

**IMPACT OF MICROFINANCE ON CLIMATE  
RESILIENCE AND LIVELIHOOD SECURITY OF  
RURAL HOUSEHOLDS IN PAKOKKU TOWNSHIP**

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**IMPACT OF MICROFINANCE ON CLIMATE  
RESILIENCE AND LIVELIHOOD SECURITY OF RURAL  
HOUSEHOLDS IN PAKOKKU TOWNSHIP**

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The thesis attached hereto, entitled “**IMPACT OF MICROFINANCE ON CLIMATE RESILIENCE AND LIVELIHOOD SECURITY OF RURAL HOUSEHOLDS IN PAKOKKU TOWNSHIP**” was prepared and submitted by Yarzar Hein under the direction of the chairperson of the candidate supervisory committee and has been approved by all members of that committee and board of examiners as a partial fulfillment of the requirements of the degree of **MASTER OF AGRICULTURAL SCIENCE (AGRICULTURAL ECONOMICS)**.

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## **DECLARATION OF ORIGINALITY**

This thesis represents the original work of the author, except where otherwise stated. It has not been submitted previously for a degree at any other university.

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## **DEDICATION**

This dissertation is lovingly dedicated to my beloved, Nang Ei Mon The who has always stood by me and dealt with all of my absence from some family occasion with a smile.

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## ABSTRACT

Nowadays, poverty alleviation together with livelihood security of rural people becomes the major issues in rural development. Microfinance is now practicing and applying in rural development as it is one of the most successful tools in poverty reduction and community development. In that case, rural development requires a new perception of the importance of resilience to climate change which is one of the challenges to the development of subsistence farming system in the Dry zone areas of Myanmar.

This study contributes to the understanding microfinance impact by focusing on the climate resilience and livelihood security of rural households in the study area by analyzing microfinance participant and non-participant households' productive assets, adaptation of crop, awareness on changes in climate, income and credit conditions, and their food security status. The research was conducted in December 2011 and set three specific objectives: (1) to examine the climate resilience of rural households, (2) to assess the impacts of microfinance programs on livelihood security of rural households and (3) to study the determinants of household income and credit demand of the sampled rural household in the study area. There were 4 sampled villages out of 256 villages in the Pakokku Township. Altogether 96 households were interviewed from these villages. The sampled households were categorized into two types of respondents; non-participant and participant in microfinance. The descriptive analyses with independent sample t test, crosstabs with Pearson chi-square test, multiple regressions (linear model) were used for fulfillment of the research objectives and the nature of data.

According to research findings, it was found that landless households in participant group (17% of sampled households) became farming households, but not visible changes in non-participant group during 2005 and 2011. In addition, those households who participate in microfinance had more positive changes in livestock assets. During 2005 and 2011, about 29% of participants and 23% of non-participants altered mono cropping to multiple cropping systems, in the response of climate change. Moreover, microfinance participant group had significantly more involvement in training programs and they had increased awareness in climate change by attending such kind of training. Participant group had significantly higher percentage change in crop income and average annual income than that of non-participants. It can be concluded that microfinance program increased productive assets of participant households, adaptation

of crop by diversification and promoted the awareness of climate change in the study area and income status of participant households. Therefore, microfinance could build climate resilience of participant households in certain extent.

In the view of livelihood security, there were two changes in economic aspect: (1) agricultural (crop) income was increased in participant households and (2) participant households possessed more productive assets than before. In terms of social/institutional aspect, the changes were (1) participants had more involvement in training program, (2) participant group could organize Taw Win Nan saving and credit cooperative successfully and (3) additional 34% of participant households attained food security level after 6 years participation in microfinance programs. Hence, livelihood security of participant households could be promoted to a positive level by participating in microfinance program.

Based on the income regression analysis, it can be concluded that the average annual household income can be increased significantly by doing the younger farmer, possessing larger farm size, higher off/non-farm income and more crop diversification. Moreover, it was obvious that the average annual household income of microfinance participant was still 35% lower than that of the non-participants significantly. Therefore, microfinance program for the poor should be encouraged to accomplish income equity status of rural people in the study area.

In accordance with regression on credit amount received, it can be concluded that the larger farm size received more loan/credit amount than the small farms. The important conclusion in this regression analysis was that, if the household will be the farming household, it will receive more credit than the other households, in contrast, if the household will be the wage earning household, it will receive less credit than the others.

As an outcome of perception of household credit demand regression, it can be concluded that the smaller family size and larger farm sizes had the lower perception of credit demand in the study area as they had more finance than others. It can also be said that the farming households had higher credit demand level and wage earning household had lower credit demand level.

In addition, microfinance has proved a powerful way to bring financial services to the poor, not only in the scope of poverty reduction but also in the scope of climate resilience.

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## LIST OF ABBREVIATIONS

<b>AAM</b>	ActionAid Myanmar
<b>ADB</b>	Asian Development Bank
<b>AMDA</b>	Association of Medical Doctors of Asia
<b>CDRT</b>	Community Development for Remote Townships Project
<b>EDA</b>	Economic Development Associated
<b>GRET</b>	Group de Recherche et d'Echanges Technologiques
<b>HDI</b>	Human Development Initiative
<b>LFR</b>	Loan from Relatives
<b>INGOs</b>	International Non-Governmental Organizations
<b>MADB</b>	Myanma Agricultural Development Bank
<b>MAS</b>	Myanma Agricultural Service (Department of Agriculture DOA at the present)
<b>MDG</b>	Millennium Development Goal
<b>MFI</b> s	Microfinance Institutions
<b>MFP</b>	Microfinance Project
<b>MFS</b>	Microfinance Service
<b>ML</b>	Money Lender
<b>MLFDB</b>	Myanmar Livestock and Fisheries Development Bank
<b>MMCWA</b>	Myanmar Maternal and Child Welfare Association
<b>MNPED</b>	Ministry of National Planning and Economic Development
<b>MP</b>	Microfinance Participant
<b>NGOs</b>	Non-Governmental Organizations
<b>NP</b>	Non-Participant in Microfinance
<b>PACT</b>	Private Agencies Collaborating Together
<b>SHG</b>	Self Help Group
<b>SRG</b>	Self-Reliance Group
<b>SC</b>	Save the Children
<b>TWN</b>	Taw Win Nan Saving and Credit Cooperative
<b>UNCCD</b>	United Nations Convention to Combat Desertification
<b>UNDP</b>	United Nations Development Program
<b>USDP</b>	Union Solidarity and Development Party
<b>UNOPS</b>	United Nations Office for Project Services

# CHAPTER 1

## INTRODUCTION

### 1.1 Overview of the Study

As consistent warming trends and more frequent and intense extreme weather events have been observed over the world, those climate change becomes one of the major contributing factors to livelihood security and challenges to sustainable development. Climate change hinders development in all sectors, not only in Myanmar, but also globally, and it has substantial implications for rural development over the world. A vast majority of the population lives in rural areas depends heavily on agriculture, forestry, fisheries, livestock and other climate sensitive sectors. Climate change poses a serious threat to livelihoods security, as well as enhancing risks and vulnerabilities through the increased frequency of natural disasters and extreme weather events. Among those cases, the rural poor are the most vulnerable and worst affected by that climate change events.

Furthermore, another identified key constraint facing the poor is lack of access to formal sector credit to enable them to take advantage of economic opportunities to increase their level of output, hence move out poverty and get livelihood security. The problems caused by informational asymmetries that are typical to credit markets are exacerbated in developing countries, because poor people lack collateral to secure their loans and the weak legal systems cannot secure enforcement if a client reneges on their loan. The poor are therefore typically unable to borrow from formal financial service providers. This lack of access can create persistent poverty traps and income inequality (Robert *et al.* 2007).

At this instant, microfinance program target at the poor has now become a worldwide approach for livelihood security and creates self-employment opportunities by raising the poor people's income. It especially encourages the empowerment and capacity building of women in particular and that of the other people in general. Microfinance is the best tool for poverty reduction and livelihood security for which Myanmar is now striving in rural development with great momentum. In those cases, an imperative precision is that microfinance can reduce vulnerability, increase activities on climate change adaptation and build resilience by providing poor people with the means to diversify, accumulate and manage the assets needed to become less susceptible to shocks and stresses or to better deal with the trends and impacts.

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”, microfinance can be most effectively harnessed for vulnerability reduction and climate resilience building when reflective of peoples’ level of poverty and livelihood characteristics. 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.

### **1.1.1 Current Status of Climate Change and Microfinance on Livelihood Security**

In Myanmar, agriculture sector is the backbone of its economy and contributes 32 percent (2009-2010) of GDP and 17.5 percent of total export earnings. The activities for the development of agriculture are given as a first priority because it contributes the highest value of gross domestic product of the country and provides 61.2 percent of the total employment. As nearly 70 percent of the population resides in rural areas and depends on income from agriculture, there must be vital need to the development of agricultural productivity, development of rural socio-economy. The Government of Republic of Union of Myanmar has interested in improving the lives of people, especially in the rural areas. The Government is giving priority to the prosperity of rural community, with special attention for the livelihood security of rural people. And it currently drives and tries to promote the rural development by laid down the eight tasks for rural development and poverty alleviation in which one of the priority tasks is development of micro-saving and credit associations. For implementing these eight tasks, however, climate change will place an additional burden on efforts to meet these development goals as the climate change has negative impacts on agricultural production and livelihood security. People in rural area are therefore more exposed than those in others to the effects of land degradation, drought, desertification, deforestation, as well as water and air pollution, which are associated with climate change. The effect of climate change on agriculture is likely to deprive large sections of the population in the rural area of their livelihoods, condemning them to perpetual poverty, causing vulnerability of the poor to climate change. Subsequently, the negative impacts of climate change conflicts with the goal of poverty alleviation and rural development of Myanmar and become a threat to livelihood security to rural households.

Consequently, microfinance programs commence the indispensable position in livelihood security and rural development. In fact, the rural financial market is composed of several distinct subsectors: a formal and various segments of an informal sector. In rural Myanmar, the financial market is composed of three subsectors: a formal; a semiformal; and various segments of an informal sector. Formal financial institutions are defined as authorized institutions by the state include the state, which include agricultural development bank (MADB), savings and credit cooperatives, public pawnshops and private licensed pawnshops. Semiformal financial institutions are not legally authorized but are partly required to apply for the state in some ways. The semiformal is composed of local NGO-MFIs (microfinance institutions) and international NGO-MFIs including 3 NGOs supported by UNDP welfare program of which is namely Human Development Initiatives (HDI). Informal financial activities are not under the control of authorities in practice. For instance, several lending system are included in this sector that the use of illegal pawnshops, the use of usurious money lenders, the use of private advanced payment contracts for agricultural crops, and lending and borrowing, usually at no interest, among relatives and friends.

Concerning formal and semiformal sectors, microfinance in Myanmar is at an embryonic stage. It is an exogenous brought to the country by international NGOs (INGOs) contracted with the UNDP (funding agency) and UNOPS (executing agency) who are interested in using microfinance as a part of an overall package for poverty alleviation. However, this situation has not prevented various local organizations or associations and other international NGOs from initiating microcredit projects, some with a saving component. Although microfinance was first introduced to Myanmar in 1997 by UNDP-HDI, a number of microfinance initiatives were implemented through various international NGOs (INGOs) such as EDA, Grameen Trust, GRET and PACT in Delta area, Dry Zone area and Shan State. Later on, other INGOs also began providing microfinance services as part of their broader poverty alleviation intervention. From March 2006, PACT was selected as the single subcontractor for UNDP microfinance programming, becoming by far the dominant microfinance provider in the country. As of September 2009, 6 actors (five INGOs and one private company namely AMDA, GRET, PACT (UNDP projects and Non UNDP), Save the Children (Dwan Microfinance Program), Total (Yedana Suboo Microfinance) and World Vision are operating institutional microfinance in the country, all regulated by specific MoUs with authorities (ACTED, FDC and BWTP 2010). At present, the Microfinance Project (MFP) is

providing various assistances to poor rural communities in 22 townships (from 5 states) in 3 different regions, namely the Dry Zone - 10 townships, Shan State – 5 townships and Ayeyarwaddy Delta – 7 townships (UNDP 2010).

### **1.1.2 Climate Change in Magway Region, Central Dry Zone**

As major impacts and threats of global warming are widespread over the world, Myanmar is also suffering from these climate changes (land degradation, drought, desertification, deforestation, flood and natural disaster). The main area affected by desertification and drought is the Dry Zone in the central part of the country. The Dry Zone is characterized by less than 1000 mm of rainfall annually (less than in other parts of Myanmar). The boundary of Dry Zone encompasses Lower Sagaing, Mandalay and Magway Region (especially in 13 districts in these Regions). The central core area is confined to Pakokku, Nyaung Oo and Myingyan districts which are the hottest places in Myanmar during summer period and where mean annual rainfall is less than 600mm. Annual mean rainfall as well as mean rainy days over the zone during the last three decades clearly indicates a declining trend. It is prone to droughts. According to characteristics of identified droughts using rainfall series, the worse drought that hit the area was during 1979 and 1980. The second worse drought that hit Lower Sagaing and Mandalay (but not Magway) took place during 1982 and 1983. The third worse drought hit the whole area of Dry Zone during 1993 and 1994 (UNCCD 2000).

Except for the interval between the second and third worst droughts of some 10 years, recurrence of droughts in the Magway Region seems to be showing up at shorter intervals (approximately three year interval). Although the region had long been experienced in drought, the curious changes come to pass the region in the recent. On 22 October 2010, Cyclone Giri which damages the eastern Rakhine coast, also affected and hit to some extent in Magway region. Besides, on 20 October 2011, Tropical Storm Two, which made landslides near the Myanmar-Bangladesh border on 19 October, resulted in heavy rain (up to 100-150 mm) and subsequently triggered flash floods in Magway, Mandalay and Sagaing Regions of Myanmar. Magway Region was the worst affected by the floods. That torrential rain triggered heavy flooding in Magway region that caused so many losses and killed many people. As of 31 October 2011, the number of reported dead or missing people has increased from 78 to 161 and 2,657 households are homeless. Information from four worst-affected among the seven townships including Pakokku affected by the disaster indicates that more than 26,000 persons have lost their houses and belongings.

An additional distinct effects of climate change in the region is change of Ayeyarwaddy River in the pattern of water flows, unusual change in water level that cause over flood in the river bank area, land slide and sometime unexpected disappears of islands in the river. Due to these changes of Ayeyarwaddy River, losses of agricultural land, losses of some productive assets and village rehabilitation that in the case of island disappear and sometime death caused by these changes are common in the river bank area, especially in Pakokku Township.

### **1.1.3 Agriculture and Food Security Status in Magway Region**

Magway Region is one of rice deficit areas in the dry zones. Agricultural land occupies 1.6 million acres of about 2.5 million acres of total arable land in this region. Although there are 47 dams and weirs for irrigation for agricultural land, it can only cover for 301484 acres, meeting most of the land as a rain-fed system. There are two main cropping systems practicing in Magway Region: (i) rice-based and (ii) sesame-based cropping systems. Rice based cropping system is practiced in wet (*Le*) land and sesame based cropping system in dry (*Yar*) land. Multiple cropping is practiced in both wet (*Le*) land and dry (*Yar*) land.

As 70% of the agricultural land is dry land, it produces mainly oil seed crops, pulses, sorghum and maize, etc. It is said to be “Oil Pot of Myanmar” because it is the main supplier of edible oil in Myanmar as sesame and groundnut are produced mainly in this region. The crops grown in Magway region are sesame, rice, groundnut, pigeon pea, green gram, chick pea and onion. The major crop is sesame occupying more than one million acres of the cultivated land. The region is densely populated, most of the land has been already converted to agriculture and its intensive use has already provoked a strong degradation, worsened by soil erosion and formation of gullies.

The region is one of the poverty-stricken and food insecurity areas in Myanmar. Based on integrated household living condition survey, the UNDP and MNPED (2007) rank this region as 11<sup>th</sup> among 17 states and regions in terms of food poverty and poverty incidences. They find that 14 and 44 percent of total population in Magway region living below the national food poverty and poverty line (UNDP and MNPED 2007).

### **1.1.4 Microfinance in Magway Region**

In Magway Region, PACT (UNDP projects) began microfinance program (MFP) in 1997 and PACT (non UNDP) started providing microfinance services (MFS) in 2005. At this moment, Save the Children (SC), Action-aid Myanmar (AAM), AMDA and World Vision were also currently providing microfinance services in the Magway Region.

Among these organizations, actually, the central approach of ActionAid in Myanmar was supporting local organizations through intensive training and deployment of ‘change-makers’ (youth leaders) in target communities. It was supporting communities who were trying to cope with the disastrous effects of climate change not only in terms of community capacity building program but also in terms of microcredit services. In that case, Microfinance Projects (MFP) financially supported the poor to emerge from poverty, by organizing to form self-help groups (SHGs) / self-reliance groups (SRGs). SHGs / SRGs were formed through a process of self-selection based on wealth ranking<sup>1</sup> and consist of 10 to 15 poor women. Participants gain increased financial and livelihood assets through their involvement in the groups, share knowledge and become more aware of health and social concerns, enabling them to advance economically and find solutions to their own problems. Its aim is to improve the welfare of rural people by encouraging them to participate in their own development. In this way, it expects the people in project area will gain confidence, take a more active role in development, and adopt that development project really answers their needs. The project also provides skills training for many such activities. This practice builds the wealth of families and entire communities, paving the way for economic independence and socio-economic advancement. Women from poor households in project villages have acquired greater decision making roles in managing family affairs and a more pronounced voice in the village level development activities as a result of their involvement in SHGs/SRGs. And the ultimate goal of these microfinance services is that the livelihoods of vulnerable households in the project area are more secure and attain higher level by diversifying income generating activities through saving mobilizations.

## **1.2 Problem Statement**

Pakokku Township is in Pakokku District, Magwe Region and a hilly area in the middle of Myanmar. It is a important river port, which is situated on the west bank of Ayeyarwaddy River. Pakokku Township is bordered by Myaing Township to the north, Yesagyoo Township to the northeast, Nyaung-U Township to the southeast, Seikphyu Township to the southwest, and Pauk Township to the northwest. Pakokku is a big town with 58 village tracts consisting of 262 villages. Total population represents over

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<sup>1</sup> Appendix 2. Village Wealth Ranking



301,000 and some 90,000 of them live in urban areas and nearly 70 % live in rural area of Pakokku.

