

The Impacts of Disaster Micro Insurance on Poor  
People, and on Vulnerability of Countries to  
Natural Disasters

by

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## STATEMENT OF AUTHENTICITY

By virtue of submitting this thesis, I certify that except where due acknowledgement has been made, the work is of my own; and the research has not been submitted previously, in whole or in part, to qualify for any other academic award. Research work carried out by a third party is acknowledged; and ethics procedures and guidelines have been followed.

Maryam Joolaei Moghaddam

January 2012

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## Abstract

Based on the World Bank statistics(2005), 4 billion people are living with less than US \$ 4 per day, and 1.4 billion people in developing world (one in four) living with less than US\$1.25 a day. This vast population of the world are trapped into poverty cycle, and are very vulnerable to different risks including natural disasters. They work hard for many years to increase their income and assets, and to finally get out of the poverty cycle, but a disastrous natural disaster happens and demolishes all their efforts and gains.

Poor people don't have access to financial risk transfer services like insurance, so after a disaster they use some informal coping strategies to decrease the negative impacts of disasters, but these strategies are not adequate to cover the covariant risk of natural disasters.

One possible solution to the vulnerability of poor people can be disaster micro insurance product, but this product is quite new, and not many studies have been done on its impacts, so the potential impacts of this product I still unknown.

The main objectives of this research were to find out the micro and macro impacts of disaster micro insurance. The micro impacts were on the poor people, and the macro impact was on the vulnerability of the country. Five different products of disaster micro insurance were chosen and analyzed to find out their impacts on the sub components of social vulnerability. The study found several positive impacts of this product on poor people, and that disaster

micro insurance products can enhance the social framework condition of the society, and can increase the capacity of the people and the country to cope with disasters and prevent a natural hazard to become a natural disaster.

**Key Words:** Natural disasters, micro insurance, vulnerability, disaster risk

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# Notations

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|         |  |
|---------|--|
| HFA     | Hyogo Frame Work for Action  |
| UN      | United Nations   |
| UNU-EHS | United Nations University<br>Institute for Environment &<br>Human Security |
| WRI     | World Risk Index   |
| CGAP    | Consultative Group to Assist the<br>Poor                                   |
| NGO     | Non Governmental Organization  |
| ADB     | Asian Development Bank   |
| HARITA  | Horn of Africa Risk Transfer for<br>Adaption                               |
| IFW     | Insurance For Work   |
| MPI     | Multidimensional Poverty Index   |
| LIIP    | Livestock Insurance Indemnity<br>Pool                                      |
| IBLI    | Index- Based Livestock Insurance   |
| RFI     | Radio Frequency Identification   |
| GFDRR   | Global Facility for Disaster Risk<br>reduction and Recovery                |
| AIDMI   | All India Disaster Mitigation<br>Institute                                 |
| ISDR    | International Strategy for Disaster<br>Reduction                           |
| UNDP    | United Nations Development<br>Program                                      |

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# Chapter One

## Introduction

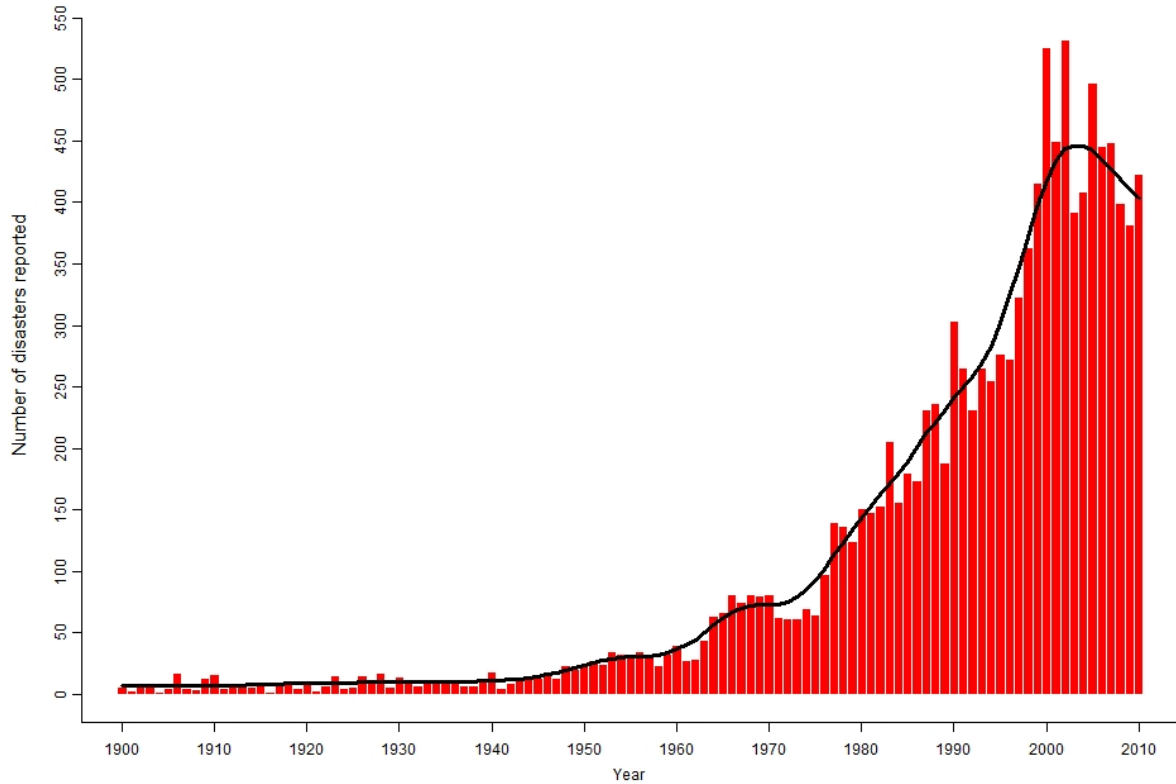
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### **1.1. Natural hazards versus natural disasters**

