enterprise development. It promotes crop diversification and efficient crop management, the adoption of improved soil management practices and livestock development interventions.

### *4.5 Opportunities for furthering the role of microfinance in adaptation in Nepal*

While some existing MFI programs in Nepal also contribute to adaptation, there are clear differences with regard to Bangladesh. Unlike the case of Bangladesh, none of the projects that were examined in Nepal had an explicit focus on reducing vulnerability to, or in building durable capacity in the face of the risks posed by climate change. Even the link to current weather and climate risks is somewhat oblique. As noted earlier, MFI activities in Nepal are essentially development projects, some of which happen to be in climate sensitive sectors and therefore linked to adaptation. As such, there are opportunities for both adjusting the existing portfolio and broadening it to enhance the role that microfinance can play in furthering adaptation in Nepal.

As noted earlier in the case of Bangladesh, it is important to recall that microfinanced projects are typically small-scale and short-term. They cannot often explicitly incorporate considerations of longer term climate change impacts. Some exceptions in the case of Nepal are loans for durable assets – such as housing loans – that may need to incorporate future vulnerabilities in view of climate change. Likewise, projects that might lead to longer term irreversibilities (for example by encouraging growth in hazard prone areas) might need to factor in the implications of climate change. DEPROSC, for instance, has a water project in the Rasuwa district of Nepal that supports the community in constructing pipes and canal irrigation in this area and gives out loans to cultivate the land and for the maintenance of water pipes. However, this region is particularly vulnerable to landslides and slope instability (Acharya et al, 2005), which could potentially increase if rainfall intensifies under climate change. Thus, there could potentially be a risk that such a project might enhance vulnerability. Moreover, it must be borne in mind that due to its high mountain context, the pace of climate change is accelerated in Nepal and many of the impacts are already discernible. Adaptation to climate change is therefore an immediate development priority.

At the same time, it is the mid to high mountain regions in Nepal that are most sensitive to the impacts of climate change. These regions tend to be sparsely populated and the MFI penetration in these areas has been limited. Further, at least some of the adaptations required – most notably the partial drainage of high mountain glacial lakes or changes in hydropower infrastructure – are of a financial scale and technical sophistication that is beyond the scope of microfinance and more appropriate for international donors and the national government. However, microfinance could play a role in facilitating softer and smaller scale adaptation efforts that focus on improving and diversifying livelihood opportunities among the populations that might be most exposed.

Disaster preparedness is another area that appears to be absent from the existing MFI portfolio, and climate change induced hazards such as enhanced risk of GLOFs, landslides, flash floods, and drought in Nepal are simply more reasons for an expanded role for microfinance in this area. More credit and technical assistance for early warning systems, social forestry programmes on unstable hill slopes, and improvement of telecommunication networks could be some areas where microfinance could play a role. Likewise, in the case of agriculture, beyond providing credit for the purchase of agricultural inputs microcredit could play a role in incentivising crop diversification and uptake of crop varieties that might be more resilient to a changing and more variable climate.

## 5. Towards a Broader Role for Microfinance in Adaptation

The fundamental promise of microfinance in the context of adaptation to climate change is that its client base consists of poor households and communities (particularly women amongst them), that also happen to be particularly vulnerable to the impacts of climate change. As Hammill et al (2008) note: "if climate change is indeed a threat to which the poor are acutely vulnerable and if microfinance is in fact a tool that can reduce the vulnerability of the poor, then the possibility of linking this tool to climate change adaptation is of considerable importance". Nevertheless, microfinance has been noticeably absent in the ever expanding set of mechanisms considered relevant for adaptation financing and implementation that now include international climate change funds, official development assistance, national planning and poverty alleviation processes, disaster risk reduction, and insurance.

The in-depth analysis of existing microfinance portfolios in two climate vulnerable countries – Bangladesh and Nepal – in this paper offers a number of insights, not only on the intricate link between microfinance and adaptation in those specific contexts but also with regard to scaling up and deepening such linkages while being mindful of the limits and constraints of microfinance.

Besides access to a large segment of the poor, microfinance institutions have the know-how and information networks necessary to track a large number of small transactions. This is particularly relevant in the context of adaptation, which will require financing of thousands of actions involving changes and adjustments to existing practices. Further, as both case studies clearly show, there are already strong linkages between the existing activities that are funded through microfinance and what might be needed for adaptation. Income and livelihood diversification would reduce vulnerability to weather and climate risks, while projects focussing on disaster preparedness, irrigation and sanitation facilities, crop diversification, insurance schemes, and building of shelters and housing will also reduce exposure to the impacts of current and future climate. There are also at least some examples in Bangladesh where some of the longer term implications of climate change are already reflected within some of the programs and activities of MFIs.