The township is located in dry zone area with the minimum temperature of 15°C and maximum 45°C. Average rainfall is less than 30 inches per annum. Rainy season is usually from May to October. It is typically drought prone and one of serious climate change affected area in Myanmar. It is a scarce and erratic rainfall regime, combined with a high population density making this area particularly food insecure.

In rural area of Pakokku Township, less people owned the cultivated land but most villagers are casual workers. The job opportunities are not much expected on agricultural field works. The land owners hire them during the cultivating and harvesting time. It is only about 6 months at most. After that they have difficulties to earn daily income. At that time some move to other townships to get jobs for their livelihoods and work as seasonal labors. Consequently the Pakokku District is characterized by a very high frequency of small holdings, most of them not allowing the household survival and requesting income integration through the mechanism of seasonal migration searching occasions for casual labor (either at service of big farmers, or in urban areas if a labor demand exists<sup>2</sup>) and estimated to observe high level of poverty. Hence, so many INGOs, NGOs such as UNDP, Save the Children (SC), Action-aid Myanmar (AAM), AMDA, Myanmar Maternal and Child Welfare Association (MMCWA), and Union' Solidarity and Development Party (USDP) currently carry out MFS and its related activities in the area with the title of poverty alleviation and community development. Among these organizations, ActionAid Myanmar has been especially involved with Disaster Risk Reduction (DRR) related activities in Pakokku District. ActionAid Myanmar, along with other agencies, has been closely working together not only in building disaster resilience communities but also in microcredit services in that area.

For those conditions, in favor of the concepts: *“climate change is indeed a threat to which the poor are acutely vulnerable and microfinance is in fact a tool that can reduce the vulnerability of the poor”*, there is necessitated to reveal how and which extent the MFP can play as climate resilience measure in Pakokku Township. Moreover, it is needed to identify if these MFS really enhance the livelihood security of the rural households in the Pakokku Township. In addition, as rural development requires a new perception of the importance of resilience to climate change, the question *whether*

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<sup>2</sup> A seasonal migration new flow to NayPyiTaw

*microfinance can foster an innovative adaptation, climate resilience and build livelihood security of rural household* becomes the major concern in this research.

### **1.3 Objectives of the Study**

The overall objective of the study is to assess the impacts of microfinance on climate change resilience and livelihood security of rural households in Pakokku Township as a tool in reducing the vulnerability of the poor. Specific objectives are:

1. To examine the climate resilience of rural households in the study area;
2. To assess the impacts of microfinance programs (MFPs) on livelihood security of rural households in the study areas; and
3. To study the determinants of household income and credit demand of the sampled household in the study area (Pakokku Township, Central Dry Zone).

### **1.4 Significant of the Study**

Microfinance provides an alternative source of finance to the poor and women, who, if without access to formal banks, have access to a variety of informal lenders. As microfinance is relatively cheaper than informal finance, access to microfinance is expected to increase household saving, income generating opportunities and reduce household borrowing from informal sources. In this study, it can be expected to observe whether the MFPs' activities have significantly contributed to increase household productive assets and incomes or not. And the results are anticipated to analysis the credit demand of rural people for their livelihood security.

Furthermore, climate change is threatening food production systems and therefore the livelihoods and food security of rural people who depend mainly on agriculture, livestock and fishery sectors. For that reason, the interest to investigate whether microfinance makes the poor more resilience to climate change, can specify and point out that an innovative adaptation to climate change and one of effective ways to build the climate resilience.

The results of this study are expected to give appropriate policy implications needed for the policy makers in order to formulate strategies for the rural development.

### **1.5 Limitation of the Study**

For the research on climate resilience building, the data collection and analysis on institutional activities and some practicing local activities on adaptation strategies for

climate change such as soil conservation, effective water harvesting, awareness raising on environmental and sustainable agriculture, re-greening on the deforestation area, etc. were limited due to various reasons such as the time limitation, data availability, limitation of budget, etc..

## **1.6 Organization of the Study**

The study is composed with eight chapters as follow:

**Chapter 1** includes the background information of microfinance projects, impact of climate change, agriculture and food security status, and climate change trends in Magway Region, problem statement, objective of the study and usefulness of the study are presented in this chapter.

**Chapter 2** provides the theoretical background for this study. In this chapter, the literature review for the concept of microfinance, the vulnerability and livelihood security, the role of microfinance in livelihood security, and the linkage microfinance program between climate resilience and livelihood security have been revised.

**Chapter 3** describes the conceptual framework of the study and detail in its important linkages, specification of key words and major assumptions.

**Chapter 4** specifies the research methodology used in the study such as the selection of the sampled size, primary and secondary data collection. The data analysis method for this study is also prescribed.

**Chapter 5** mentions the impact of microfinance on climate resilience building in the content of sampled households' productive assets, income status, participation in training and educational programs and awareness on climate change.

**Chapter 6** shows the details on the impact of microfinance on livelihood security of the rural household in the economic aspect and social/institutional aspects.

**Chapter 7** explains the major factors influencing in average annual household income, the annual credit amount received of household and the perception of household credit demand in the study area.

**Chapter 8** deals with the synthesis of the results and findings of the study. This final chapter encompasses with the drawing conclusion, policy implications and suggestion for the further studies.

## **CHAPTER 2**

### **REVIEW OF LITERATURE**

#### **2.1 Microfinance and Climate Resilience**

Microfinance, according to Otero (1999) is “the provision of financial services to low-income poor and very poor self-employed people”. These financial services according to Ledgerwood (1999) generally include savings and credit but can also include other financial services such as insurance and payment services. Schreiner and Colombet (2001, p.339) define microfinance as “the attempt to improve access to small deposits and small loans for poor households neglected by banks.” Therefore, microfinance involves the provision of financial services such as savings, loans and insurance to poor people living in both urban and rural settings who are unable to obtain such services from the formal financial sector.

In the literature, the terms microcredit and microfinance are often used interchangeably, but it is important to highlight the differences between them because both terms are often confused. Sinha (1998, p.2) states “microcredit refers to small loans, whereas microfinance is appropriate where NGOs and MFIs supplement the loans with other financial services (savings, insurance, etc)”. Therefore microcredit is a component of microfinance in that it involves providing credit to the poor, but microfinance also involves additional non-credit financial services such as savings, insurance, pensions and payment services (Okiocredit 2005).

Microfinance instruments, such as micro-credit and micro-insurance for the agricultural sector have many benefits and can help break the cycle of poverty by providing low income households, farmers, and businesses with access to liquidity to secure their livelihoods during and after shocks. It allows them to rehabilitate crops and businesses with the minimal possible disruption. Financial mechanisms act like a buffer that moderate the losses for smallholders and protect them from falling further into poverty after a flood or a drought. This is what makes the poor more resilient to disasters, because “disaster resilience is seen as the shield, shock absorber or buffer that moderates the outcome to ensure benign or small-scale negative consequences” (Manyena 2006).

Agrawala Shardul and Maëlis Carraro (2010) revealed that 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.

Reducing peoples' vulnerability to climate change is closely linked to the poverty reduction agenda, since poverty is both a condition and determinant of vulnerability. Many of the world's poor are already vulnerable to climate risk due to factors such as settlement on marginal lands, high dependence on climate-sensitive livelihoods, and limited access to or availability of resources to respond to shocks and stresses (ADB *et al.* 2003).

Climate change will amplify, modify or introduce new types of threats, which may affect natural and human systems independently or in combination with other determinants to alter productivity, diversity and functioning of ecosystems and livelihoods (IISD *et al.* 2003).

If people do not have the resources to deal with today's stresses, then they are unlikely to be able to deal with the additional stresses associated with climate change, a condition known as the 'adaptation deficit' (Burton 2004).

Adaptation to climate change must start with reducing this deficit. To this end, many strategies currently used for development and poverty reduction have an important role to play. According to Hammill *et al.* (2008), the most powerful case for microfinance services MFS with regard to climate change adaptation is its ability to help families build and diversify assets, so that they have more than one means of livelihood; more than one skill set to avoid dependency. In high risk areas (such as flood- or hurricane-prone regions), micro-insurance schemes or savings may be the only (imperfect) MFS option for dealing with risks. MFIs can serve as distribution channels for donors to reach the household families in these areas when done in such a way that does not mix development aid (handouts) with loans (the lender/borrower financial contracts).

MFS can be most effectively harnessed for vulnerability reduction when reflective of peoples' level of poverty and livelihood characteristics. As Allen (2007) notes, the poor tend to be 'much more interested in services that protect productive assets and

reduce risks to their livelihoods' and as such, savings related services may be the most accessible and appropriate for the poorest individuals and households.

Although the concept of resilience has been much discussed in the literature, it is still not clear what is needed to build resilient communities such that they are not vulnerable to climate-related shocks and disasters. It is particularly the multidimensional nature of resilience and its different component parts that make up its complexity, and it is necessary that a broad model be tested empirically at the community level (Cumming *et al.* 2005).

There are several aspects of resilience that are discussed in the literature and which require different forms of analysis and measurement. Cutter *et al.* (2008) have compiled these dimensions of resilience and their measurement variables. Community resilience indicators are proposed based on the following dimensions: ecological, social, economic, institutional, infrastructure and community competence. In a sense, this research touches upon all these dimensions. However, the emphasis is on the social, economic and institutional dimensions and on the community's competence, i.e., the coping and adaptation strategies of local farmers to climate-related risks.

## **2.2 Microfinance and Livelihood Security**

Carney (1998) defines a livelihood as comprising "...the capabilities, assets (including both material and social resources) and activities required for a means of living." Chambers (1997) states that livelihood security is "basic to well-being" and that security "refers to secure rights and reliable access to resources, food, income and basic services. It includes tangible and intangible assets to offset risk, ease shocks and meet contingencies." Lindenberg (2002) defines livelihood security as "a family's or community's ability to maintain and improve its income, assets and social well-being from year to year." Concern also state that livelihood security is more than just economic well-being as they define livelihood security as "the adequate and sustainable access to and control over resources, both material and social, to enable households to achieve their rights without undermining the natural resource base" (Concern 2003). Livelihood security therefore, like poverty, is not just about income, but includes tangible and intangible assets, and social well being.

Brocklesby and Fisher (2003, p.187) explain the four main components of the livelihoods framework which has been widely adopted in the development field. These are:

- a) people live within a vulnerability context i.e. they are exposed to risks such as sudden shocks, trends over time and seasonal change;
- b) people have a number of capital assets (financial capital, physical capital, human capital, natural capital and social capital) which they draw upon to make their livelihoods;
- c) these assets are drawn upon within people's livelihood strategies; and
- d) policies, institutions and processes help to shape people's assets, livelihood activities and the vulnerability context within which they live.

A livelihood security approach according to Concern (2003) aims for a holistic analysis and understanding of the root causes of poverty and how people cope with poverty. They identify livelihood shocks such as natural disasters and drought, the social, political and economic context, and people's livelihood resources such as education and local infrastructure as factors affecting people's livelihood security.

According to Hammill *et al.* (2008), MFSs can be divided into three main types.

- a) Microcredit lends funds to poor people so they can exploit their capacities for income production (job creation, enterprise growth, and increased production); it is about asset building and diversification. Returns are consumed, saved, or reinvested. Loans are also offered for nonproductive purposes that may contribute to reducing vulnerability, such as emergency loans, education loans, and home improvement loans.
- b) Microinsurance (Pierro and Desai 2008) protects poor people against specific perils (such as injury, death, and natural hazards) in exchange for regular premium payments (Churchill 2006). Thus, like the social protection policies already described, it protects assets and gives people the freedom to pursue profit without fear, ideally leading to increased income production and adaptability (Morduch 2006).
- c) Microsavings are small balance deposits for the safe storage of money, allowing people to obtain lump sums to meet both predictable and unpredictable expenses. They can be used as insurance or for investment, yielding the same results for asset bases already described (Hammill, Matthew, and McCarter 2008).

Johnson and Rogaly (1997, p.122) state that "NGOs aiming for poverty reduction need to assess the impact of their services on user's livelihoods." They argue that in addressing the question of the impact of microfinance, NGOs must go beyond analysing quantitative data detailing the numbers of users, and volumes and size of loans disbursed, to understanding how their projects are impacting on clients' livelihoods. They state

(1997, p. 118) that the provision of microfinance can give poor people “the means to protect their livelihoods against shocks as well as to build up and diversify their livelihood activities”.

Zohir and Matin (2004, p.318) state that many MFI loans are used for agricultural production, trading, processing and transport, resulting in an increase in the use of agricultural inputs and increased output of agricultural production. This leads to enhance employment opportunities in these sectors for the wider community and a reduction in the prices of such produce due to increased supply.

Robinson (2001) in a study of 16 different MFIs from all over the world shows that having access to microfinance services has led to an enhancement in the quality of life of clients, an increase in their self-confidence, and has helped them to diversify their livelihood security strategies and thereby increase their income.

Health and education are two key areas of non-financial impact of microfinance at a household level. Wright (2000, p.31) states that from the little research that has been conducted on the impact of microfinance interventions on health and education, nutritional indicators seem to improve where MFIs have been working. Murdugh (2003, p.3) also acknowledge the sparse specific evidence of the impact of microfinance on health but where studies have been conducted they conclude, “households of microfinance clients appear to have better nutrition, health practices and health education than comparable non-client households”. Among the examples they give is of FOCCAS, a Ugandan MFI whose clients were given health care instructions on breastfeeding and family planning. They were seen to have much better health care practices than non-clients, with 95% of clients engaged in improved health and nutrition practices for their children, as opposed to 72% for non-clients (Littlefield, Murdugh and Hashemi, 2003).

Microfinance interventions have also been shown to have a positive impact on the education of clients’ children. Littlefield, Murdugh and Hashemi (2003, p.4) state that one of the first things that poor people do with new income from microenterprise activities is to invest in their children’s education. Studies show that children of microfinance clients are more likely to go to school and stay longer in school than for children of non-clients. Again, in their study of FOCCAS, client households were found to be investing more in education than non-client households.



## CHAPTER 3

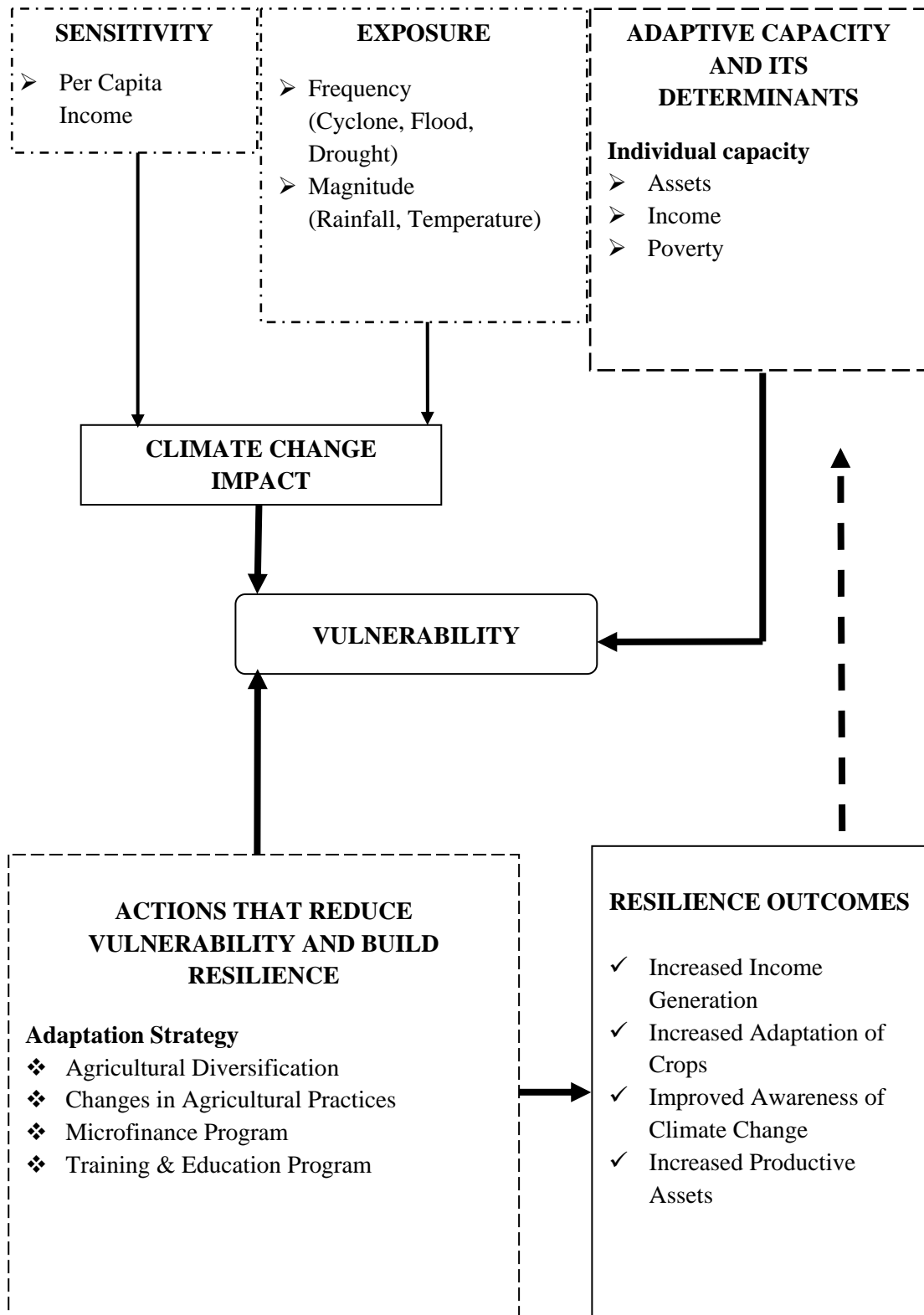
### CONCEPTUAL FRAMEWORKS OF THE STUDY

There were two fundamental conceptual frameworks for which climate resilience building and livelihood security. The two concepts were thought to be nearly similar, however, with different perspectives of view.

#### **3.1 Climate Resilience Building Conceptual Framework**

The concept of resilience is central to an understanding of the vulnerability of the agriculture sector to climate change. Vulnerability is the degree to which a system is susceptible to, or unable to cope with, the adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (IPCC 2007). Vulnerability is often denoted as the antonym of resilience (SRI 2009). Resilience is used to describe the magnitude of a disturbance that a system can withstand without crossing a threshold into a new structure or dynamic. In human systems, resilience referred to the ability of community or a household to withstand and recover from stresses—such as environmental change or social, economic, or political upheaval - while for natural systems, it is a measure of how much disturbance (in terms of storms, fire, pollutants, and so on) an ecosystem can handle without shifting into a qualitatively different state (SRI 2009). Building resilience to climate change requires simultaneously building resilience in human systems and in the interlinked ecosystems on which they depend.