*The information in this chapter has a macro to micro layout. Starting from the natural disasters in the world level, then the vulnerability to natural disasters in country level, the vulnerability within a country, and the last two parts will provide information on natural disaster insurance and micro insurance. The purpose of this chapter is to provide background information necessary and related to the argument of the research.*

Natural hazards like earthquake, flood, tsunami, etc. are happening more frequently and with higher intensity these days (Bündnis Entwicklung Hilft, 2011). According to (Swiss Re, 2011) 297000 people died or were missing from natural disasters in 2010. The reason of the increase in frequency and intensity of natural hazards can be due to the “changing demographics, technological and socio-economic conditions, unplanned urbanization, and development within high-risk zones, under-development, environmental degradation, climate variability, climate change, geological hazards, and competition for scarce resources” (International Strategy for Disaster Reduction (ISDR), 2005). The increasing trend in number of natural disasters of the world between the years 1900-2010 can be observed in Figure 1.1.

**Figure 2.1 Number of Natural Disasters reported 1900-2010**



source:EM-DAT: The OFDA/CRED International Disaster Database

Natural hazards have the potential to ruin the physical and social environment that they happen in not only at the time they happen, but also in long run they can create indirect losses associated with them. Natural hazards are different from natural disasters; only Extreme natural hazards that cause significant losses in the society and infrastructure of a country become natural disasters (Ayala, 2002).

Not all the natural hazards can become a natural disaster; there are political, economical and social factors in a country that can transform a hazard into a devastating disaster. So a phenomenon like earthquake is not always a scary and disastrous event. According to Cannon (1994) hazards are natural but disasters are not natural they are not the anger of nature or the result of the hazard, but they are because of several factors within the countries. Cannon argues that there must be some conditions for a natural hazard to become a disaster. for example the living condition of the people in the country can transform a hazard to a disaster.

Natural disasters according to Brown & Churchill (1999) are Mass covariant risks, because they affect many people at the same time and they cause multiple losses like death, illness, loss of property, and livestock at the same time that's why they are disastrous. According to Brown & Churchill covariant risks have three characteristics:

1. It is very hard to predict them; the degree of uncertainty is very high about them.
2. They affect many people and make the risk transfer mechanism services like insurance unable to provide coverage.
3. They are very costly risks; the reason of being is that they cause multiple losses and force the households to deal with many losses at the same time, and also because they affect many people at the same time people will also be unable to use the informal way of raising fund like borrowing from family and friends because they are also affected by the risk.

The risk of natural disaster is a global concern these days due to the significant disastrous impacts that natural disasters can have on country and global level. The importance of the risk of the disasters and their potential negative impacts on the societies have been

recognized in recent international and national conferences and frameworks aimed at building more resilient nations to the risk of natural disasters. For example Hyogo Framework for Action (HFA) which was signed in 2005 by 168 members of the United Nations at world disaster reduction conference is the first plan that explains in detail the required efforts from different sectors to reduce the losses from disasters and create resilient nations to disasters.