At the same time, there are also examples of short term practices that microfinance may encourage which could, in fact, increase vulnerability to the impacts of climate change. These include, for example, encouraging growth in hazard prone areas, livelihood strategies that are environmentally unsustainable, or coping strategies that sustain status quo where a shift to other livelihood strategies or locations might be warranted in view of the longer term implications of climate change. Such cases would require rethinking of existing lending practices and the design of projects that are funded.

There is also considerable scope for expansion or scaling up of microfinance in areas that are particularly relevant in view of climate change. For example, microfinance could play a greater role in disaster preparedness and early warning systems, in promoting crop varieties that might be more resilient to the anticipated impacts of climate change, and in technical training and education programs related to community level adaptation.

Another broader message from this analysis is that microfinance is not just about the provision of small credit transactions for the poor. Other accompanying "credit plus" elements including the development of an appropriate enabling environment, training and skill development, monitoring, and enforcement of fiscal discipline, on the part of both lenders and borrowers, are all critical for the overall success of development outcomes, and will be for adaptation as well. Further, as illustrated by both the Bangladesh and Nepal case studies, microfinance projects are often not standalone but instead have a blended character. In other words microfinance is but one element of a larger more comprehensive effort that is implemented in collaboration with commercial banks, cooperatives, NGOs, the government, and international donors. Such blending or mainstreaming would be critical for any microfinance supported adaptation activity as well.

Scaling up the role of microfinance in adaptation, however, will require addressing the fundamental challenge of "financing microfinance". Start-up funding – usually from governments and

international donors – is critical for microfinance. In fact, without this at the least initial funding, many MFIs would be unsustainable. They would have to charge excessively high interest rates to be able to survive, thus the products would be unaffordable for the clients (Mallick, 2002). At the same time, these external subsidies make MFIs vulnerable to changes in government policy or in development priorities that might affect funding flows. Donor funding is also often project-based with a set time frame, which also creates financial insecurity and may prevent microfinance from taking hold.

In the context of adaptation, predictable financing could be possible if a portion of the resources from the Adaptation Fund (or any related international funds that may be established under a post 2012 agreement) could be dedicated to start, or scale-up, microfinancing for adaptation. This need not, of course, replace other investments at the project or programmatic level. But microfinance could offer an effective additional delivery channel for the global funds to operationalise adaptation among the poor and the vulnerable. Proper accountability by any participating MFI on the use of such funds dedicated for adaptation, however, would be an important prerequisite. Practical channels for the delivery of funds to the MFIs are the so called apex institutions or wholesale funds. Wholesale organisations are useful intermediaries for donors, investors and governments. In fact, they are politically independent, have the necessary information on all local institutions to select the most qualified, effective and transparent MFIs and can provide them with technical assistance.

Private investors could also increase the scale of financing directed to MFIs, and direct it for adaptation purposes. A large number of international banks are already engaged in microfinance funding. Dexia bank, Deutsche bank, Citibank and ABN and AMRO bank are notable examples. With increasing awareness and the realisation of the market opportunity presented by microfinance in the face of climate risk, it is possible that banks would be willing to further engage in making large investments in microfinance. Partnerships between private banks, development agencies or other institutions could also provide additional opportunities to raise the number of investors and finance MFIs.

In exploring and potentially scaling-up the role of microfinance for adaptation it is quite critical to keep expectations realistic. Despite its promise and several successful examples of MFIs worldwide, the overall record of microfinance remains somewhat mixed in terms of their end results and financial viability over the long-term. In applying microfinance for adaptation it is therefore important not to repeat the mistakes that were made in the context of applying this instrument for poverty alleviation.

Microfinance also has some specific limitations with regard to its viability as a tool to promote adaptation to climate change. For example, while microfinance successfully targets the poor, its clients are primarily the “economically active” poor and not the poorest of the poor who do not even have recourse to economic activity. For the very bottom of the social pyramid other mechanisms might clearly be needed. However, it can be questioned how important climate change might be for such groups, considering their already very high baseline vulnerabilities. Microfinance has also not taken hold in all developing countries. While it has been relatively successful in many countries in South Asia and Latin America, comparable success is lacking in Africa which also happens to be particularly vulnerable to the impacts of climate change.