In this study, adopted by Asian Development Bank (2009), there were three dimensions of vulnerability: exposure, sensitivity, and adaptive capacity. Exposure was the biophysical impacts of climate change, which could vary in magnitude, frequency, and duration. As in this component, frequency of Cyclone, Flood and Drought in the study area were evaluated. Sensitivity meant the degree to which a system was affected, either adversely or beneficially, by climate variability or change. The effect may be direct (for example, a change in crop yield in response to a change) or indirect (for example, changes in per capita income). Adaptive capacity referred to the ability of institutions and individuals to avoid potential damage, to take advantage of opportunities, or to cope with consequences of change. For the study area, adaptive capacity of sampled households was set up in terms of their assets, income and poverty (Figure 3.1).



Note: Adopted by Asian Development Bank (2009)

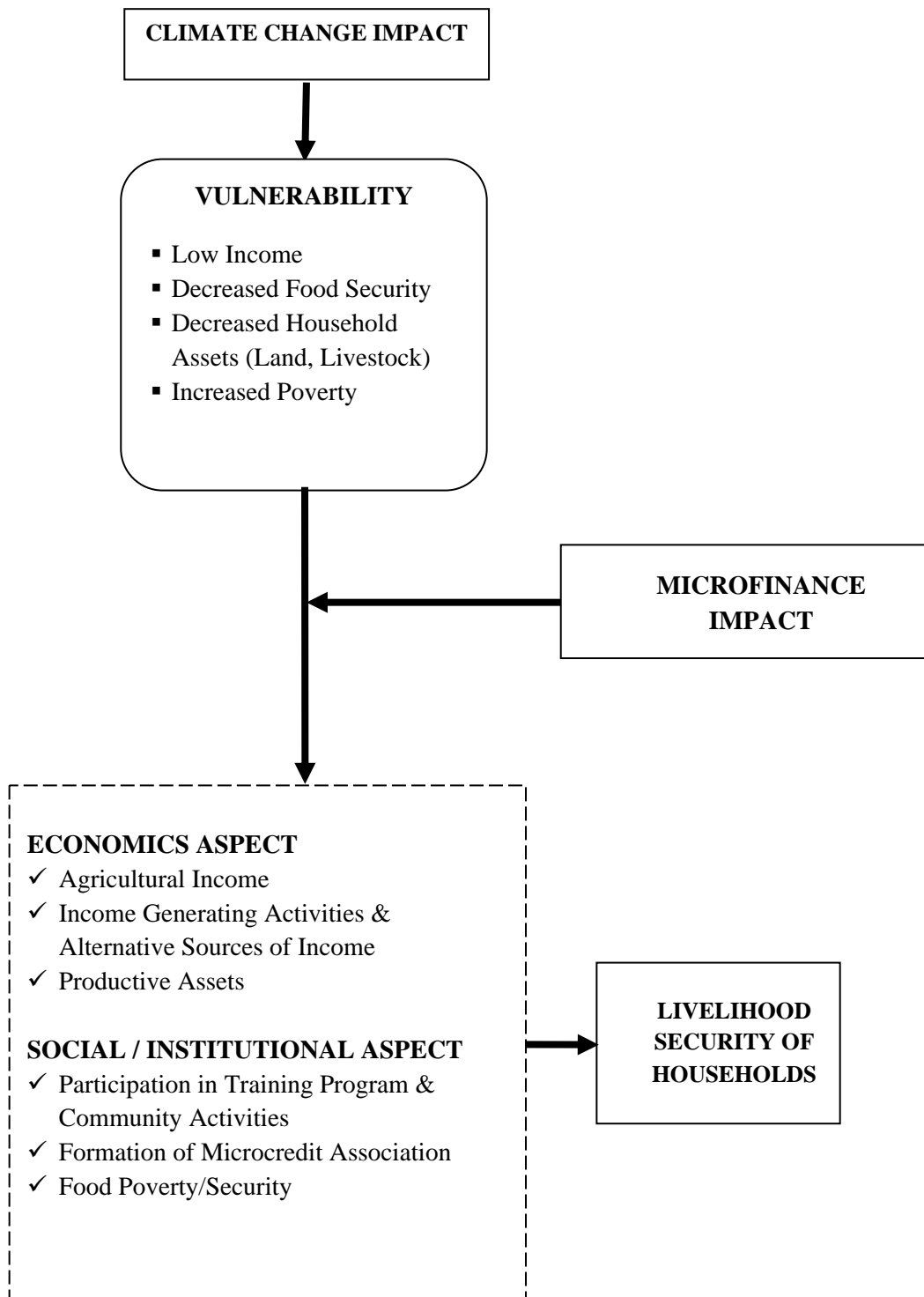
**Figure 3.1 Climate resilience building conceptual framework**

In these dimensions, the adaptive capacity was normally lower than the two others and cause more vulnerability of the poor. Therefore, there was some action needed to reduce vulnerability. Action to reduce vulnerability and build resilience in the agriculture sector was defined as either strategies for adaptation or strategies for mitigation. According to Adger *et al.* (2007), changing agricultural practices, diversifying crops and income sources, developing tolerant crop varieties could be some adaptation measures for agriculture as well as livelihood security. Agricultural diversification, changes in agricultural practices, providing microfinance service, and providing training and education program were found as the adaptation strategies for the local households in the study area. Consequently, increased income, increased adaptation of crops, improved awareness of climate change and increased productive assets of households were expected to be attained as a resilience outcome.

### **3.2 Conceptual Framework on Livelihood Security of Rural Households**

The concept of livelihood security by microfinance was nearly similar; however, it was precise more specified linkages. As mentioned in Figure 3.2, because of the negative climate change, the poor people will be more vulnerable and they faced low income, food insufficiency and food insecurity, less productive assets and increased poverty. In this circumstances, microfinance services (MFSs) could be an important tool in reducing the vulnerability of the poor and, in the context of climate change adaptation, could provide poor people to become less susceptible to shocks and stresses or to finer cope with these impacts and attain their livelihood security, by improving agricultural incomes, possessing more income generating activities and productive assets, attaining more training and educational program, participation in community activities and reducing food poverty level. According to Lindenberg (2002), livelihood security referred a family's or community's ability to maintain and improve its income, assets and social well-being from year to year. Practicing microfinance as a remedial tool, there was anticipated to observe some changes in the economic aspect and also social/institutional aspects that can lead to livelihood security of the household.

Based on these two conceptual frameworks, the primary data related on vulnerability and its three components, microfinance impacts, economic and social aspects were collected in this study.



Note: Adopted by Asian Development Bank (2009)

**Figure 3.2 Livelihood security of rural households by microfinance**

## CHAPTER 4

### RESEARCH METHDOLOGY

#### 4.1 Study Area Profile

In Pakokku Township, there were 58 village tracts consisting 262 villages, occupying total agricultural land 56609 ha with *Le* (wet) land was 354 ha, *Yar* (dry) land was 46344 ha, *Kaing/Kyun* (alluvial soil) land 1772 ha and Garden 43 ha. Along with these area, pulses were grown in 22192 ha (both monsoon and summer), oil seed crops 18150 ha (monsoon, winter and summer), kitchen good crops consist of 10635 ha (monsoon and winter) and the cropping intensity of Pakokku Township comprises around 239% (MAS-PPK 2011). Among 58 village tracts with 262 villages, 4 villages from 4 different village tracts were selected as a sampling area based on the following criteria.

- (i) Climate change affected area;
- (ii) Existing microfinance services; and
- (iii) SHGs/SRGs formation

##### 4.1.1 Chauk Kan (East) Village

Chauk Kan.(E) village was located in Chauk Kan village tract. Total population of the village was 1441 Nos. with 706 males and 735 females. The number of household in the village consists of 295. The 82% of village agricultural land, 418.4 ha represent as *Yar* land and it was one of drought prone areas in Pakokku Township. Most of the households in the village worked as wage labor in Pakokku urban area, seasonal casual labor in farm and non-farm activities in the village as it was just far form 4 miles from Pakokku. There was a basic primary school in the village.

##### 4.1.2 Kyun O Village

Kyun O village was located in Ma Gyi Pin Pu village tract. Total population of the village was 316 Nos. with 149 males and 167 females. The number of household in the village consists of 93. There were 351.4 ha of village agricultural land and 41% was *Yar* land, 38% represents *Kaing/Kyun* Land. It was one of flood affected areas in Pakokku Township because it was situated in River Bank. Most of the households in the village worked as seasonal casual labor in farm and non-farm activities in the village. There was a basic education high school in the village.

##### 4.1.3 Shwe Dar Village

Shwe Dar village was located in Shwe Dar village tract. Total population of the village was 335 numbers with 142 males and 193 females. The number of household in

the village consists of 78. There was no other village agricultural land as the village was reestablished in 1997 from the disappeared island in the Ayeyarwaddy River due to the river flow change and water level rises. It was also drought prone areas in Pakokku Township. Most of the households in the village worked as migration labor in the urban area. There was one village level health care center, however, any other school in the village.

#### **4.1.4 Kin Mon Kha Village**

Kin Mon Kha village was located in Nat Kyun village tract. Total population of the village was 1304 numbers with 600 males and 704 females. The number of household in the village consists of 287. There was 123.65ha of village agricultural land and 90% was Kaing/Kyun Land. It was not only drought prone areas but also flood affected area in Pakokku Township. Most of the households in the village worked as small scale farmers as well as farm labors in the region. There was a basic primary school in the village and one village level health care center.

#### **4.1.5 Microfinance Activities in Sampled Villages**

In the rural credit sector of Pakokku, there were two formal financial institutions: Myanmar Agricultural Development Bank (MADB), Myanmar Livestock and Fisheries Development Bank (MLFDB) and four semi-formal financial institutions namely ActionAid-Myanmar, Save the Children, AMDA and PACT-Myanmar (UNDP) providing credit to the rural poor. Formal financial institutions are defined as authorized institutions by the state, which include agricultural development bank, savings and credit cooperatives, public pawnshops and private licensed pawnshops. Semiformal financial institutions are not legally authorized but are partly required to apply for the state in some ways. The semiformal is composed of local NGO-MFIs and international NGO-MFIs including 3 NGOs supported by UNDP welfare program of which name is “Human Development Initiatives” (HDI). Informal financial activities are not under the control of authorities in practice.

In the study area, there were seven types of organizations and institutions providing microfinance services. These were one formal financial institution namely Myanmar Agricultural Development Bank, five semi formal institutions that were Pact-Myanmar (UNDP-SRG), Save the Children, Union Solidarity and Development Party (USDP), Taw Win Nan Saving and Credit Cooperative, and two informal financial activities which were loan from relatives and money lender. Among these types, Taw

Win Nan Saving and Credit Cooperative was organized by successful SRGs in 2010 after 5 years period.

#### **4.2 Data Collection and Sample Size**

The research survey was conducted during the period of December 2011 to January 2012. Both primary and secondary sources of data were used in this study. The primary data were collected from 102 respondents of the four sampled villages in Pakokku Township through personal interview using a set of structured questionnaire. In each sampled village, the respondents were chosen based on two categories: the participant of SHGs/SRGs and non-participant of SHGs/SRGs, but all the sampled households had supported by others credit society.

From Chauk Kan.E village, there were 60 participant households. Among them, 17 participant households (29% of participants in village) were selected and 10 households from non-participant.

In Kyun O village, the total participants in this village were 40 households. From this, 12 participant households (30% of participant in village) and 10 households from others were selected as a sample household.

There were 47 participant households and 15 households (31%) were selected from it and 10 households from non-participants in Shwe Dar village.

In addition, 32% of participant households (16 out of total 50 in village) and 12 households from others were selected from Kin Mon Kha village.

There were totally 102 sample households including 60 participant households and 42 non-participant households. However, although 102 households were interviewed, the missing data and the irrelevant data were excluded in the calculation. Therefore, 96 sampled households were taken into account for this study.

All kinds of socio-economic and production data were collected. Detail data on household head' age, education level, family members, family labor, home assets, farm size and farm implements, other productive assets such as livestock, non-farm and off-farm employment opportunities were collected.

The more specific data on loan and credit availability, amount of credit received, its interest rate and payback period, type of credit organization were systematically collected. Moreover, awareness on rainfall, temperature, cyclone, flood and drought, type of training received, training attendance, and participation in community activities were collected in this study.

Information on microfinance program and microcredit service in the study area were also collected from different organizations such as UNDP, ActionAid Myanmar and Department of Agriculture, Pakokku.

### 4.3 Analytical Methods

Both qualitative and quantitative data were firstly entered into the Microsoft Excel program. Annual income was computed by using crop yield, current prices and employment data. Then, the data were re-entered into the Statistical Package for Social Science (SPSS) software. Using SPSS version 16.00, descriptive statistics with Independent Sample *t test*, crosstabs with Pearson Chi-Square and multiple regression models were calculated.

#### 4.3.1 Inferential Analysis

In examining the climate resilience and adaptive capacity of the poor based on the socioeconomic characteristics, inferential analysis including frequency and descriptive statistics were used in this study. Descriptive Analysis with Independent Sample *t test* and Crosstabs with Pearson Chi-Square test were applied to explore the significant factor of the two groups: participant and non-participant households, and the major changes within the groups.

#### 4.3.2 Regression Analysis

Multiple regression models were used to explore the determinants of average annual household income, loan/credit amount received by sampled households and perception of household credit demand (borrowing function).

Based on the nature of the data and its correlation, the following empirical regression models were formulated.

##### 4.3.2.1 Empirical Regression Model for Average Annual Household Income

$$\ln A_i = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \dots + \beta_7 \ln X_7 + b_1 D_1 + b_2 D_2 + \mu_i$$

where,

$A_i$  = Annual Household Income

$\beta_0$  = constant

$\beta_i, b_j$  = estimated coefficients; ( $i = 1, 2, 3 \dots n; j = 1, 2, 3 \dots n$ )

$X_1$  = Household Head's Age (year)

$X_2$  = Household Head's Schooling Year

$X_3$  = No. of Family Labor (No.)

$X_4$  = No. of Income Source



- $X_5$  = Farm Size in 2011 (ha)  
 $X_6$  = Off-Farm and Non-Farm Income in 2011(kyats/year)  
 $X_7$  = Received Loan/Credit Amount (kyats/year)  
 $D_1$  = Dummy for Crop Diversification Status in 2011 (No=0, Yes=1)  
 $D_2$  = Dummy for Microfinance Participation Status  
 (Non-participant=0, Participant =1)  
 $\mu_i$  = disturbance term  
 $\beta_0$  is the intercept and  $\beta_i, b_j$  are the coefficients of the independent variables.

#### 4.3.2.2 Empirical Regression Model for Annual Loan/Credit Amount Received by Sampled Households

$$C_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_5 X_5 + b_1 D_1 + b_2 D_2 + \dots + b_2 D_2 + \mu_i$$

where,

- $C_i$  = Annual Loan/Credit Received by Household  
 $\beta_0$  = constant  
 $\beta_i, b_j$  = estimated coefficients; ( $i = 1, 2, 3 \dots n; j = 1, 2, 3 \dots n$ )  
 $X_1$  = Household Head's Schooling Year  
 $X_2$  = Family Size (No.)  
 $X_3$  = Farm Size in 2011 (ha)  
 $X_4$  = Average Annual Household Income in 2011(kyats/year)  
 $X_5$  = Average Crop Income in 2011 (kyats/year)  
 $D_1$  = Dummy for Microfinance Participation Status  
 (Non-participant=0, Participant =1)  
 $D_2$  = Dummy for Household Head's Gender  
 (Female Headed Household=0, Male Headed Household=1)  
 $D_3$  = Dummy for Farming Household (Farmer=1, Others=0)  
 $D_4$  = Dummy for Wage Earning Household (Labor=1, Others=0)  
 $\mu_i$  = disturbance term

$\beta_0$  is the intercept and  $\beta_i, b_j$  are the coefficients of the independent variables.

#### 4.3.2.3 Empirical Regression Model for Perception of Household Credit Demand PHCD

$$CD_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_5 X_5 + b_1 D_1 + b_2 D_2 + b_3 D_3 + \mu_i$$

where,

- $CD_i$  = Perception of Household Credit Demand  
 which was scored by Credit Source, Interest Rate and Payback Period

$\beta_0$  = constant

$\beta_i, b_j$  = estimated coefficients; ( $i = 1, 2, 3 \dots n$ ;  $j = 1, 2, 3 \dots n$ )

$X_1$  = Household Head's Schooling Year

$X_2$  = Family Size (No.)

$X_3$  = No. of Credit Source

$X_4$  = Farm Size in 2011 (ha)

$X_5$  = Annual Per Capita Income in 2011 (kyats/year)

$D_1$  = Dummy for Household Head's Gender

(Female Headed=0, Male Headed=1)

$D_2$  = Dummy for Farming Household (Farmer=1, Others=0)

$D_3$  = Dummy for Wage Earning Household (Labor=1, Others=0)

$\mu_i$  = disturbance term

$\beta_0$  is the intercept and  $\beta_i, b_j$  are the coefficients of the independent variables.

In calculation PHCD score, the following equation was used and thus PHCD score ranged from 3 to 9.

PHCD = (Score on Credit Source + Score on Interest Rate + Score on Payback Period)

### **Score on Credit Source**

Credit Source that borrow less than 100,000 ks without collateral	= 1
Credit Source that borrow between 100,000 and 300,000ks without collateral	= 2
Credit Source that borrow between 300,000 and 500,000ks without collateral	= 3
Credit Source that borrow more than 500,000 ks without collateral	= 4

### **Score on Interest rate**

Interest rate (7-10%)	= 1
Interest rate (5-7%)	= 2
Interest rate (3-5%)	= 3
Interest rate (1-3%)	= 4

### **Score on Payback period**

Less than 4 months	= 1
Between 4 months and 6 months	= 2
Between 6 month and 8 months	= 3
More than 8 months	= 4

According to the perception of sampled households, if the credit source borrowed more than five hundred thousand kyats without collateral, the demand was highest and its score was 4. For the score on interest rate, if the more the interest rate, the lower the demand of these credits. Its score ranged from 1 to 4. For the score on payback period, if the longer the payback period, there would be the greater the demand of that loan. When combining these three scores, PHCD score was 3 in minimum and 12 in maximum. Perception Score 3 means the lowest demand in credit, and perception score 12 means the highest demand in credit.