## **1.2. Vulnerability of countries and its consequences**

In this research, vulnerability means social vulnerability and the definition used is the definition of vulnerability by World risk report and index of 2011, in this definition vulnerability is one of the components of disaster risk which can affect whether a natural hazard becomes a disaster or not. According to world risk index (WRI) social Vulnerability consists of three components of susceptibility, coping and adaptive strategies. It determines how people and societies are susceptible to the impacts of natural hazards, and how capable they are to cope with disasters and adapt to the risk of natural disasters. If social vulnerability is reduced by any means in a country, the probability that a natural hazard becomes a natural disaster will be decreased accordingly (world risk report, 2011).

Now the question is why some countries are more vulnerable to natural hazards? And why similar natural hazards can affect countries in a different way? An earthquake can create disastrous impacts and fatalities in one country while not in another country, for example the 8.8 MW earthquake in Chile which was among the fifth largest earthquakes in the world caused 562 fatalities, while a weaker earthquake of 7 MW in Haiti caused 220,000 fatalities (CRED EM-DAT, 2011).

Many scientists consider the socio-economic condition of a country as one of the main factors affecting the vulnerability of that country to natural disasters (Ayala, 2002). According to Cannon (1994) natural hazards can have different impacts on different countries depending on the level of preparedness of that country, strength of incomes, access to insurance, and government budget for post-disaster reconstruction.

Middle and low income countries are usually the victims of natural disasters, the negative impact of natural disasters are very severe on them (Ayala, 2002). The possible reasons of higher vulnerability of these countries to natural disasters can be attributed to lack of preparedness of these countries to cope with the disasters (lack of coping strategies according to WRI), weak tax bases, lack of strong fiscal budget, and lack of insurance coverage. Once a natural disaster happens in these countries the government is not strong and cannot raise enough money for quick post disaster relief and recovery so they might use an emergency budget diverted from the funds allocated to other development purposes or they might ask for loans and borrow domestically or internationally, all of which can exacerbate the economic condition of these countries, and can become an impediment on their social and economic growth. Another solution for middle-and low income countries is reliance on post disaster donor aids that are arbitrary and unreliable unless the disaster is really devastating and the news spread in medias attract donors attention (Bayer & Mechler, 2009; Bayer, Mechler, & Stigler, 2011).

The situation is different in developed countries because they have strong public revenue and fiscal budget and the country is well prepared to cope with a natural hazard and prevent it from becoming a disaster. as an example the devastating earthquake& tsunami that happened in Japan in March 2011 that was one of the biggest earthquake in the world according to

CRED EM-DAT disaster data base, the disaster was much more severe and stronger than estimated however the country's perfect coping strategies and post disaster support and relief was amazing if the same kind of natural hazard happens in any of the developing countries or even some of the developed countries the disastrous impacts may demolish the whole country lessons learned from Japan coping strategies can be very help full in the fields of disaster preparedness and management.

### **1.3. Vulnerability with in a country**

In previous part the most vulnerable countries in the world were discussed in this part the view will be narrower to the most vulnerable group within a country that are the target group of this research. Natural hazards not only have different impacts on different countries, but also they have different impacts on different people within a country. A natural hazard becomes a natural disaster when it hits vulnerable people of a country, who are the vulnerable people with in a country that this research will focus on? There are different groups of vulnerable people to natural disasters with in a country like old people, disabled people, babies, etc. but the target vulnerable group in this research are based on their income level and living condition. The people in a country that are economically disadvantaged and live in very low life condition are the most vulnerable to natural disasters, "All the poor people are vulnerable but not all the vulnerable people are poor" (Action Aid, 2005). Poverty and vulnerability are not the same concepts but they are closely related however Most of the development plans focus on poverty reduction not vulnerability reduction. According to Yamin, Rahman, & Huq (2005) the poverty of today is as a result of ignored and unsolved vulnerabilities of yesterday so the two concepts can reinforce each other trying to reduce



poverty without reducing vulnerability of poor people to natural hazards is because all the efforts to alleviate poverty will be demolished with a disastrous natural disaster. Natural disasters can significantly exacerbate poverty, poor people work hard for many years with the hope to increase their income and build more assets, and to finally get out of the poverty cycle which they are trapped in, a natural disaster happens and demolish all their efforts and gains in just an eye blink and again trap them into poverty cycle for some more years to come, this is a continuous story for poor people and needs serious consideration. Figure 1.2.shows the disaster poverty cycle.

**Figure1.2. Disaster poverty cycle**



Source: Sharma, Hochrainer, & Mechler

According to Sharma, Hochrainer, & Mechler (2011) poor people are more vulnerable because of several reasons like, their livelihood is unstable. They do not have enough income

even for their basic needs, they lack enough food, they are in poor health condition, they don't have enough saving, they are usually indebted, their housing condition is not good, and they are not aware of the ways to protect themselves. Below are other reasons of high vulnerability of poor people in addition to those mentioned by Sharma et al.