Further, microfinance is, by definition, not suited for adaptation interventions that are either long-term or require considerable investment. For example, microfinance cannot fund the scale of investment required for building dams, seawalls, or for draining dangerous glacial lakes. Small microfinance institutions without recourse to reinsurance may also not have adequate reserve funds to insure against weather and climate risks, as these risks tend to be covariant and may adversely affect an entire population or group at the same time.

Finally, like in the case of development, adaptation to climate change would require a multi-pronged approach. This paper makes the case that microfinance is an important and overlooked tool in such an adaptation arsenal but it is, by no means, a panacea.

## REFERENCES

Acharya, G. et al. (2006), Assessing landslide hazard in GIS: a case study from Rasuwa, Nepal, Bulletin of Engineering Geology and the Environment, Vol. 65, No 1, pp. 99-107

Agrawala, S. et al. (2003a), Development and climate change in Bangladesh: focus on coastal flooding and the Sundarbans, OECD, Paris.

Agrawala, S. et al. (2003b), Development and climate change in Nepal: focus on water resources and hydropower, OECD, Paris.

Armendariz, B. and Murdoch, J. (2007), The Economics of Microfinance, MIT Press, Cambridge, Massachusetts

Barua, D.C. (1999), The Experience of Grameen Bank Housing Program, Grameen Bank, Bangladesh. http://www.iadb.org/sds/doc/ifm-chandrabarua-e.pdf

BRAC (2007), Annual Report 2007, www.brac.net

CDF (2002), Credit and Development Forum Annual Report, Bangladesh, http://www.cdfbd.org/annual_report.php

Cenapred, Sistema Nacional de Protection Civil and Segob (2009), Impacto socioeconomic de los principales desastres occurridos en la republica Mexicana en año 2007, Mexico.

CGAP (undated), Why do MFIs Charge High Interest Rates?, CGAP, http://www.cgap.org/p/site/c/template.rc/1.26.1309

DEPROSC (2007), Annual Report, Nepal.

Ferrari, A. (2008), Access to Financial Services in Nepal, The World Bank, Washington, DC.

Ferrari, A. (2008), Increasing Access to Rural Finance in Bangladesh, The Forgotten Missing Middle, The World Bank, Washington, DC.

Field, E. and R. Pande (2008), "Repayment Frequency and Default in Microfinance: Evidence From India", *Journal of the European Economic Association*, Vol. 6, No 2-3, pp. 501-509

Hammill, A. et al. (2008), "Microfinance and Climate Change Adaptation", *IDS Bulletin*, Institute of Development Studies, Vol. 39, No 4, pp. 113-122.

Hoek-Smit, M. (1998), Housing Finance in Bangladesh Improving Access to Housing Finance by Middle and Lower Income Groups, prepared for The Government of Bangladesh and UNDP/UNCHS, December.

Hossain, M et al. (2005), Adoption of rice-rice and rice-aquaculture farming system in coastal West Bengal: determinants and impact, IRRI report. http://www.irri.org/publications/program/pdfs/00programreport/rainfed.pdf

Hulme, D. and K. Moore (2006), "Why has Microfinance been a policy success in Bangladesh (and beyond)?", GPRG-WPS-041, GPRG and ESRC, http://www.gprg.org/pubs/workingpapers/pdfs/gprg-wps-041.pdf

Mallick, R. (2002), Implementing and Evaluating Microcredit in Bangladesh, *Development in Practice*, 12(2), 153-163.

McKee, K. (2008), "Microfinance: Climate change connections", *Development outreach*, The World Bank, http://www1.worldbank.org/devoutreach/article.asp?id=476

OECD (2003), *Development and climate change in Bangladesh: Focus on coastal flooding and the Sundarbans*, OECD, Paris.

OECD (2003), *Development and climate change in Nepal: Focus on Water Resources and Hydropower*, OECD, Paris.

OECD (2005), *Bridge over Troubled Waters: Linking Climate Change and Development*, OECD, Paris.

ProDesarollo (2008), Benchmarking de la microfinanzas en México: Un informe del sector, Mexico.

Pierro, R and B. Desai (2008), Climate Insurance for the Poor: Challenges for Targeting and Participation, *IDS Bulletin*, Vol. 39, No 4, pp. 123-129

Rippey, P. (2009), "Microfinance and Climate Change: Threats and Opportunities", *Focus Note 52*. Washington, D.C.: CGAP, February.