## CHAPTER 5

### IMPACT OF MICROFINANCE ON CLIMATE RESILIENCE

#### 5.1 Microfinance Participation Status of Sampled Households

In the sampled households, there were two types of respondents, non-participant and participant households in microfinance. There were 4 sampled villages and from each sampled village tracts and around 20 to 29 percent of total sample were interviewed. In specific, 24 households including 9 from non-participants and 15 from participants were interviewed in Chauk Khan (E) village. There were 28 sampled households from Khin Mon Kha, 20 samples from Kyun O and 24 from Shwe Dar as described in Table 5.1. As in percentage, 25.9% from Chauk Khan (E) village, 27.6% from Khin Mon Kha village, 20.7% from KyunO and 25.9% from Shwe Dar village were randomly selected from sampled participants. The percentage of sample size in non-participants and participants were nearly the same that there was no significant difference between these two sampled groups according to Pearson Chi-square (Table 5.1).

Pertaining to microfinance participation status by gender of sampled household head, majority of the sampled households were male headed households as usual manner of Myanmar tradition and it was found that 18.7% of non-participant households and 20.7% of participant households were female headed households. In total sampled size, female headed households and male headed households were 19.8% and 80.2% respectively (Table 5.2).

#### 5.2 Socioeconomic Characteristic of Sampled Households

In the analysis, the socioeconomic characteristics of participant and non-participant sampled households such as household head's age, working experience year, schooling year, number of family size, number of family labor, number of children to be enrolled in school at 2011, number of children who drop out school at that year, etc., were examined by independent sample *t test*. The household head's age of non-participant was 49.5 years and that of participant was 44 years in average. According to *t test*, all of the socioeconomic variable except household head's age, were not significantly different, however, it was found that household head's age of non-participants was significantly higher than that of participants at one percent level (Table 5.3).

**Table 5.1 Microfinance participation status of sampled households (H/hs)**

Village Name	Microfinance Participation Status			Total Sampled Household
	Non-Participant in MFP (N=38)	Participant in MFP (N=58)		
1. Chauk Khan (E)	Count (%)	9 (23.7%)	15 (25.9%)	24 (25.0%)
2. Khin Mon Kha	Count (%)	12 (31.6%)	16 (27.6%)	28 (29.2%)
3. Kyun O	Count (%)	8 (21.1%)	12 (20.7%)	20 (20.8%)
4. Shwe Dar	Count (%)	9 (23.7%)	15 (25.9%)	24 (25.0%)
Pearson Chi-square		0.214 <sup>ns</sup>		

**Table 5.2 Microfinance participation status by gender of sampled H/h head**

Household Head Gender	Microfinance Participation Status			Total Sampled Household
	Non-Participant in MFP (N=38)	Participant in MFP (N=58)		
Female Headed Household	Count (%)	7 (18.7)	12 (20.7)	19 (19.8)
Male Headed Household	Count (%)	31 (81.3)	46 (79.3)	77 (80.2)
Pearson Chi-square		0.74 <sup>ns</sup>		

**Table 5.3 Socioeconomic characteristics of participant and non-participant sampled households**

Socioeconomic Status	Microfinance Participation Status						t value <sup>1</sup>
	Non-Participant in MFP			Participant in MFP			
	Mean	SD	Range	Mean	SD	Range	
H/H' Head Age (year)	49.55	8.822	33-67	44.00	9.507	27-67	2.878 <sup>***</sup>
H/H' Head Working Experience (year)	22.58	9.985	7-44	20.38	9.801	6-47	1.067 <sup>ns</sup>
H/H' Head Schooling Year	3.95	2.64	0-10	4.05	2.8	0-10	-0.183 <sup>ns</sup>
Family Size (No.)	5.24	1.344	3-7	4.91	1.76	2-9	0.962 <sup>ns</sup>
No. of Farm Labor	3.34	1.236	1-5	3.14	1.235	1-6	0.792 <sup>ns</sup>
No. of Children to be enrolled in school	0.84	0.823	0-3	0.88	0.9	0-4	-2.85 <sup>ns</sup>
No. of Children who dropped out school	0.16	0.37	0-1	0.28	0.488	0-2	-1.269 <sup>ns</sup>

Note: <sup>1</sup> Independent Sample *t* test

### 5.3 Land Ownership Status of Sampled Households and its Changes

In the study area, average farm size owned by the households was very small. As some of the villages in study area were rehabilitated due to the changes in the river flows of Ayeyardaddy, these villages did not have possession of cultivated land. In 2000, as the flow of Ayeyardaddy annihilated the island of old ShweDar village, it was rehabilitated in 2001 at the inland from the river. Therefore, all of the households in that village lost their cultivated land in the island and they became landless at the rehabilitated village.

Table 5.4 described the land tenure status of sampled households in 2005 and 2011. According to this table, average farm size of participants was 0.244ha in 2005 and 0.475ha in 2011. As the average farm size non-participants were 1.385ha in 2005 and 1.460ha in 2011, average farm size of non-participant households was significantly higher than that of participants at one percent level.

As in the landless households, 63.8% participant households were landless in 2005 and 48.3% in 2011, participants had more landless households than non-participants in both years. According to Pearson Chi-square, the percentages were statistically significant at one percentage level for participants and non-participants.

In participant households, it could be observed three categories according to their participation in microfinance by year; (a) participants who involved microfinance program in 2005/06, (b) participants who involved microfinance program in 2008/09 and (c) participants who involved microfinance program in 2009/10.

There are five categories in land ownership status as in Table 5.5. It was defined the households that possessed the land with the range of 0.1 to 1.98ha as the small farm size, the households that possessed the land with the range of 1.99 to 4.04ha as medium farm and above 4.04ha as the large farm size.

In Table 5.5, landless households were 21.1% in non-participant households and 48% in participants including 10% in group (a), 21% in group (b) and 17 % in group (c). In the small farm category, there were 36% of non-participants and 46% of participant households in which 43% in group (a), 1% in group (b) and 2% in group (c). 39% of non-participant and 5% of participants were the medium farm households.

**Table 5.4 Land tenure status of participant and non-participant sampled households**

Farming Status	Microfinance Participation Status						t value <sup>1</sup>
	Non-Participant in MFP (N=38)			Participant in MFP (N=58)			
	Mean	SD	Range	Mean	SD	Range	
2005 Average Farm Size (ha)	1.385	1.020	0-3.24	0.244	0.580	0-2.34	6.483***
2011 Average Farm Size (ha)	1.460	1.079	0-4.05	0.475	0.690	0-3.64	5.121***
	Count		(%)	Count		(%)	p value <sup>2</sup>
Landless Households (2005)	8		(21.1)	37		(63.8)	24.151***
Landless Households (2011)	8		(21.1)	28		(48.3)	20.977***

Note: <sup>1</sup> Independent Sample *t test*, <sup>2</sup> Pearson Chi-square

**Table 5.5 Land ownership category by different years of microfinance participation status in 2011**

Household Category	Participants in MFP by different year				Non-Participants
	Participants in 2005/06	Participants in 2007/08	Participants in 2009/10		
Landless	Count	6	(12+6)=18	(10+18)=28	8
	(%)	(10.34)	(31.03)	(48.28)	(21.10)
Small Farm (0.1-1.98 ha)	Count	25	(1+25)=26	(1+26)=27	14
	(%)	(43.10)	(44.83)	(46.55)	(36.80)
Medium Farm (1.99-4.04 ha)	Count	0	(1+0)=1	(2+1)=3	15
	(%)	(.00)	(1.72)	(5.17)	(39.50)
Large Farm (above 4.04 ha)	Count	0	0	0	1
	(%)	(.00)	(.00)	(.00)	(2.6)
Pearson Chi-square				24.151***	

Table 5.6 represents changes in land ownership by participant and non-participant sampled households. For the participant households, there was visible change in land ownership status. The number of landless participant households was 37 in 2005 and decreased to 28 in 2011. As a result, after 5 years participation in microfinance, the percentage of landless households of participant households was changed from 64% to 48%, and these decreased 17% of landless participant households became small farm households. Regarding with the remaining categories of participant, there was no change during 2005 and 2011, except 1.7% of medium farm households of participant altered to small farm households. In non-participant households, landless households remained the same number, 21% of non-participants, for the year 2005 and year 2011 respectively. The medium farm households were decreased from 44.7% to 39.5% and these percentages were altered 2.63% to small farm households and 2.63% to large farm households.

According to Table 5.4, 5.5 and 5.6, it was found that land holding status was significantly increased in participant households and microfinance could carry positive changes in land assets of participants after 5 years of participation.

#### **5.4 Major Occupation of Household's Head and quantity of Income Sources**

Table 5.7 clarified the major occupation of participant and non-participant sampled households. It was found that farming (farmer) was the most dominant occupation for both households as 68% of non-participants and 48% of participants. In the participant households, non-farm labor (19%) was the second important occupation and self-employments (17%) such as small textile trading, home based grocery shops and tailoring business were the third important income generating activities. According to Pearson Chi-square test, there was no significant different in major occupation status of both sampled households.

Table 5.8 showed the number of income sources by sampled households in the study area. Among total sampled households, 50% of sampled households had two income sources and 38.5% had three income sources. Most of non-participant households (57.9%) depended on two income sources and 44.8% of participant households were dependent on three income sources. Therefore participant households relied on more income sources than non-participant households. However, according to Pearson Chi-square test, as in major occupation, it was also found that the number of income sources was not significantly different for participants and non-participants.



**Table 5.6 Changes in land ownership category by participant and non-participant sampled households**

Household Status	Land Ownership Status in 2005	Land Ownership Status in 2011	Changes in Land Ownership
<b>Participant H/Hs (N=58)</b>			
– Landless Farm	37 (63.8)	28 (48.3)	-9
– Small Farm	17 (29.3)	27 (46.6)	+10 (17.24)
– Medium Farm	4 (6.9)	3 (5.2)	-1
– Large Farm	0 (.0)	0 (.0)	0
<b>II. Non-Participant H/Hs (N=38)</b>			
– Landless Farm	8 (21.1)	8 (21.1)	0
– Small Farm	13 (34.2)	14 (36.8)	+1 (2.63)
– Medium Farm	17 (44.7)	15 (39.5)	-2
– Large Farm	0 (.0)	1 (2.6)	+1 (2.63)

**Table 5.7 Major occupation of participant and non-participant sampled households**

H/H' Head Major Occupation	Total Sampled H/Hs	Microfinance Participation Status	
		Non-Participant in MFP (N=38)	Participant in MFP (N=58)
1. Farmer	54 (56.2)	26 (68.4)	28 (48.3)
2. Farm Labor	9 (9.4)	3 (7.9)	6 (10.3)
3. Non-Farm Labor	14 (14.6)	3 (7.9)	11 (19.0)
4. Self-Employment	13 (13.5)	3 (7.9)	10 (17.2)
5. Livestock Keeping	6 (6.2)	3 (7.9)	3 (5.2)
Pearson Chi-Square		5.486 <sup>ns</sup>	

Note: Figures in the parenthesis were percentage.

**Table 5.8 Number of income sources by participant and non-participant sampled households**

No. of Income Source	Total Sampled H/Hs	Microfinance Participation Status	
		Non-Participant in MFP (N=38)	Participant in MFP (N=58)
1. One Source of Income	11 (11.5)	5 (13.2)	6 (10.3)
2. Two Sources of Income	48 (50.0)	22 (57.9)	26 (44.8)
3. Three Sources of Income	37 (38.5)	11 (28.9)	26 (44.8)
Mean	2.27	2.16	2.34
SD	0.657	0.638	0.664
Pearson Chi-Square		2.445 <sup>ns</sup>	

Note: Figures in the parenthesis were percentage.

### 5.5 Income Status of Participant and Non-participant Households

Table 5.9 stated average income status of sampled households in the study area. Average annual household income of non-participant households was 1,190,457 kyats per year in 2005 and 2,336,363 kyats per year in 2011. For the participant households, average annual household income was 465,268 kyats per year in 2005 and 1,499,035 kyats per year in 2011. In those cases, according to independent sampled *t test*, average annual household incomes of non-participants were significantly higher than that of participant, at one percent level.

Concerning about average per capita income, it was 324,189 kyats per year and 475,525 kyats per year for the non-participants, in 2005 and 2011 respectively. The average per capita incomes of participants were 108,892 kyats per year in 2005 and 335,773 kyats per year in 2011. It was also found that per capita incomes of non-participants were significantly higher than that of participant, at one percent level by independent sampled *t test*.

There were two important component of average annual household income composition of sampled households namely (a) average crop income and (b) average off-farm and non-farm income. The average crop income of non-participants, 646,828 kyats per year, was the higher proportion of annual income than average off-farm and non-farm income, 543,628 kyats per year, in 2005. In 2011, however, the average off-farm and non-farm income, 1,329,855 kyats per year, was higher than average crop income, 1,006,507 kyats per year, for the non-participant households (Figure 5.1 and 5.2).

For the annual income composition of participant households, average off-farm and non-farm income was more important for their livelihoods than average crop income, because average off-farm and non-farm income was higher proportion in annual income than crop income, both in 2005 and 2011, as shown in Figure 5.1 and 5.2.

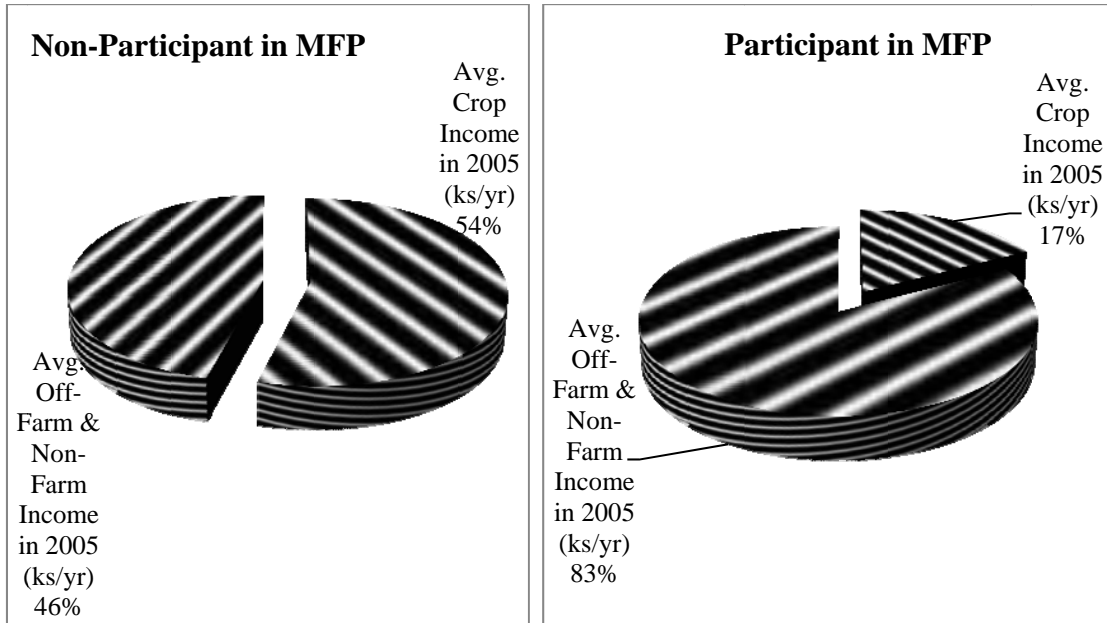
According to independent sampled *t test*, it was found that crop income and non-farm/off-farm income of non-participant were significantly higher than that of participant households. For the participant households, it should be recognized that average crop income and off-farm/nan-farm income of 2011 were greater than that of 2005.

Table 5.10 explained changes in average annual income of sampled participants and non-participants in the study area. The amount change in average crop income was 359,679 kyats per year for non-participant households and 473,147 kyats per year for participants.

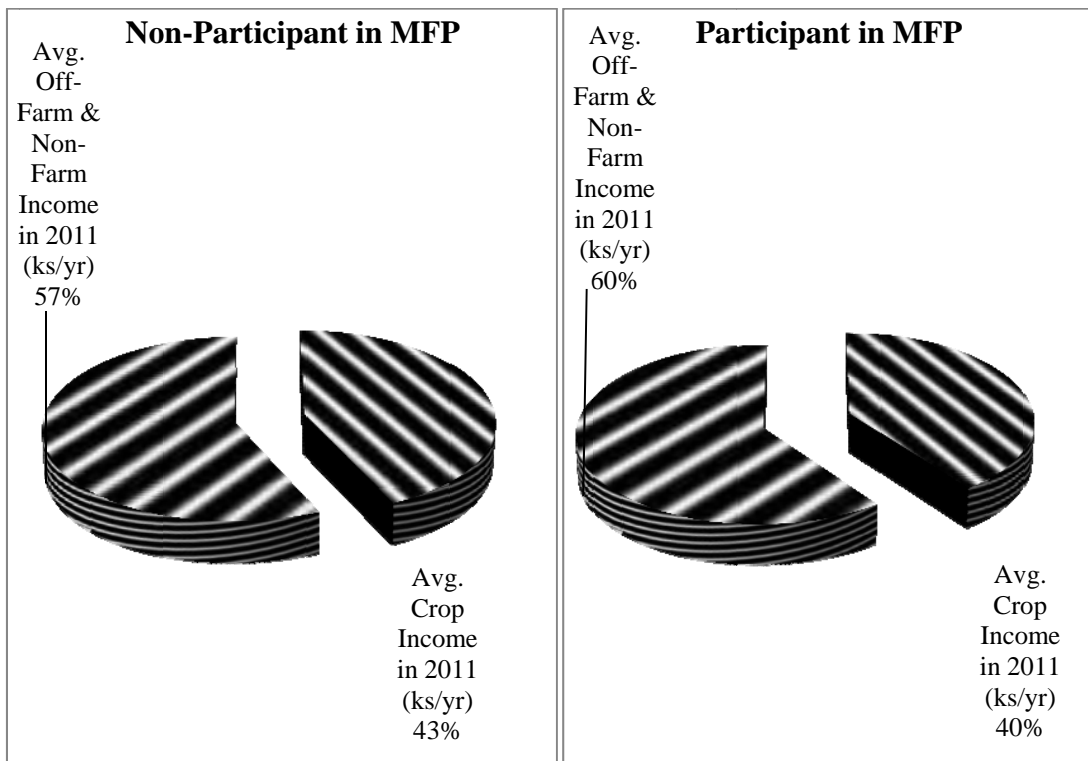
**Table 5.9 Income sources and average income of participant and non-participant sampled households**

Income Status	Microfinance Participation Status						t value <sup>1</sup>
	Non-Participant in MFP (N=38)			Participant in MFP (N=58)			
	Mean	SD	Range	Mean	SD	Range	
No. of Income Source	2.16	0.638	1-3	2.34	0.664	1-3	-1.370 <sup>ns</sup>
Avg. Annual H/H Income in 2005 (ks/yr)	1190457	583635	101250-2098500	465268	214167	59400-1297800	8.636 <sup>***</sup>
Avg. Annual H/H Income in 2011 (ks/yr)	2336363	1097683	252000-4312000	1499035	843102	566500-4809200	4.217 <sup>***</sup>
Avg. Per Capita Income in 2005 (ks/yr)	324189	189067	16875-699500	108892	86255	11880-648900	7.568 <sup>***</sup>
Avg. Per Capita Income in 2011 (ks/yr)	475526	253527	63000-1151000	335775	202010	112500-1040667	2.993 <sup>***</sup>

Note: <sup>1</sup> Independent Sample *t* test



**Figure 5.1 Income Compositions of Non-participant and Participant Households in 2005**



**Figure 5.2 Income Compositions of Non-participant and Participant Households in 2011**

It was significantly different in these two sampled households at five percentage level. However, amount changes in off-farm/non-farm income and average annual household income of non-participant households were higher than that of participant households, but not significant.