Poor people's source of income is from nature and is nature sensitive for example they are farmers or herders their job is their source of livelihood, and food security; a natural disaster affecting the crops of a farmer and the herds of a herder can have devastating impacts on their livelihood and food security. For example in Mongolia where the livelihood of almost half of the residents depends on domestic animals (Bayer & Mechler,2009), a harsh winter can endanger the livelihood of many people and even add more people into poverty cycle.

In a country, some people live in better conditions and are less vulnerable to natural disasters in the expense of other peoples, Poor people mostly live in areas that are hazard prone and at high risk of natural disasters while a rich family has a choice where to live and they usually live in safe areas. A poor family has less productive land, and their housing condition is usually weak and vulnerable to natural hazards, it will collapse easily with a wind blow. Poor people don't have insurance coverage for some reasons like expensive premiums, lack of awareness about available insurance products for poor people, and lack of trust to insurance payments; on the other hand rich people have mostly insurance and can recover from a hazard and get back to the normal track of life. Poor people do not have credit or money in banks or other financial capitals they can rely on after a disaster, and when a disaster happens they may lose everything they have in an eye blink (house, assets, small amounts of reserved cash, etc.). For example a poor family that is living in a very weak building susceptible to

any natural hazards and they have one cow as a source of their income and food, once a natural hazard happens they may lose both the house and the cow.

It is very difficult for poor people to recover and get back on their normal life after a disaster there must be proper support and disaster recovery programs to break the disaster poverty cycle.

Poor people everywhere in the world, in developing or developed countries are more vulnerable to natural disasters, but the degree of vulnerability is different according to the country that poor people reside. Poor people in developing countries are more vulnerable due to the vulnerability of country itself and lack of preparedness to cope with the natural disasters, According to Bayer & Mechler (2009) low and middle income countries, and especially the poor in these countries suffer the most from natural disasters.

#### **1.4. Natural disaster Insurance in the world**

*In previous parts it has been tried to clarify the concepts of natural disasters, and vulnerability of people and countries. This part will be about the current condition and penetration of natural disaster insurance in the world in order to pave the way for better understanding of the main topic of this research that is providing disaster micro insurance as a tool to decrease the vulnerability.*

There are international efforts and emphasis from international organizations like UN and World Bank to alleviate poverty and fight against it. UN principal goals and objectives are to eradicate extreme poverty and hunger and to halve the proportion of people who are living on less than \$ 1.25 per day between years 1990 and 2015. One of the serious threats to the poverty are natural disasters.

According to Hyogo Framework for Action (HFA), development, poverty alleviation, and

risk reduction objectives are mutually supportive, and the efforts to reduce disaster risks must be integrated into policies and programs for sustainable development and poverty alleviation. One possible way to manage the risk of natural disasters is through insurance (Bayer & Mechler, 2009; Bayer, Mechler, & Stigler, 2011).

The Hyogo Framework for Action (HFA) of the world conference on disaster reduction identifies “the need to promote the development of financial risk-sharing mechanisms, particularly insurance and reinsurance against disasters” as one of the priority actions to build the resilience of nations and communities to natural disasters. Although there is emphasis on developing insurance and reinsurance for decreasing the risk of natural disasters, but the culture and existence of insurance especially in developing countries is almost nil, but there is potential for the growth of insurance in these countries.

In developing countries, only 1% of losses are insured while in developed countries almost 30% of losses are insured (Bayer & Mechler, 2009). According to Munich Re, there are very few disaster insurance products in Asia, Africa, and Latin America. In United States, parts of Europe and Australia an average person pays US\$ 500 annually for non-life disaster coverage on the other hand in Africa and parts of Asia the average person pays US\$ 5 (Bayer & Mechler, 2009; Bayer, Mechler, & Stigler, 2011). This is controversial because most of the African countries according to the world risk report are highly exposed to disaster risks and are very vulnerable, so they are really in need of insurance coverage.

In low- and middle income countries natural disaster insurance markets are underdeveloped, it is estimated that less than 10% of the losses from natural disasters are insured in middle income countries, and less than 5% in low income countries however in developed countries

40% of the losses from natural disasters are insured (CUMMINS & MAHUL, 2009, P.5).