Ro, J. (2009), Expanded Microcredit loans to support low-income households, Korea Government News, October 5. http://www.korea.net/news/news/NewsView.asp?serial_no=20091005004&part=101

Saldana-Zorilla (2006), Reducing Economic Vulnerabilty in Mexico : Natrural disasters, Foreign Trade and Agriculture, Dissertation zur Erlangung des akademischen Grades Doktor der Sozial- und Wirtschaftswissenschaften Doctor rerum socialium oeconomicarumque, Wien.

Tang, S. and N. Bhatt, "Making Microcredit work in the United States: Social Financial and Administrative Dimensions", *Economic Development Quarterly*, Vol. 15, No 3, pp. 229-241.

The WorldFish Center (2007), Fisheries and aquaculture can provide solutions to cope with climate change, Issue Brief 1701, Malaysia. http://www.worldfishcenter.org/v2/files/CC-ThreatToFisheries1701.pdf

Yunus (2006), "A Hand up, not a Handout, Why not microloans for Katrina victims?", The Wall Street Journal, October 14.

World Bank (2003), Nepal: Poverty Reduction Strategy Paper- The Tenth Plan 2002-2007, Kathmandu, Nepal. siteresources.worldbank.org/NEPALEXTN/…/Nepal_PRSP.pdf

World Bank, 2002. World Development Indicators. On CD Rom. The World Bank, Washington, DC.

Zaman, H. (2004), "The Scaling-Up of Microfinance in Bangladesh: Determinants, Impact, and Lessons", World Bank Policy Research Working Paper No. 3398, available at SSRN: http://ssrn.com/abstract=625275

Zaman, H. (2004), Microfinance in Bangladesh: growth, achievements, and lessons, in *Scaling Up Poverty Reduction Case Studies in Microfinance*, CGAP/The World Bank, Washington DC, http://www.cgap.org/docs/CaseStudy_scalingup.pdf

## ANNEX A: MICROFINANCE INSTITUTIONS IN BANGLADESH EXAMINED IN THIS REPORT

| | |
|---|---|
| Grameen Bank | |
| ASA | Association for Social Advancement |
| BRAC | Bangladesh Rural Advancement Committee |
| Proshika | |
| TMSS | Thengamara Mohila Sabuj Sangha |
| BURO | BURO Tangail Bangladesh |
| SSS | Society for Social Services |
| JCF | Jagorani Chakra Foundation |
| Shakti Foundation | |
| UDDIPAN | United Development Initiatives for Programmed Action |
| POPI | People's Oriented Program Implementation |
| PMUK | Padakhep Manabik Unnayan Kendra |
| RDRS | Rangpur Dinajpur Rural Service |
| DSK | Dushtha Shasthya Kendra |
| IDF | Integrated Development Foundation |
| WAVE Foundation | |
| PMK | Palli Mongal Karmosuchi |
| CODEC | Community Development Centre |
| COAST | Coastal Association for Social Transformation |
| VERC | Village Education Resource Centre |
| NGF | Nowabenki Gonomukhi Foundation |
| UDPS | Uttara Development Program Society |

## ANNEX B: MICROFINANCE INSTITUTIONS IN NEPAL EXAMINED IN THIS REPORT

| | |
|---|---|
| PGBB | Pashchimanchal Grameen Bikas Bank |
| MGBB | Madhyamanchal Grameen Bikas Bank |
| MPGBB | Madhya-Pashchimanchal Grameen Bikas Bank |
| SPGBB | Sudur-Pashimanchal Grameen Bikas Bank |
| GBNB | Grameen Bank Nepal Biratnagar |
| Nirdhan | Nirdhan Utthan Bank |
| SB Bank | Swalamban Bikas Bank |
| CBB Bank | Chhimek Bikas Bank |
| DD Bank | Deprosc Development Bank |
| CSD | Centre for Self-Help Development |
| NSSC | Neighbourhood Society Service Centre |
| NMCSL | Nepal Multipurpose Cooperative Society Ltd |
| FORWARD | Forum for Rural Women Ardency Development |
| BISCOL | Bindabasani Savings Cooperative Society Ltd |
| NRDSC | Nepal Rural Development Society Centre |
| NERUDO | Nepal Rural Development Organization |
| JVS | Jeevum Vikas Samaj |
| VYCCU | Savings and Credit Cooperative Society |
| SOLVE | Society of Local Volunteers Efforts Nepal |
| BMSCCSL | Buddha Mahila Savings and Credit Cooperative |
| UNYC | United Youth Community |
| CCODER | Centre for Community Development and Research |