As in percentage changes of average income, it was found that percentage changes of incomes was higher in participant households than that in non-participants. There were 3.8 times increased in average crop income for participants and 0.55 times for non-participants, and that percentage change in crop income of participant was significantly higher than that of non-participants at five percent level. However, percent change in off-farm/non-farm income was not significant for both samples. Therefore, mainly influenced by changes in crop income, the percent change of average annual household income was significantly higher in participant than that in non-participant households. It was increased 100% for non-participants' average annual household income and 272% for participants, with the period of 2005 to 2011 (Table 5.10).

As a result of those changes, there was also change in income group of sampled households. In the study area, it was classified sampled households into three groups based on their average annual household income. It was categorized that the household earning average annual household income lower than 1,200,000 kyats per year was low income household, the household with the annual income between 1,200,000 and 2,400,000 kyats per year was medium income household and the household attaining the income greater than 2,400,000 kyats per year was high income household.

In the participant households, from low income group, 41% of participant became medium households and 14% became high income households during 2005 to 2011, after 5 years participation in microfinance. For the non-participant households, there was only 29% changed from low income and medium income group to high income group (Table 5.11).

Based on these findings, it was found that microfinance could increase average income of participant households due to more involvement in income generating activities.

**Table 5.10 Changes in average income of participant and non-participant sampled households from 2005 to 2011**

Income Status	Microfinance Participation Status				t value <sup>1</sup>
	Non-Participant in MFP (N=38)		Participant in MFP (N=58)		
	Mean	SD	Mean	SD	
1. Changes in Avg. Crop Income (ks/yr)	359679	402935	473147	672239	-0.935*
% Changes in Avg. Crop Income	55.6		380.0		-1.893*
2. Changes in Avg. Off/Non-Farm Income (ks/yr)	786226	849803	560619	647764	1.472 <sup>ns</sup>
% Changes in Avg. Off/Non-Farm Income	144.6		164.5		-1.005 <sup>ns</sup>
3. Changes in Avg. Annual H/H Income (ks/yr)	1145906	902706	1033766	813856	-1.857 <sup>ns</sup>
% Changes in Avg. Annual H/H Income	100.1		272.25		-0.784*

Note: <sup>1</sup> Independent Sample *t* test

**Table 5.11 Changes in income group of participant and non-participant sampled households from 2005 to 2011**

Household Status	In 2005	In 2011	Changes in Income Group
<b>I. Participant H/Hs (N=58)</b>			
– Low Income Group (<1200000ks/yr)	56 (96.6)	24 (41.4)	-32
– Medium Income Group (bet:1200000 and 2400000ks/yr)	2 (3.4)	26 (44.8)	+24 (41.38)
– High Income Group (>2400000ks/yr)	0 (.0)	8 (13.8)	+8 (13.8)
<b>II. Non-Participant H/Hs (N=38)</b>			
– Low Income Group (<1200000ks/yr)	13 (34.2)	9 (23.7)	-4
– Medium Income Group (bet:1200000 and 2400000ks/yr)	18 (47.4)	11 (28.9)	-7
– High Income Group (>2400000ks/yr)	7 (18.4)	18 (47.4)	+11 (28.94)

## 5.6 Cropping Pattern and Crop Diversification

In Pakokku Township, the main crops are paddy (both rain fed and irrigated), corn (yellow maize), groundnut, sesame and pluses etc. Tobacco, onion, and potato are also cultivated in alluvial soil (Myay nu kyun), and tobacco is the most important crop for the rural people because of highly demand by State Owned and also Private Cigarette Factories, Tobacco Processing Factories in this township. Toddy palm is the number one cash crop for average rural households in Pakokku area. Jaggery production from toddy provides employment opportunity for about half year for those involved in this business. In some villages, villagers grow Thanakha (Limonia) tree, a valuable perennial plant which has big demand in Myanmar cosmetic market.

In the study area, it was found that there were 16 cropping patterns that mainly practice in year 2005 and 21 patterns in year 2011 (Table 5.12). Although there were three different types of cropping patterns practicing: sequential cropping, mixed intercropping and mono cropping pattern in both 2005 and 2011, mono-cropping pattern was the most dominant pattern in 2005. In 2005, it was found that 10 mono-cropping patterns, 4 sequential cropping patterns and 2 mixed intercropping patterns were practicing in the study area. Among mono-cropping, 23 farmers cultivated only tobacco in monsoon, 15 farmers produced pigeon pea in monsoon, 11 farmers sowed sesame in monsoon and 8 farmers produced rice in monsoon. These four cropping were the most practicing patterns in the study area in 2005 and others were carried out by the very few percentage of total sample households.

In 2011, there were some changes in the practicing cropping patterns in the study area. The number of households which produced sequential cropping was increased from 8 households in 2005 to 31 households in 2011 and the number of households practicing mono-cropping was decreased from 69 in 2005 to 82 in 2011 (Table 5.12).

Table 5.13 discussed crop diversification status due to the multiple cropping in the study area and its changes. 82.6% of non-participant and 69.6% of participant households practiced mono-cropping in 2005, and it was not significantly different by Pearson Chi-square. In 2011, 50.0% of non-participants and 29.4% of participant households practiced mono-cropping and 50.0% of participants and 70.6% of participant households diversified crop production. Therefore, there were additional 23.67% of non-participants and 29.31% of participant households practicing multiple cropping patterns. This percentage change of participant was significantly greater than that of non-participants by Pearson Chi-square test.

**Table 5.12 Observed cropping patterns by sampled households**

Observed Cropping Pattern	No. of Households	
	2005	2011
<u>Sequential Cropping</u>		
1. Groundnut(Monsoon)-Tobacco(Winter)	2	12
2. Pulses(Monsoon)-Tobacco(Winter)	2	6
3. Chick pea(Monsoon)-Tobacco(Winter)	2	5
4. Tobacco(Monsoon)-HortiCrops(Winter)	0	4
5. Piegon pea(Monsoon)-Tobacco(Winter)	2	2
6. Tobacco(Monsoon)-Onion(Winter)	0	1
7. Groundnut(Monsoon)-Chillies(Winter)	0	1
<u>Mixed Intercropping</u>		
1. Pigeon pea + Sesame (Monsoon)	3	8
2. Pigeon pea + Green gram (Monsoon)	2	2
<u>Mono Cropping</u>		
1. Tobacco(Monsoon)	23	19
2. Pigeon pea(Monsoon)	15	16
3. Sesame(Monsoon)	11	11
4. Groundnut(Monsoon)	5	11
5. Rice(Monsoon)	8	10
6. Pulses(Monsoon)	1	7
7. Horticrops(Monsoon+Winter)	0	7
8. Chillies(Monsoon)	3	5
9. Flowers(Winter)	0	2
10. Maize(Monsoon)	1	2
11. Chick pea(Monsoon)	1	1
12. Green gram(Monsoon)	1	1
<b>Total Observed Cropping Pattern</b>	<b>16</b>	<b>21</b>



**Table 5.13 Crop diversification due to the multiple cropping and its changes by sampled households**

Household Status		Microfinance Participation Status			
		Non-Participant in MFP (N=38)	Participant in MFP (N=58)	Total	
In 2005	Mono Cropping	Count	19	16	35
		(%)	(82.6)	(69.6)	(76.1)
	Multiple Cropping	Count	4	7	11
		(%)	(17.4)	(30.4)	(23.9)
Pearson Chi-Square		1.075 <sup>ns</sup>			
In 2011	Mono Cropping	Count	13	10	23
		(%)	(50.0)	(29.4)	(23.96)
	Multiple Cropping	Count	13	24	37
		(%)	(50.0)	(70.6)	(38.54)
Pearson Chi-Square		2.642 <sup>ns</sup>			
Changes	Mono Cropping		-6	-6	-12
	Multiple Cropping		+9 (23.67)	+17 (29.31)	+27 (28.13)
Pearson Chi-Square		5.230 <sup>**</sup>			

Based on the finding of cropping patterns and crop diversification status in the study area, it was observed that sampled households responded climate change vulnerability by crop diversification and participant households had more crop diversification after 5 years participation in microfinance activities. Microfinance contributes as a major driven factor to practice more crop multiplication system in the study area.

### **5.7 Livestock Assets and Its Changes**

Status of livestock assets owned by the sampled households and its changes during 2005 and 2011 were presented in Table 5.14. In the study area, almost of the sampled households did not have the livestock assets for their livelihoods at the beginning of 2005 because they were the poor in the community and lack of productive assets. In 2005, 43.2% of non-participant households kept draft cattle and just 3.4% of participant households possessed draft cattle. However, after 5 years participation in microfinance, the percentage of sampled participants who kept draft cattle was increased from 3.4% in 2005 to 8.6% in 2011. For the non-participant households, its percentage was a little decrease from 43.2% in 2005 to 36.8% in 2011, due to the negative climate change impact.

In the rural area, it was used to keep pigs in small scale as a “saving bank” or as a secondary source of income. In the study area, small scale sow/pig raising was initiated by the microfinance activities, and therefore, although there was very few small scale pig raisers in 2005 (only 1.7% of participant household kept pig), 22.4% of sampled participant households used to keep sow/pig as a secondary source of income for their livelihoods in 2011 (Table 5.14).

Therefore, it was observed that participant households had more positive changes in livestock assets and livestock assets of participant households possibly could be increased by microfinance activities in the study area.

### **5.8 Participation in Training Programs and Community Activities**

Table 5.15 and 5.16 showed the number and different types of training received by the sampled households. In Table 5.16, the number of training programs received in 2011 by non-participants and participants were 3.00 and 3.02 respectively, and it was not statistically significant.

**Table 5.14 Livestock assets and its changes by sampled households**

Household Status		Microfinance Participation Status		Total
		Non-Participant in MFP (N=38)	Participant in MFP (N=58)	
1. No. of H/Hs who keep Draft Cattle in 2005	Count	16	2	18
	(%)	(43.2)	(3.4)	(18.75)
No. of H/Hs who keep Draft Cattle in 2011	Count	14	5	19
	(%)	(36.8)	(8.6)	(19.79)
Change in No. of H/Hs who keeps Draft Cattle	Count	-2	3	5
	(%)	(5.3)	(5.2)	(5.21)
2. No. of H/Hs who keep Sow in 2005	Count	0	1	1
	(%)	(0)	(1.7)	(1.04)
No. of H/Hs who keep Sow in 2011	Count	0	13	13
	(%)	(0)	(22.4)	(13.54)
Change in No. of H/Hs who keep Sow	Count	0	12	12
	(%)	(0)	(20.7)	(12.5)

**Table 5.15 Number of trainings received by participant and non-participant sampled households in 2011**

Statistic		Microfinance Participation Status	
		Non-Participant in MFP (N=38)	Participant in MFP (N=58)
No. of Training Attendance	Mean	3.00	3.02
	SD	2.74	2.94
	Range	(0-7)	(0-7)
Pearson Chi-Square		1.075 <sup>ns</sup>	

**Table 5.16 Number of sampled households attended in different types of training**

Type of Training	Non-Participant in MFP (N=38)	Participant in MFP (N=58)	
Training Attendance on	1. Prevention and Care of Locally Endemic Diseases	11	19
	2. Homestead Gardening for the Poor	8	33
	3. Compost Production	18	25
	4. Rain Water Harvesting Technique for Agriculture	32	34
Program Participation in	5. Rain Water Harvesting Cisterns	16	36
	6. Environmental Education Awareness Raising	13	21
	7. Soil Conservation	22	33

Concerning the number of households attending training programs and participating community activities, however, it was observed that participant households had more involvements in the training programs than the non-participant (Table 5.16). In the study area, there were 4 different training programs and 3 community activities for the rural households offered by different organizations in 2011. Among these programs, as the study area was drought prone area, the training program ‘Rain Water Harvesting Technique for Agriculture’ was the most popular and 34 participant households and 32 non-participant households attended these program. ‘Homestead Gardening for the Poor’ training program was the second important training program and 33 participant households and 8 non-participants households involved in this training. Compost production training program was participated by 25 households of participants and 18 households of non-participants. For the community activities, it was found that 36 households of participants and 16 households of non-participant in microfinance were participated in “Rain Water Harvesting Cisterns”, 33 participants’ households and 22 non-participants’ households in “Soil Conservation Activities” and 21 households of participants and 13 households of non-participants involved in “Environmental Education Awareness Raising Activities”.

### **5.9 Awareness on Climate Change**

For the awareness on the climate change, the sampled households responded that their opinions based on changes in rainfall, changes in temperature, occurrences in cyclone, unexpected flood and severe drought events, over 10 years period.

In Figure 5.3, it was obvious that the frequency of rainfall was increased over 10 year period in the study area because 65.8% of non-participants and 65.5% of participants answered it was less rain in last 10 years, 68.4% of non-participants and 70.7% of participants responded it was normal rainfall in last 5 years and, 71.1% of non-participants and 70.7% of participants have experience that it was more rain in last year.

Although the majority of respondents had awareness on changes in rainfall, there was also some percentage in no awareness on rainfall changes. In that case, although the no awareness percentage of non-participants was nearly the same for three different periods, it was found that the no awareness percentage of participant households was decreased, 29.3% in last 10 years, 24.1% in last 5 years and 15.5% in last year, after 5 years participations in microfinance activities and attending some training programs. According Pearson Chi-square test, it was found that non-participant households had

more percentage in no awareness of frequency of rainfall significantly at 1% level (Figure 5.4).

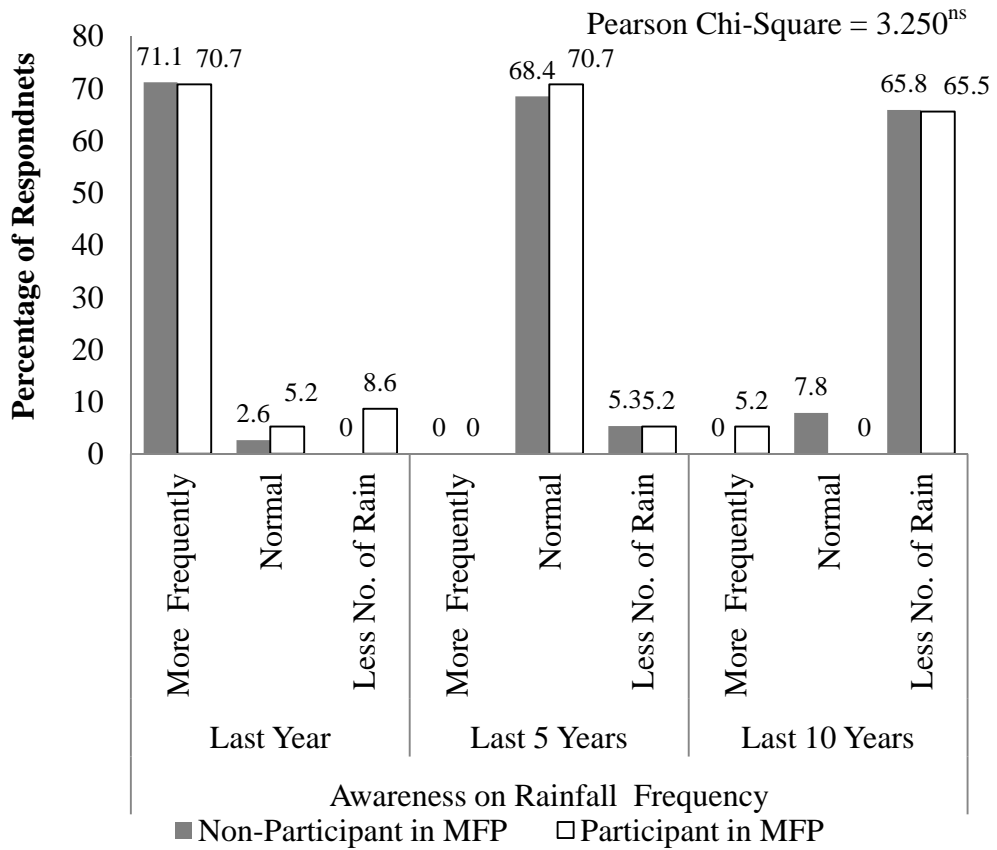
Figure 5.5 and 5.6 demonstrated the awareness on temperature particularly change in summer season by sampled households in the study area. It was observed that the summer temperature in the study area was increased during 10 years period according to the sampled households' awareness (Figure 5.5). For the no awareness percentage of sampled households, it was also the same as in the case of rainfall awareness. There were the same percentage in no awareness by non-participants and the decreasing percentages of participants on no awareness, 25.7% in last 10 years, 17.2% in last 5 years and 6.9% in last year. According Pearson Chi-square test, it was found that non-participant households had more percentage in no awareness of summer temperature significantly at 1% level.

In the occurrences of unusual event of climate change such as cyclone, flood and drought, there was different trend of responses on these events. In accordance with the response of sampled households, cyclone was never happened in the study area, except in last 5 years because of cyclone Giri in 2010 and tropical storm II in 2011 (Figure 5.7).