There are several reasons for the low penetration rate of disaster insurance in low and middle-income countries some possible reasons are:

1. Lower income level and high poverty rate, disaster insurance products are usually expensive due to the covariant nature of natural disaster risks and people especially in developing countries are not willing to pay for something that might happen in future.
2. Lack of awareness about the exposure to disaster risks in these countries
3. Lack of trust to insurance companies: usually there is not a positive perception about insurance in low-income countries and the culture of insurance is very low. There is lack of trust that insurance pays out the claims after a disaster.
4. High reliance on post disaster public and donor helps.
5. Lack of data about the loss and frequency that is necessary in estimating the right amount of premiums against covariant losses.
6. Lack of technical and actuarial expertise, and undercapitalized insurance companies
7. Regulatory obstacles for providing disaster insurance
8. The unwillingness of insurance companies to provide disaster products: because Providing Natural disaster insurance is a challenging job for insurers, natural disasters are covariant risks (explained in 1.1.) and they are events with low probability of occurrence but high consequence once they happen.

According to Born & Viscusi(2006) although natural disasters have tremendous impacts on individual homeowners, but they also influence insurance companies. According to them natural disasters have the potential to make insurance companies insolvent and push them out of the market and bankrupt, so the risk of insolvency is high for insurance companies who

provide disaster coverage. In order to prevent insolvency they have to transfer the risks to reinsurers or to international financial markets, which will make the natural disaster products more expensive than other products.

According to Swiss Re (2011) in first half of 2011 , catastrophe events have cost the insurance industry USD 70 billion, which ranks this year already as the second costliest year for insured catastrophic losses after year 2005 being the costliest year. However in some of the middle income countries well developed insurance market exists and the financial literacy of people is higher in compare to low income countries.

## **1.5. Micro insurance**

Micro insurance is the Insurance for poor people and is defined as: “the protection of low-income people against specific perils in exchange for regular premium payments proportionate to the likelihood and cost of the risk involved”(Churchill, 2006). The term “micro” reflects its small size of transactions, premiums, coverage, products, distribution, and target groups all these micro features differentiate micro insurance from regular commercial insurance, but is the impact of micro insurance also micro? The answer to this question will be clarified in the end of this research. Micro insurance is not a charity to provide coverage free but it is a win-win business that both the providers and the poor people must benefit, insurance companies must find the innovative ways to access the low-income people, provide them coverage, and persuade them to pay for the coverage they receive.

Although the principles of insurance like premium, claim settlement, moral hazard, etc might be the same for regular insurance and micro insurance, but there are some differences

between them. Table 1.1. compares regular insurance with micro insurance from different aspects which can be very helpful in clarifying the concept and operation of micro insurance.

| <b>Table 1.1. the difference between regular insurance and micro insurance</b> |   |   |
|--|---|---|
|  | <b>Traditional insurance</b>  | <b>Micro insurance</b>  |
| <b>clients</b>   | <ul style="list-style-type: none"> <li>• Low risk environment</li> <li>• Established insurance culture</li> </ul>   | <ul style="list-style-type: none"> <li>• Higher risk exposure/ high vulnerability</li> <li>• Weak insurance market</li> </ul>   |
| <b>Distribution models</b>   | <ul style="list-style-type: none"> <li>• Sold by licensed intermediaries or by insurance companies directly to wealthy clients or companies that understand insurance</li> </ul>    | <ul style="list-style-type: none"> <li>• Sold by non-traditional intermediaries to clients with little experience of insurance</li> </ul>   |
| <b>Policies</b>  | <ul style="list-style-type: none"> <li>• Complex policy documents with many exclusions</li> </ul>   | <ul style="list-style-type: none"> <li>• Simple language</li> <li>• Few, if any, exclusions</li> <li>• Group policies</li> </ul>  |
| <b>Premium calculation</b>   | <ul style="list-style-type: none"> <li>• Good statistical data</li> <li>• Pricing based on individual risk (age and other characteristics)</li> </ul>                               | <ul style="list-style-type: none"> <li>• Little historical data</li> <li>• Group pricing</li> <li>• Often higher premium to cover ratios</li> <li>• Very price sensitive market</li> </ul>  |
| <b>Premium collection</b>  | <ul style="list-style-type: none"> <li>• Monthly to yearly payments, often-paid by mail-based on an invoice, or by debit orders</li> </ul>  | <ul style="list-style-type: none"> <li>• Frequent and irregular payments adapted to volatile cash flows of clients</li> <li>• Often linked with other transactions (eg loan repayment)</li> </ul>   |
| <b>Control of insurance risk (adverse selection, moral hazard, fraud)</b>      | <ul style="list-style-type: none"> <li>• Limited eligibility</li> <li>• Significant documentation required</li> <li>• Screenings, such as medical tests, may be required</li> </ul> | <ul style="list-style-type: none"> <li>• Broad eligibility</li> <li>• Limited but effective controls (reduces costs)</li> <li>• Insurance risk included in premiums rather than controlled by exclusions</li> <li>• Link to other services (eg credit)</li> </ul> |
| <b>Claims handling</b>   | <ul style="list-style-type: none"> <li>• Complicated processes</li> <li>• Extensive verification documentation</li> </ul>   | <ul style="list-style-type: none"> <li>• Simple and fast procedures for small sums</li> <li>• Efficient fraud control</li> </ul>  |

Source: LLOYD'S

The main suppliers of micro insurance products are commercial insurers, and the partners and promoters of the program are international organizations, NGOs, governments, and donors. Micro insurance is a young financial service with high demand which indicates a potential market (Cohen & McCord, 2003). It is an untapped growth market for insurance companies with potential benefits. The insurers who are active in the micro insurance sector and are the first movers are not only helping to serve the unmet needs of the poor people, but they are also creating a strong reputation and client base for their future, because today's poor clients will be tomorrow's middle income clients who have the ability to purchase commercial insurance and if they are satisfied with the insurance company services they will stay with the company and even can add more clients for the company through the effects of word of mouth (Swiss Re, 2010a; LLOYD'S). Micro insurance already covers around 135 million people (LLOYD'S) and it is experiencing huge growth (Radermacher, Ashok, Zabel, & Dror, 2009).

Micro insurance has different products of life, health, property and the last but not the least natural disaster. Among micro insurance products, life is the most commonly used because estimating the losses is easy, and the probability of moral hazard and fraud is low for this product. The most popular form of life product is credit life due to its simplicity and the demand of microfinance institutions to protect against the risk of default arising from the death of the loan taker, other products of micro insurance are health and property which are a bit more complex than life products, and the most complicated micro insurance products are those covering disaster risks (Swiss Re 2011a). The reason of complexity of this type of product is because natural disasters are covariant risks and as explained in previous parts insuring covariant disaster risks is a challenging job.



Although some products of micro insurance like health and life are well established but micro insurance for natural disaster is just starting and is in beginning stages (Mechler, Bayer, & Peppiatt, 2006 a). the main difference between disaster products and other products of micro insurance lies on the nature of the disaster risks that are covariant risks as explained in part 1.1 they affect many people, many regions, and create many losses at the same. This characteristic of the covariant disaster risks make them unpopular and complex to be covered. Providing disaster insurance requires high amount of capital in order to protect the insurer from the risk of insolvency and default high capital requirements makes it difficult for small insurers to enter the disaster micro insurance sector, and the remaining insurers need to charge higher premiums which contradicts the definition and objective of micro insurance. A micro insurance scheme must be affordable for poor people, that is why finding a balance between affordability and viability of the disaster micro insurance products is very important and as many suggest disaster micro insurance products must be in forms of public-private partnerships, and must receive outside financial supports and subsidies from donors and development organizations in order to be viable and sustainable (Bayer, Mechler, & Stigler, 2011).

Low and middle income countries need an insurance coverage for the natural disasters due to the lack of coping strategies in these countries, and that they are highly reliant on arbitrary donor and government post disaster supports. However providing regular commercial natural disaster products in these countries is not viable because according to Roth, McCord, & Liber (2007) In developing countries a large proportion of the society are poor who cannot afford paying the expensive premiums of natural disaster insurance. but the reality is that poor people are the one really in need of insurance but are deprived from having it (Churchill,

2006; Roth et al. , 2007). So if governments and international development organizations are trying in different ways to alleviate poverty and reduce the risk of natural disasters, disaster micro insurance must be the corner stone of any other development and poverty alleviation programs because once a natural disaster happens all the efforts made by these programs will be stopped and people will lose their assets, income, houses, and again get trapped into poverty cycle. the programs have to restart from zero point or even below zero point; poor people work for many years with the hope that they can increase their income, assets and get out of poverty but a sudden natural disaster can demolish all their efforts in just an eye blink and leave them with nothing and even poorer than before the disaster, this is a continuous story for poor people.

## **1.6. Purpose and significance of the study**

Poor people usually don't have access to formal risk transfer mechanisms like insurance after a disaster and they usually rely on arbitrary donor helps that most of the times are not quick and efficient and the poor people will be even poorer than before the disaster. There is a need to promote development of financial risk transfer mechanisms like insurance and reinsurance against disasters; this is one of the priority actions identified in Hyogo Frame Work for Action (2005-2015).

This research is generally on the topic of disaster micro insurance and its possible impacts on people and countries. Disaster micro insurance is a new product and very limited studies have been done on the impacts of this product. and if the impacts and benefits of this product are not identified it will not be developed because the parties involved in promoting and

developing this product are not encouraged to develop something that its benefits are not clear yet. The result will be 4 billion poor people of the world with less US \$ 4 per day being left alone to deal with the covariant risk of the natural disasters and get poorer and poorer by every natural disaster.