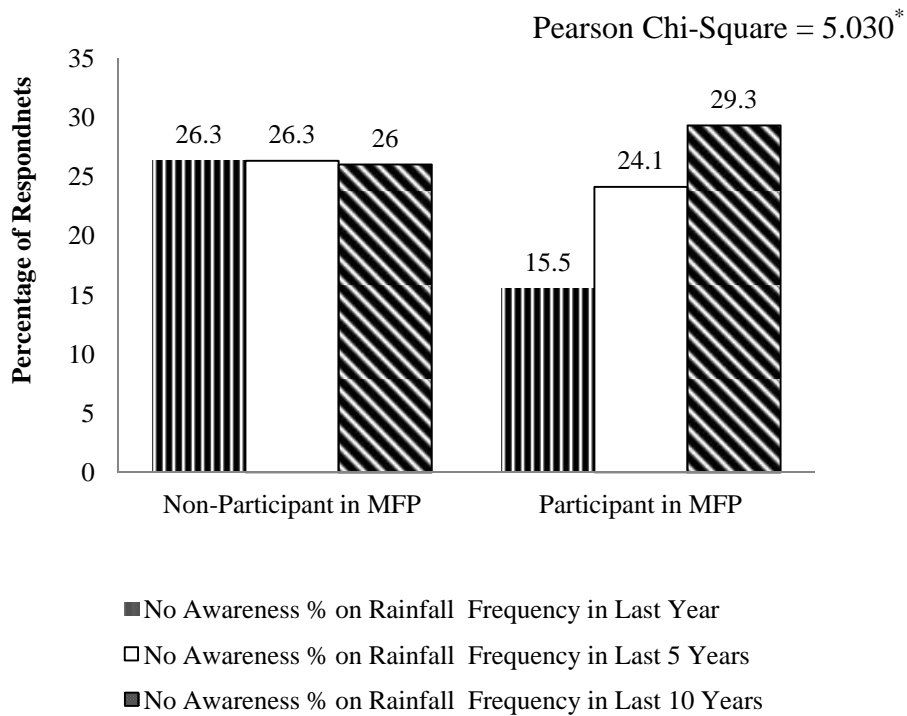
For the flood event, there were no significant differences in awareness by Pearson Chi-square test. All sampled households had awareness on this event because of heavy flooding triggered by torrential rain in October 2011 and frequent flood in river bank area (Figure 5.9). In the case of drought, most of the respondents suffered that it was frequently occurred in the study area because the study area was located in the dry zone (Figure 5.11).

For the non-awareness on unusual events (Figure 5.8, 5.10 and 5.12), the households from non-participants had the decreasing trend on non-awareness percentage. The participant households were aware the event cyclone, flood and drought, only when they experienced these events, however, the percentage of non-awareness on unusual events by participants were lower than that of non-participant households in last year.

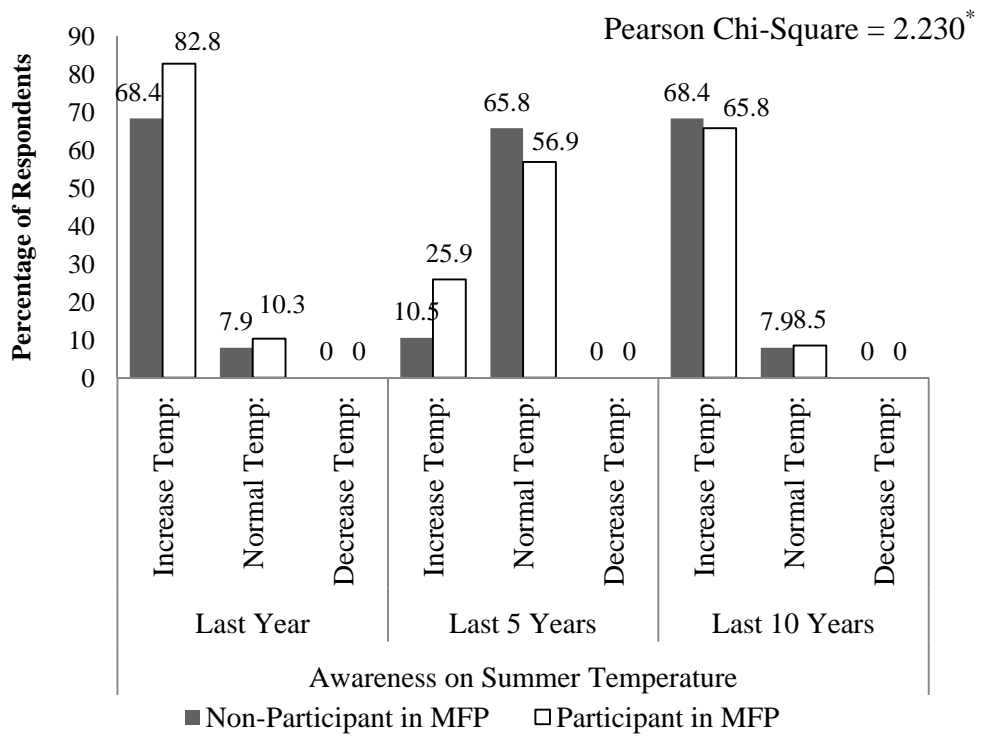
The possible factor for rising climate change awareness of participants was that they were more suffering these climate changes and unusual events which were affected during their livelihoods. On the other hand, it can be said that the awareness on climate change and unusual events of participant households was increased by 5 years participation in microfinance and receiving some training programs such as environmental awareness raising program.



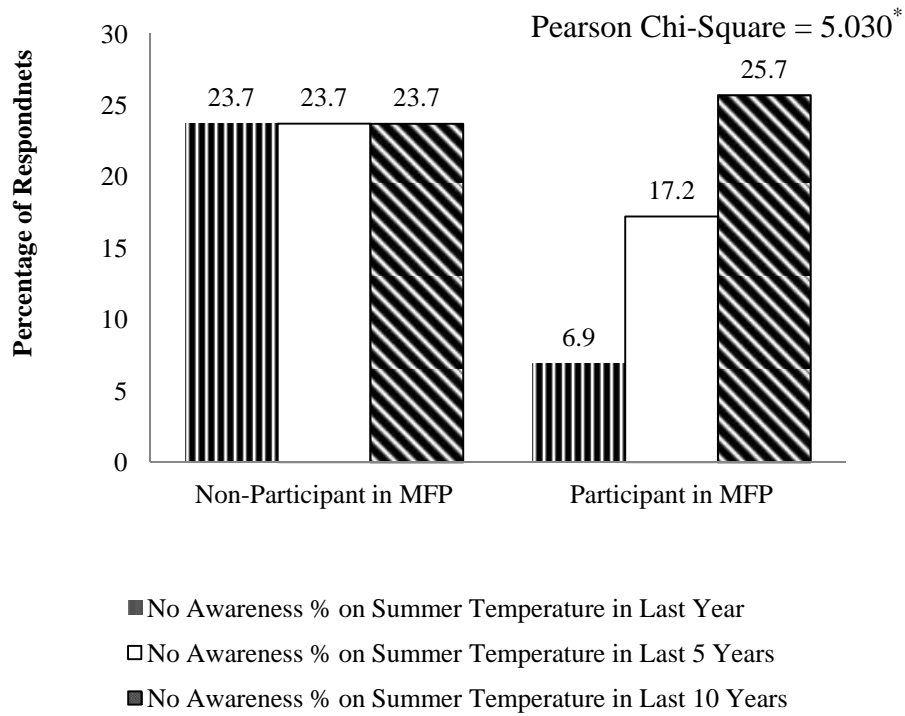
**Figure 5.3 Awareness on rainfall (frequency) over last 10 years period by sampled households**



**Figure 5.4 No awareness % on rainfall (frequency) over last 10 years period by sampled households**

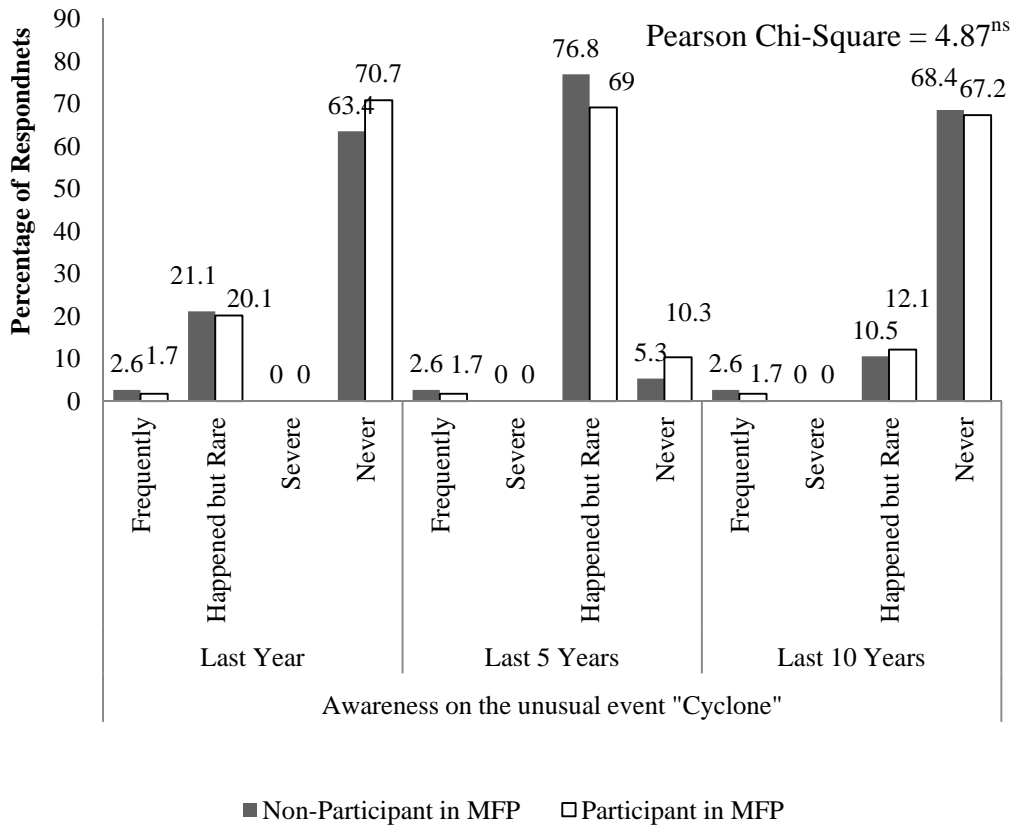


**Figure 5.5 Awareness on temperature changes in summer period over last 10 years period by sampled households**

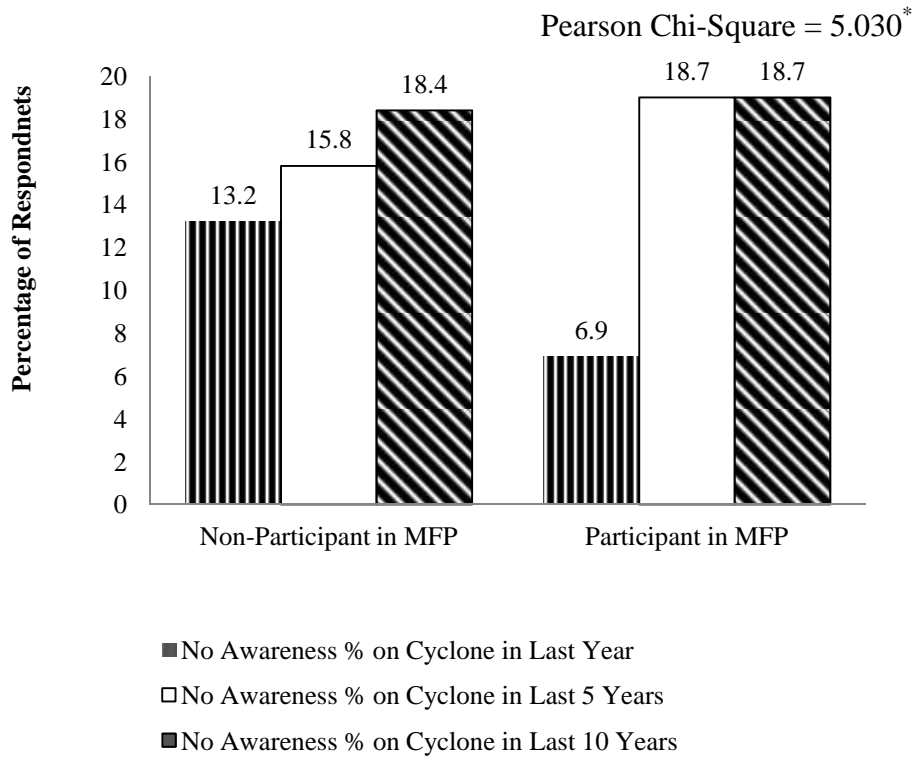


**Figure 5.6 No awareness % on temperature change in summer period over last 10 years period by sampled households**

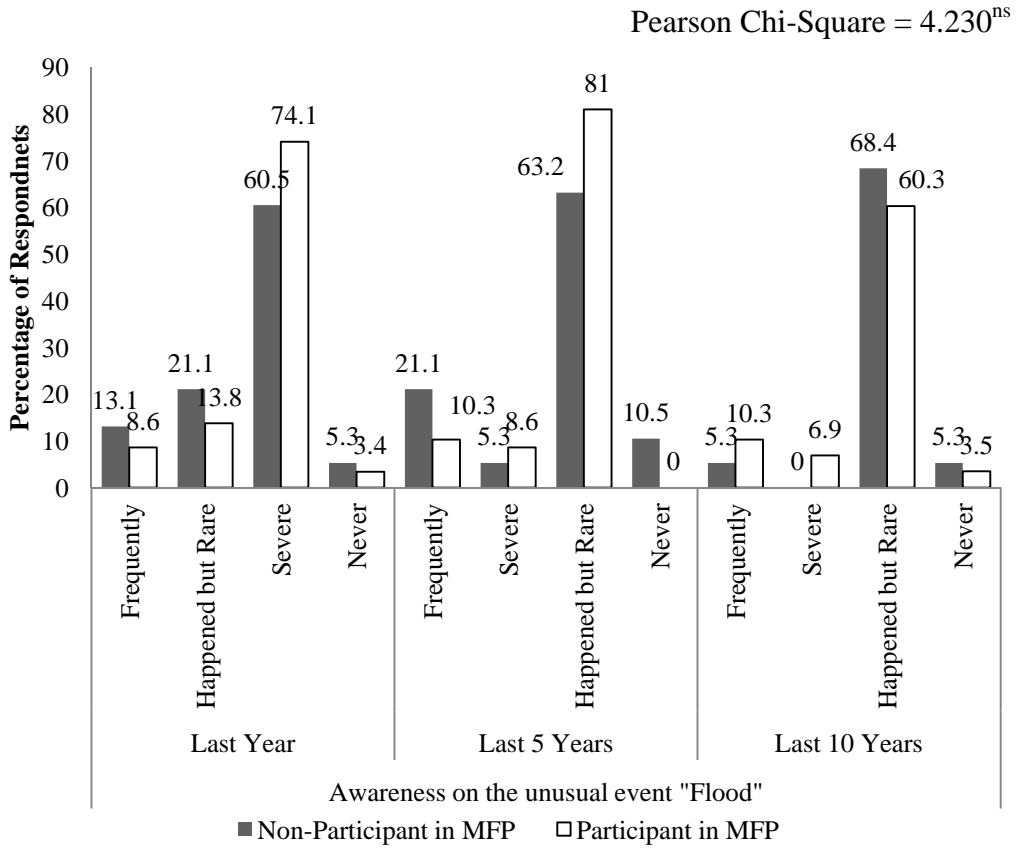




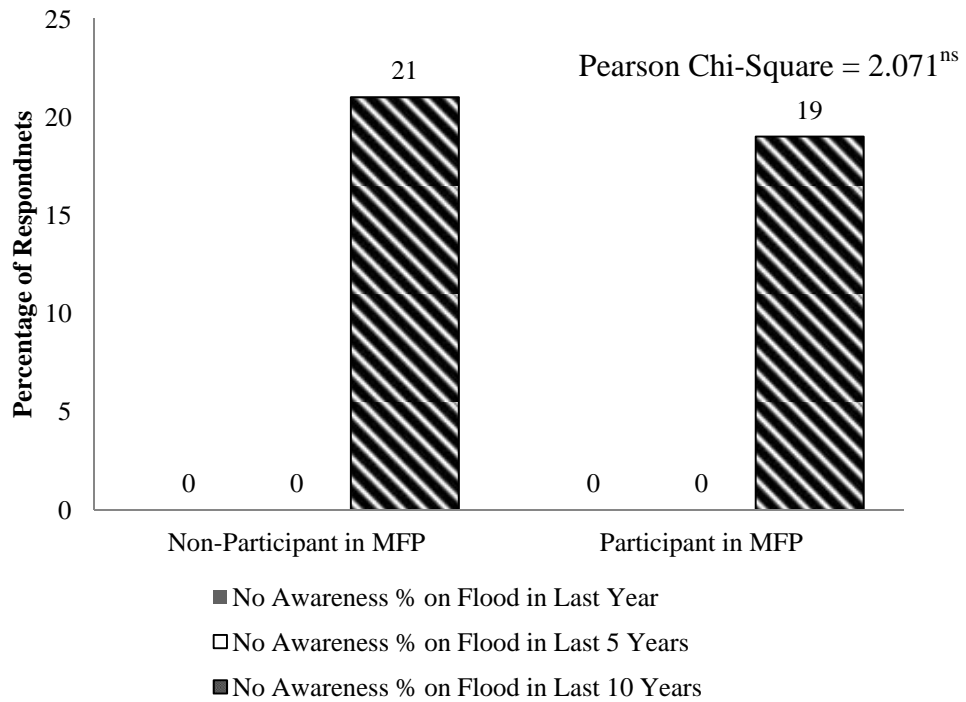
**Figure 5.7 Awareness on unusual event (cyclone) over last 10 years period by sampled households**



**Figure 5.8 No awareness % on unusual event (cyclone) over last 10 years period by sampled households**



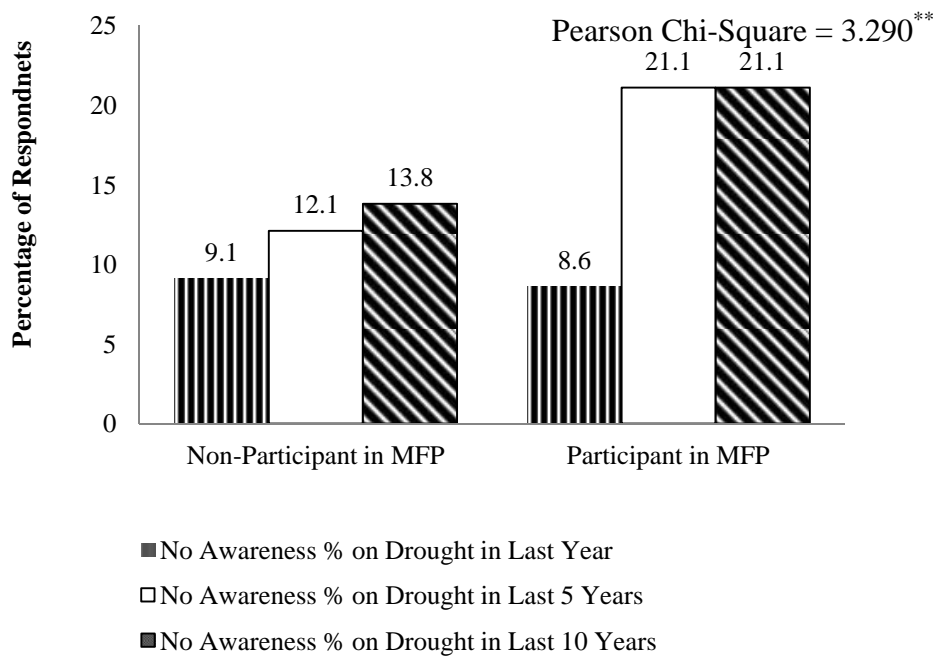
**Figure 5.9 Awareness on unusual event (flood) over last 10 years period by sampled households**



**Figure 5.10 No awareness % on unusual event (flood) over last 10 years period by sampled households**



**Figure 5.11 Awareness on unusual event (drought) over last 10 years period by sampled households**



**Figure 5.12 No awareness on unusual event (drought) over last 10 years period by sampled households**

## **CHAPTER 6**

### **IMPACT OF MICROFINANCE ON LIVELIHOOD SECURITY**

Improving the livelihood security of vulnerable people by applying microfinance as a remedial tool, there was expected to observe the improvement in economic, social and institutional aspects of the vulnerable people in the study area.

#### **6.1 Impact of Microfinance Program: Economic Aspect**

Regarding with the economic aspect of microfinance impact on the vulnerability of the poor in the study area, there were three themes in this aspect: (a) increasing productive assets, (b) encouraging income generating activities and (c) promoting agricultural income. As discussed in Chapter 5, it was clear that the land holding status of microfinance participant households was significantly increased than that of non-participant households, and participant households had more positive changes in livestock assets than non-participants. Therefore, it was found that the productive assets (land and livestock) of microfinance participant households were increased in last 6 years as one of the economics aspect of microfinance impact. Moreover, the research findings on “Income Status of Participant and Non-Participant Households” in the previous chapter point out that crop income of participant households was significantly increased than that of non-participants during 2005 to 2011, and microfinance program significantly promote the agricultural income of its participant households in terms of economic aspect.

#### **6.2 Impact of Microfinance Program: Social/Institutional Aspect**

The impact of microfinance program on the participant households concerning social and institutional aspect can be measured by three indicators: (1) participation in the training program and community activities, (2) formation of microfinance associations at the community level and (3) food poverty or food security status of the sampled households.

For the participation in the training program and community activities, it was observed that the microfinance participant households had more involvements in the training programs than the non-participant as mentioned in Table 5.17 of the previous chapter.

### **6.2.1 Status of Credit Received by the Sampled Households**

In the study area, the sampled households received credit from different sources and the number of credit sources ranged one to four. In Table 6.1, 46.6% of participant households and 34.2% of non-participant households had only one source of credit and 31% of participants and 55.3% of non-participants had two sources of credit.

There were 7 types of credit sources namely (1) Small loans provided for Self-Reliance Groups SRGs organized by UNDP-PACT Myanmar, (2) Save the Children (SC), (3) Union Solidarity and Development Party (USDP), (4) Myanmar Agricultural Development Bank (MADB), (5) Taw Win Nan Saving and Credit Cooperative (TWN), (6) loan from relatives (LFR) and (7) money lenders (ML). Among these 7 types, TawWinNan Saving and Credit Cooperative was organized by successful SRGs in 2010 after 5 years period in the study area. In the case of loan received, 57% of non-participant received loan form Save the Children and 47.4% from MADB. For the participant group, 100% of Participant received loan from SRG group and secondly 34.5% from USDP (Table 6.2).

Table 6.3 showed the average loan amount received from these 7 organizations. From the point of the formal financial institution, MADB borrowed with the lowest interest rate 1.4% and its loan amount ranged from 60,000kyats to 90,000kyats for participant households and 12,000kyats to 126,000kyats for the non-participants. In the semi formal financial institution, the main source of credit for the participant group was SRGs. It borrowed all of participant households in the study area with 3% interest rate and its loan ranged from 15,000kyats to 600,000kyats. In the case of Taw Win Nan Saving and Credit Cooperative, its loan was just received only by outstanding participants and it borrowed 412,500kyats in average, with the interest rate of 3%.

According to independent sample *t* test, the average annual loan received by the participants, 364,724kyats per year was significantly greater than that of non-participant households, 126,078kyats per year, at one percent level (Table 6.4).

### **6.2.2 Gender and Credit/Loan Status of Sampled Households**

In this analysis, although it was observed that 19.8% of total sample households (19 households) were female headed households including 7 non-participant households and 12 participant households, it was found that the households which receive credit/loan by the title of women were 58 households from SRG and 36 households from Save the Children. It was obvious that these women group receive the highest loan amount which

was about 600,000 kyats per households. Moreover, it was also found that these women group's loan repayment rate was the highest in the study area.

### **6.2.3 Poverty Status of Sampled Households**

The poverty and food poverty status of sampled households were explained in Table 6.5 and Figure 6.1. To examine poverty and food poverty status of sampled households, UNDP's poverty and food poverty lines in 2005 and 2010 were applied. The food poverty line was 118402 kyats/year/person and poverty line was 162,136ks/yr/person in year 2005 and the food poverty line was 274,990 kyats/year/person and poverty line was 376,151 kyats/year/person in year 2011 (UNDP June 2011).

It was observed that the numbers of participant households under poverty and food poverty line were significantly greater than the number of non-participants. They were significant at one percent level.

In Table 6.5, 21.1% of non-participant households and 81.0% of participant households were below food poverty line in 2005. This 21.1% of non-participants was still remained under food poverty line in 2011. However, 46.6% of participants left under food poverty in 2011. As a result, although there was no change in food poverty status of non-participants, additional 34.5% of participant households lived above food poverty level in 2011 after 5 years participation in microfinance program.

In relation to poverty status of sampled households, 31.6% of non-participants and 91.3% of participants were under poverty line in year 2005. The poverty status of non-participant households was found as 34.2% of that group in year 2011. It was found that 2.6% increase in poverty status of non-participant households in the study area after 5 years period, because of exceptional case that one of sampled respondents in non-participant group experienced losses in all of his agricultural land due to the river bank land slide in 2008. However, it was found that there were 67.2% of participant households under poverty line in 2011. It mentioned that additional 24.1% of microfinance participant households received higher income and lived above poverty line after 5 years period participation in microfinance program.

As a result, as the social/institutional aspect of microfinance impact, it was observed that microfinance could promote not only the food but also livelihood security of rural households who participate actively in the microfinance program in the study area.

**Table 6.1 Number of credit sources received by sampled households in 2011**

No. of Credit Source	Total Sampled H/Hs	Microfinance Participation Status		
		Non-Participant in MFP (N=38)	Participant in MFP (N=58)	
1. One Source of Credit	Count (%)	40 (41.7)	13 (34.2)	27 (46.6)
2. Two Sources of Credit	Count (%)	39 (40.6)	21 (55.3)	18 (31.0)
3. Three Sources of Credit	Count (%)	13 (13.5)	4 (10.5)	9 (15.5)
4. Four Sources of Credit	Count (%)	4 (4.2)	0 (.0)	4 (6.9)
	Mean	1.80	1.76	1.83
	SD	.829	.634	.939
Pearson Chi-Square		7.200 <sup>ns</sup>		

**Table 6.2 Number of sampled households receiving different credit sources in 2011**

Name of Credit Source	Total Sample	Microfinance Participation Status		
		Non-Participant in MFP (N=38)	Participant in MFP (N=58)	
SRG	Count (%)	58 (60.4)	0 (.0)	58 (100.0)
SC	Count (%)	36 (37.5)	22 (57.9)	14 (24.1)
USDP	Count (%)	38 (39.6)	18 (47.4)	20 (34.5)
MADB	Count (%)	24 (25.0)	18 (47.4)	6 (10.3)
TWN	Count (%)	8 (8.3)	0 (.0)	8 (13.8)
LFR	Count (%)	2 (2.1)	2 (5.3)	0 (.0)
ML	Count (%)	7 (7.3)	7 (18.4)	0 (.0)

**Table 6.3 Average loan amount of sampled households by different microfinance organization**

Name of Credit Source	Microfinance Participation Status	
	Non-Participant in MFP	Participant in MFP
Small Loan for SRG	Interest Rate %	3%
	Mean	285810
	SD	227223
	Range	(15000-600000)
	No. of H/hs	58
SC	Interest Rate %	5%
	Mean	36636
	SD	12272
	Range	(20000-50000)
	No. of H/hs	22
USDP	Interest Rate %	2%
	Mean	12222
	SD	9428
	Range	(10000-50000)
	No. of H/hs	18
MADB	Interest Rate %	1.4%
	Mean	81389
	SD	30722
	Range	(12000-126000)
	No. of H/hs	18
TWN	Interest Rate %	3%
	Mean	412500
	SD	23145
	Range	(400000-450000)
	No. of H/hs	8
LFR	Interest Rate %	5%
	Mean	350000
	SD	70710
	Range	(300000-400000)
	No. of H/hs	2
ML	Interest Rate %	10%
	Mean	228571
	SD	114953
	Range	(100000-450000)
	No. of H/hs	7

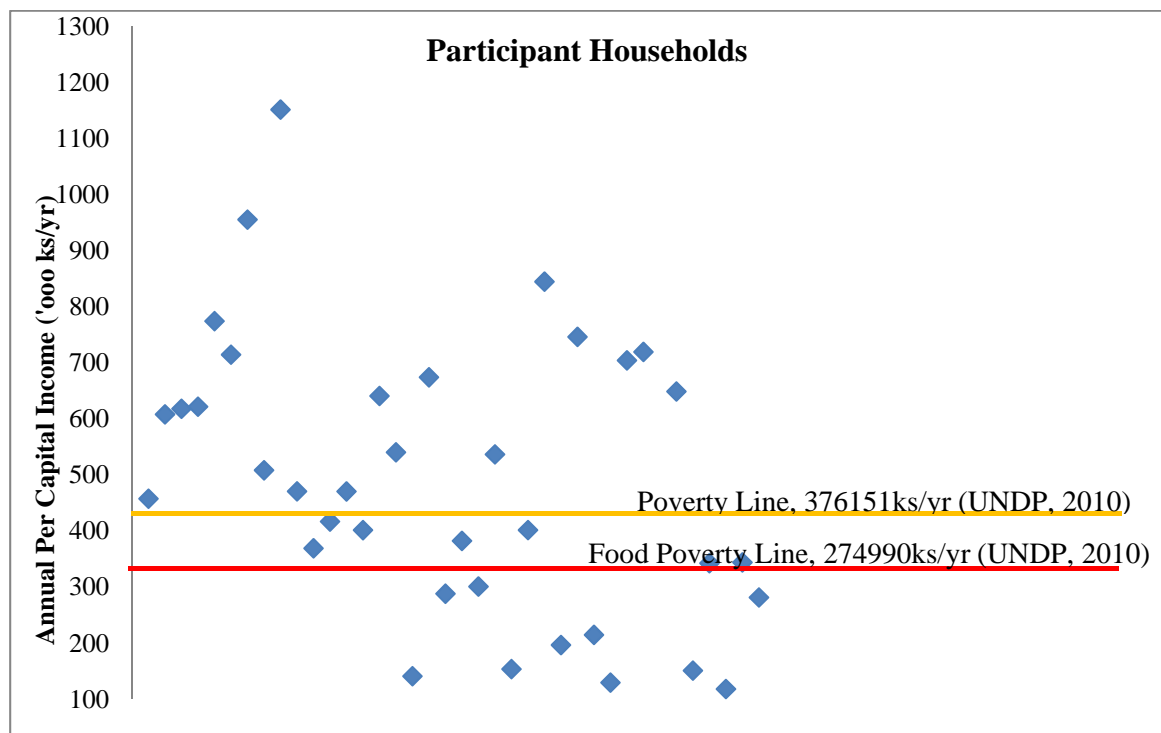


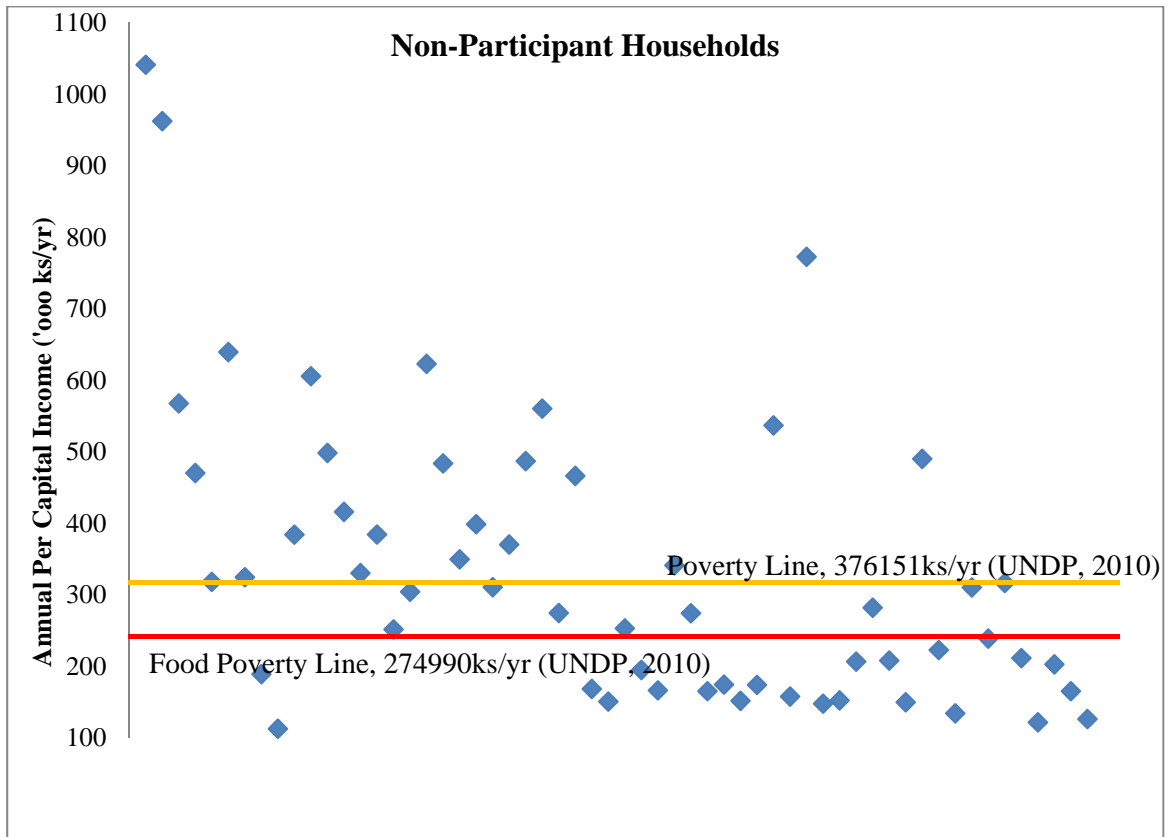
**Table 6.4 Average annual loan amount received by sampled households in 2011**

Statistic	Microfinance Participation Status	
	Non-Participant in MFP (N=38)	Participant in MFP (N=58)
Mean	126078	364724
SD	127319	289536
Range	(10000-528000)	(15000-600000)
N	38	58
Independent Sample t test	-4.780***	

**Table 6.5 Poverty and food poverty status of sampled households**

Status		2005		2011		Changes	
		NP	MP	NP	MP	NP	MP
Below Food Poverty Line	Count	8	47	8	27	0	-20
	(%)	(21.1)	(81.0)	(21.1)	(46.6)	(.0)	(34.5)
Independent Sample t test		6.693***		2.601***			
Below Poverty Line	Count	12	53	13	39	+1	-14
	(%)	(31.6)	(91.3)	(34.2)	(67.2)	(2.6)	(24.1)
Independent Sample t test		4.876***		3.012***			

**Figure 6.1 Poverty and food poverty status of sampled participant households in 2011**



**Figure 6.2 Poverty and food poverty status of sampled non-participant households in 2011**

## CHAPTER 7

### DETERMINANTS OF ANNUAL INCOME AND CREDIT DEMAND

To explore the determinants of average annual household income, loan/credit amount received by sampled households and perception of household credit demand, multiple regression analysis models were used with specific dependent variables based on the nature of the data and its expected correlation.

#### 7.1 Factors Influencing the Average Annual Household Income

The determinants of the average annual household income of participants and non-participants in microfinance were estimated by SPSS version 16.0. The results of the influencing factors were shown by Table 7.1. The average annual household income of participants and non-participants in natural log value was included as the dependent variable of the regression model. The independent variables of the model were household head's age (years), household head's schooling year, number of family member (No.), number of income sources (No.), farm size in 2011 (ha), off-farm and non-farm income in 2011 (kyats/year), received loan/credit amount in 2011 (kyats/year), and two dummy variables: crop diversification status (yes/no) and microfinance participation status (participant/ non-participant).

In Table 7.1, the F value (17.282) was statistically significant at 1% level and the adjusted  $R^2$  value (0.724) expressed the goodness of fit of the model.

Among explanatory variables, farm size, off-farm/non-farm income and crop diversification status of the sampled households were positively related to the average annual household income and statistically significant at 1% level. These results indicated that one percent increases in farm size and off-farm/non-farm income expressing the average annual household income were expected to be increased by 0.26%, and 0.43% respectively. Moreover, if the household diversified cropping in farming, then the average annual household income will increase significantly about 0.42%.

There was a strong negative relationship between the average annual household income and the two explanatory variables: household head's age and microfinance participation status, and statistically significant at 1% level. According to regression estimates, other things being equal, one percent increases in household head's age will reduce the average annual household income significantly in 0.66%.

**Table 7.1 Determinants of average annual household income of participants and non-participants**

Independent Variable	Unstandardized		Standardized		Sig.
	B	SE	Beta	t	
(Constant)	10.341	1.066		9.699***	.000
Microfinance Participation Status (0=non-participant, 1=participant)	-.378	.136	-.360	-2.779***	.009
H/H Head Age (Ln)	-.662	.209	-.267	-3.172***	.003
H/H Head Schooling Year (Ln)	-.053	.066	.067	.811	.423
Number of Farm Labor (Ln)	.187	.133	.157	1.408	.168
Farm Size in 2011 (ha) (Ln)	.263	.063	.385	4.160***	.000
Off/Non-Farm Income in 2011 (Ln)	.437	.060	.766	7.277***	.000
Received Loan/Credit Amount (Ln)	.060	.053	.144	1.138	.263
Crop Diversification in 2011 (0= mono cropping, 1=multiple cropping)	.429	.096	.384	4.446***	.000
No. of Income Source (Ln)	-.264	.134	-.166	-1.967*	.057
		<b>R<sup>2</sup> = 0.773</b>	<b>Adj R<sup>2</sup> = 0.724</b>	<b>F = 17.282***</b>	

Dependent Variable: Log of average annual household income in 2011. \* significant different at 10% level, \*\* significant different at 5% level, \*\*\* significant different at 1% level, <sup>ns</sup>=not significant

Concern with the dummy variable, microfinance participation status (non-participant = 0, participant = 1) specified that the average annual household income of microfinance participant was 37.8% lesser than that of the non-participants. Moreover, the number of income source was highly and negatively associated with the average annual household income. Other thing being equal, if the one percent increases in the number of income source, then the average annual household income was expected to reduce by 26.4% and statistically significant at 10% level.

Overall, the model was significant at 1% level and it can explain the variation in average annual household income by 72 percent.

## **7.2 Factors Influencing the Annual Credit Received by Sampled Households**

In determining the factors influencing annual loan/credit received, the variables such as household head's schooling year, family size of the household, farm size in 2011 (ha), average annual household income in 2011 (kyats/year), average crop income in 2011 (kyats/year) and the dummy variable such as microfinance participation status (non-participant = 0, participant = 1), household head's gender (female = 0, male = 1), farming household (farmer =1, others = 0) and wage earning household ( wage laborer = 1, others = 0), were included as the explanatorily variables in the model.

Based on the results of the regression, family size, the farming household and the wage earning household played as the major influencing factors to the average annual loan/credit received by the sampled household, among the independent variables. There was a significant and positive relationship between average annual loan and the variables: family size, farming household and the annual household income in year 2011. It is observed that there was a significant and negative relationship between the wage earning household and the annual loan/credit received (Table 7.2).

According to the regression estimates, other things being equal, one unit increased in family size expresses that the annual loan/credit received will be expected to increase 36,392 kyats/year. If the household will be the farming household, it will be increased by 167,451 kyats/year than the other households. However, if the household will be the wage earning household, it will be decreased by 136,157 kyats/year than the others.

Moreover, there were more other explanatorily variables that can vary the annual loan/credit amount. These variables were microfinance participation status, household head's gender types, farm size and average annual household income.

**Table 7.2 Determinants of loan/credit received by sampled households**

Independent Variable	Unstandardized		Standardized		
	<b>B</b>	<b>SE</b>	<b>Beta</b>	<b>t</b>	<b>Sig.</b>
(Constant)	91282	91954		.993	.324
Microfinance Participation Status (0=non-participants, 1=participants)	112691	55167	.209	2.043**	.044
H/H Gender Status (0=Female , 1=Male)	-85566	47898	-.129	-1.786*	.078
H/H Head Schooling Year	-7918	7491	-.080	-1.057	.293
Family Size (No.)	36392	12590	.228	2.890***	.005
Farm Size in 2011 (ha)	-45175	17324	-.232	-2.608**	.011
Farming Household (0=others, 1=Farmer)	167451	51057	.317	3.280***	.002
Wage Earning Household (0=others, 1=Wage Laborer)	-136157	50426	-.241	-2.700***	.008
Avg. Annual H/H Income in 2011	.038	.023	.146	1.597*	.071
Avg. On-Farm Income in 2011	.015	.032	.044	.459	.647
	<b>R<sup>2</sup> = 0.670</b>		<b>Adj R<sup>2</sup> = 0.625</b>		<b>F = 12.662***</b>

Dependent Variable: Average annual loan/credit amount received by household in 2011 (kyats/year). \* significant different at 10% level, \*\* significant different at 5% level, \*\*\* significant different at 1% level, <sup>ns</sup>=not significant

The microfinance participation status and average annual household income were the positively related factor and significant at 5% and 10% level respectively. It indicated that if the household participates in microfinance program, received credit amount will be increased by 112,691 kyats/year in annual loan/credit amount than the non-participant household.

The farm size of the household had negative impact and significant at 5% level. Other thing being equal, if one unit increases in farm size, the household will be expected to receive less 45,175 kyats/year in annual loan/credit amount. The household head's gender status was one of the negatively influenced factors to the annual loan/credit amount and significant at 10% level. It meant that if the household were male headed household, then received credit amount will be decreased by 85,566 kyats/year.

In overall view, the model was statistically significant at 1% level by F test and explained the variation in annual loan/credit received by 65 percent.

### **7.3 Factors Influencing the Perception of Household Credit Demand**

In this multiple regression, the dependent variable, the perception of households credit demand was calculated by the scoring method in which the total score was ranged from 3 to 12. In accordance with the household credit demand score, 71% of non-participant household were found in the medium household credit demand level, and 54% of participants were observed in the high credit demand level. Pearson Chi-square value (21.006) was statistically significant at 1% level and it was obvious that participant households had highly credit demand than non-participants in this study (Table 7.3).

As the explanatory variables, household head's schooling year, family size, number of credit source, farm size in 2011 (ha), annual per capita income in 2011 (kyats/year) and three dummy variables (household head's gender, farming household and wage earning household) were included in the model.

According to the regression results of Table 7.4, family size and the dummy farming household were positively and significantly related to the perception of household credit demand at 1% level. These variables were the major positive factor for the perception of household credit demand. Other thing being equal, if one member of family increases in the household, then 0.26 score point will be expected to increase in the household credit demand level. Moreover, if the household were the farming household, its credit demand level was 1.036 point higher than that of other households.

**Table 7.3 Household credit demand level of sampled respondents**

		Microfinance Participation Status		
		Non-Participant in MFP (N=38)	Participant in MFP (N=58)	Total
Household Credit Demand (HCD) Level	Low HCD	8 (21.1)	5 (8.6)	13 (13.5)
	Medium HCD	27 (71.1)	22 (37.9)	49 (51.0)
	High HCD	3 (7.9)	31 (53.9)	34 (35.4)
	Total	38	58	96
<b>Pearson Chi-square</b>		<b>21.006***</b>		

Note: Figures in the parentheses are percentage.

**Table 7.4 Perception of household credit demand by sampled households**

Independent Variable	Unstandardized		Standardized		Sig.
	B	SE	Beta	t	
(Constant)	3.197	2.815		1.136	.259
H/H Gender Status	-.482	.279	-.109	-1.728*	.088
H/H Head Schooling Year	-.039	.044	-.060	-.895	.374
Family Size	.263	.073	.248	3.624***	.000
Farming Household (Farmer)	1.036	.289	.295	3.581***	.001
Wage Earning Household (Labor)	-1.155	.295	-.308	-3.913***	.000
Number of Credit Source	-.463	.149	-.218	-3.102***	.003
Farm Size in 2011 (ha)	-.313	.084	-.241	-3.737***	.000
Average Per Capital Income in 2011 (Ln)	.367	.205	.128	1.789*	.077
		<b>R<sup>2</sup> = 0.666</b>	<b>Adj R<sup>2</sup> = 0.635</b>	<b>F = 21.646***</b>	

Dependent Variable: Perception of Household Credit Demand by score (3-12).  
 \*significant different at 10% level, \*\* significant different at 5% level, \*\*\* significant different at 1% level, <sup>ns</sup>=not significant



It was found that the number of credit source, the farm size and the dummy variable wage earning household had the negative relationship on the perception of household credit demand, and they were statistically significant at 1% level. The results in Table 7.4 indicated that one unit increases in the number of credit source and the farm size, the household credit demand level was expected to decrease at 0.463 point and 0.313 point respectively. In addition, if the household were the wage earning household, its credit demand level was assumed to decrease 1.15 point than the other households.

Consequently, it was found that the dummy variables, farming household and wage earning household were the most important factors on the perception of household credit demand as they had a strong influence on it (greater than 1 point in household credit score).

Taken as a whole, it was found that the model was statistically significant at one percent level by F test, and it can solve the variation in the perception of household credit demand by 63.5 percent.

## **CHAPTER 8**

### **CONCLUSION**

The study contributes to the understanding of microfinance impact by focusing on the climate resilience and livelihood security of rural households in the study area by analyzing microfinance participant and non-participant households' productive assets, adaptation of crop, awareness on climate, income and credit conditions, and their food security status. Based on the findings of the study, conclusion and recommendation can be drawn to highlight the important point especially for climate resilience and livelihood security of rural households in the study area.

#### **8.1 Building Climate Resilience of Rural Households**

In the content of productive assets, it was found that some landless farmers in participant households (17% of participants) became farming households, which possessed own cultivated land after 5 years participation in microfinance program, but no visible changes in non-participant group. Moreover, it was also obvious that participant households had more positive changes in livestock assets as 20% of participant households could initiate livestock keeping during 2005 and 2011. Therefore, it can be concluded that microfinance increased the productive assets of participant household in the study area.

In the case of crop diversification by multiple cropping system in the study area, it was also found that about 29% of participants and 23% of non-participants altered mono cropping to multiple cropping, in the respond of climate change during 2005 and 2011, and increased adaptation of crop by multiple cropping system. All these results have been achieved by fully participation in microfinance program.

It was observed that participant households had more involvement in training programs and increased awareness in climate change than in the past by getting such kind of training programs. And it can be concluded that the awareness of climate change in the study area was promoted by microfinance.

Moreover, participant households had higher percent change in crop income and average annual household income than that of non-participants. It can be said that income status of participant households was increased by microfinance.

According to these results judging against the climate resilience conceptual framework, it can be concluded that microfinance could build climate resilience of participant households in certain extent.

## **8.2 Livelihood Security of Rural Households**

While evaluating livelihood security of rural household, it was found that there were two changes in economic aspect and three changes in social and institutional aspects. In the economic aspect of microfinance impact, the first improvement was the agricultural (crop) income was significantly increased in participant households and the second was the participant households possessed more productive assets than before participation in microfinance.

In the social and institutional aspect, it was found that (a) participant households had more contribution in training programs, (b) they could organize TawWinNan Saving and Credit Cooperative successfully and (c) more 34% of participant households attained food security level after 5 years participation in microfinance. Therefore, in accordance with the conceptual framework of livelihood security of rural household, it can be concluded that livelihood security of participant households could be promoted to a positive level (+34% of participant households) by microfinance.

## **8.3 Determinants of Annual Income and Credit Demand**

According to multiple regression model result, the most significant factors influencing on average annual household income were the household head's age, farm size, off-farm and non-farm income, microfinance participation status and crop diversification. It was obvious that the average annual household income can be increased by farming with more the younger farmer, possessing larger farm size, higher off/non-farm income and more crop diversification. Moreover, it was noticeable that the average annual household income of microfinance participant was lower than that of the non-participants. Therefore, microfinance program for the poor should be encouraged to accomplish income equity status of rural people.

In the determinants of average loan/credit amount, the family size, the farming household and wage earning household were found as the most important determinants by the regression analysis. It can be concluded that the larger farm size could move up the loan/credit received by participants. The important conclusion in this regression analysis was that, if the household will be the farming household, it will receive more credit than

the other households, otherwise, if the household will be the wage earning household, it will receive less credit than the others.

In the case of perception of household credit demand, the most dominant factors influencing on it were family size, farm size, farming household and wage earning household. It can be concluded that the smaller family size, and higher farm sizes could decrease perception of credit demand in the study area. It also can be said that the farming households had higher credit demand level and wage earning household had lower credit demand level.

#### **8.4 Recommendations and Policy Implication**

Derived from the conclusion of the findings, it can be drawn the following recommendations and policy implication for the stakeholders in microfinance, implementing the future microfinance program as an innovative adaptation to climate change and as a tool to build climate resilience and promote livelihood security.

- (1) Microfinance can reduce vulnerability, build climate resilience and promote food security by providing poor people with the means to diversify, accumulate and manage the assets needed to become less susceptible to shocks and stresses or to better deal with the trends and impacts.
- (2) Access to credit is very important for the poor in promoting their livelihoods and poverty alleviation because small loan or credit with low interest rate can support to increase income generating activities of the household in certain extent and household income status can be improved by employment or income diversification.
- (3) Microfinance has proved a powerful way to bring financial services to the poor, not only in the scope of poverty reduction but also in the scope of climate resilience.
- (4) It was observed that microfinance participants had more positive change in income status than non-participants, and among participants, some farmer still remained the same income status because of poor participation in the microfinance. Therefore, farmer in the study area should notice their income changes by participating in microfinance activities. Poor farmers should participate more in microfinance programs. And also landless and small farmers should actively participate in microfinance activities. In addition, microfinance program for the poor should be encouraged to accomplish income equity status of rural people.

- (5) Moreover, effective microfinance program should be initiated and implemented in the indispensable area of the country. It should be encouraged the private sector and NGOs, INGOs to contribute in microfinance program.
- (6) If credit/ loan/ cash grant/ may be used more on adaptation activities of climate change, climate resilience and sustainable agriculture will improve especially the subsistence farmers.
- (7) Additionally, sustainability of microfinance program should be considered while implementation and operation stages, for the long run development.

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## APPENDICES

### Appendix 1 Number of SRG and total population in the study area

Village Tract Name	Village Name	HH	M	F	POP	No of SRG
ChaukKan	ChaukKan.E	295	706	735	1441	3
MaGyiPinPu	Kyun O	93	149	167	316	2
ShweDar	ShweDar	78	142	193	335	3
NatKyun	KinMonKha	287	600	704	1304	3

Note: There were 7815 households with the population of 37911 Nos. consists of 18034 male and 19877 female, and 117 numbers of SRG in the Pakokku Township.

### Appendix 2 Households with SRG wealth ranking and sample size in the study area

Village Name	SRG Wealth Ranking					Total SRG HH	Sample Size		
	Rich	Middle	Poor	Very Poor	Destitute		Sample SRG HH	Non-participants	Total Sample Size
ChaukKan.E	0	0	20	32	8	60	17	10	27
KyunO	0	0	28	12	0	40	12	10	22
ShweDar	0	0	12	35	0	47	15	10	25
KinMonKha	0	0	31	12	7	50	16	12	28
Total	0	0	91	91	15	197	60	42	102

### Appendix 3 Average annual income composition of participant and non-participant sampled households

Income Status	Microfinance Participation Status						t value <sup>1</sup>
	Non-Participant in MFP			Participant in MFP			
	Mean	SD	Range	Mean	SD	Range	
Avg. Crop Income in 2005 (ks/yr)	646828	569218	0 - 1815150	124491	214167	0 - 1297800	6.306***
Avg. Crop Income in 2011 (ks/yr)	1006507	829971	0 - 2577000	597638	725123	0 - 3135000	2.551**
Avg. Off-Farm & Non-Farm Income in 2005 (ks/yr)	543628	487012	0 - 1728000	340777	185332	0 - 866160	2.876***
Avg. Off-Farm & Non-Farm Income in 2011 (ks/yr)	1329855	1145084	0 - 4220000	901396	680317	0 - 4320000	2.300**

Note: <sup>1</sup> Independent Sample *t* test

### Appendix 4 Training attended status of sampled participant households

Microfinance Participation Status	H/Hs Category by Land Ownership	No. of Training Attendant in 2005	No. of Training Attendant in 2011
Participated in MFP	Landless (N=28)	Mean	2.46
		SD	3.20
		Range	(0-7)
	Small (N=27)	Mean	3.78
		SD	2.56
		Range	(-0-7)
	Medium (N=3)	Mean	1.33
		SD	2.31
		Range	(0-4)
	Total (N=58)	Mean	3.02
		SD	2.94
		Range	(0-7)

**Appendix 5 Training attended status of sampled non-participant households**

Microfinance Participation Status	H/Hs Category by Land Ownership		No. of Training Attendant in 2005	No. of Training Attendant in 2011
Non-Participated in MFPP	Landless (N=8)	Mean	.00	2.12
		SD	.00	2.36
		Range	(0-0)	(0-5)
	Small (N=14)	Mean	.43	3.93
		SD	.852	2.759
		Range	(0-2)	(0-7)
	Medium (N=15)	Mean	.00	2.53
		SD	.00	2.90
		Range	(0-0)	(0-7)
	Large (N=1)	Mean	.00	4.00
		SD	-	-
		Range	0	(4-4)
Total (N=38)	Mean	.16	3.00	
	SD	.55	2.74	
	Range	(0-2)	(0-7)	

**Appendix 6 Number of sampled households attended in different type of training**

Type of Training	NMFP (N=38)			PMFP (N=58)			
	2005	2011	Change	2005	2011	Change	
Training Attendance on	1. Prevention and Care of Locally Endemic Diseases	3	11	8 (21.05)	3	19	16 (27.59)
	2. Homestead Gardening for the Poor	0	8	8 (21.05)	7	33	26 (44.82)
	3. Compost Production	3	18	15 (39.47)	3	25	22 (37.93)
	4. Rain Water Harvesting Technique for Agriculture	0	32	32 (84.21)	0	34	34 (58.62)
Program Participation in	5. Rain Water Harvesting Cisterns	0	16	16 (42.11)	0	36	36 (62.07)
	6. Environmental Education Awareness Raising	0	13	13 (34.21)	0	21	21 (36.21)
	7. Soil Conservation	0	22	22 (57.89)	0	33	33 (56.90)

Appendix 7 Map of survey area in Pakokku Township