The main objectives of this research are:

1. To find out the possible impacts of disaster micro insurance products on low income people considering several indicators (Micro impact)
2. To find out the impact of disaster micro insurance products on vulnerability of a country to natural disasters and correspondingly the disaster risk of the country (macro impact)

In order to reach the objectives of this research, several disaster micro insurance products will be scrutinized to find their impacts on the sub components of vulnerability defined by world risk index, the world risk index is the corner stone of the analyses of this research. The research will be analyzing the effects of disaster micro insurance in both micro and macro level with the aim to:

1. Show and introduce new potential impacts of disaster micro insurance, the general impression about micro insurance products is that they are not viable and beneficial. they might only have micro impacts on the poor sector of the society,
2. to foster and encourage the provision of disaster micro insurance products
3. to show how a micro product can have macro impacts on the whole country

This research for sure is not a cure-all research but it can be a starting point for more studies and innovative ideas in this comprehensive potential area.

# Chapter Two

## Literature Review

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### 2.1. Vulnerability

*A number of studies have been focused on the topic of vulnerability to natural disasters, and have given different definition from different approaches to vulnerability. The concept of vulnerability is not just a simple homogenous term hat can be applied to everyone equally it consists of different components and these components build the vulnerability of an individual or a community that's why different individuals and communities have different vulnerability level and the same hazard can affect them differently. so vulnerability must be considered and analyzed by its components and indicators.*

Cannon (1993) discusses that different factors affect the individual or group vulnerability; according to him vulnerability is “a characteristic of individuals and groups of people who inhabit a given natural, social and economic space, within which they are differentiated according to their varying position in society into more or less vulnerable individuals and groups. It is a complex characteristics produced by a combination of factors derived especially (but not entirely) from class, gender, or ethnicity” (Cannon, 1993). Canon divides vulnerability to three components of livelihood, self protection, and social protection. Table 2.1 shows the components and determinants of vulnerability.

**Table2.1. Components of vulnerability**

| Types of Vulnerability          | Components  | Determinants  |
|---------------------------------|---|---|
| <b>Livelihood vulnerability</b> | -Income opportunities<br>-Livelihood type<br>-Entry qualifications<br>-Assets and savings<br>-Health status | -Class position<br>-Gender<br>-Ethnicity<br>-Age<br>-Action of state  |
| <b>Self-protection</b>          | -Building quality<br>-Hazard protection<br>-Location of home/work   | -All the livelihood determinants mentioned above<br>-Technical ability<br>-Hazard-specific(return period, intensity, magnitude)   |
| <b>Social protection</b>        | -All the self-protection components<br>-Building regulations<br>-Technical interventions                    | - All the determinants mentioned above<br>- Level of scientific knowledge<br>-Level and characteristics of technical practice<br>-Type of science and engineering used by state and dominant groups |

**Source: (Vatsa & Krimgold, 2000)**

Aysan (1993) has identified different types of vulnerability as:

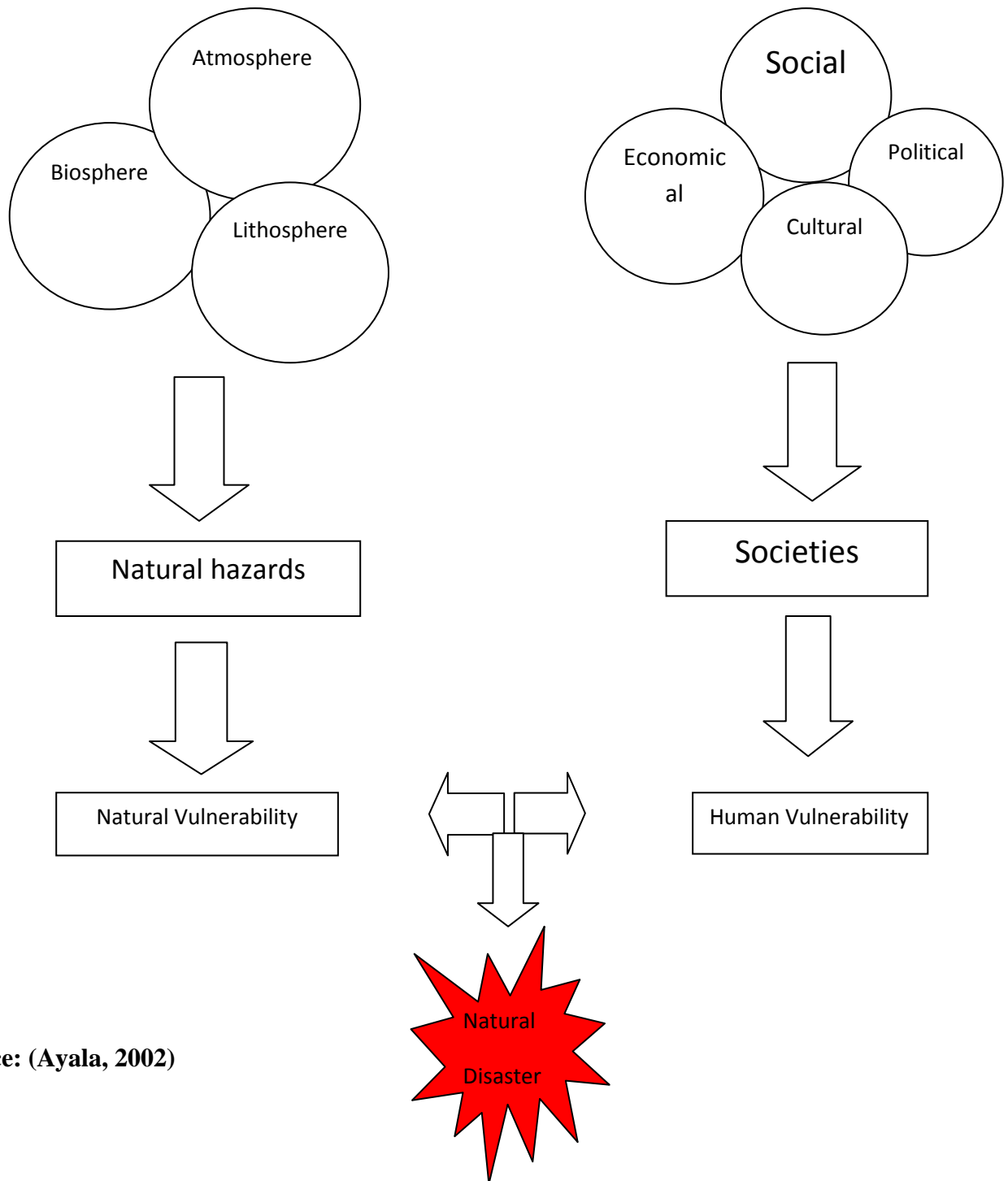
1. Lack of access to resources (materials/economic vulnerability)
2. Disintegration of social patterns (social vulnerability)
3. Lack of strong national and local institutional structures (organizational vulnerability)
4. Lack of access to information and knowledge (educational vulnerability)
5. Lack of public awareness (attitudinal and motivational vulnerability)
6. Limited access to political power and representation (political vulnerability)
7. Certain beliefs and customs (cultural vulnerability)

## 8. Weak buildings of weak individuals (physical vulnerability)

Ayala (2002) divides vulnerability into natural and human vulnerability. Natural vulnerability is based on natural hazards like flood, earthquakes, etc. and human vulnerability is based on different social, political, economical, and cultural systems. Vulnerability in this categorization is defined as “propensity of an endangered element due to any kind of natural hazard to suffer different degrees of loss or amount of damage depending on its particular social, economic, cultural, and political weaknesses. Total vulnerability is a function of the individual types of vulnerability present in a given area. Such vulnerability determines the magnitude of the disaster, the level of resilience and the recovery process” (Ayala, 2002).

Figure 2.1. describes the definition according to Ayala also it shows clearly that not all the natural hazards become a natural disaster and it depends on the vulnerability.

**Figure 2.1. Components of vulnerability**



**Source: (Ayala, 2002)**



Yamin, Rahman, & Huq (2005) define vulnerability from different approaches. For example the definition of vulnerability in natural hazard and disaster approach, is focused and emphasized mostly on factors such as: frequency, intensity and nature of natural hazards and the exposure of communities to natural hazards. In another approach, the social vulnerability approach, the definition emphasizes on people's coping strategy and the socio-economic structures. And the new definition of vulnerability which is an integrative approach of the previous two approaches mentioned was introduced in the Hyogo framework for action (HFA) and adopted by the UN in 2005. In this approach vulnerability is defined as "the conditions determined by physical, social, Economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards" (Yamin, Rahman, & Huq, 2005).

Cohen & Sebstad (2005) did a field study in three countries of Tanzania, Uganda, and Kenya to explore the demand of micro insurance. In this paper vulnerability is defined as "ability of households and individuals to deal with risk" (Cohen & Sebstad, 2005). Poor people are more vulnerable than others because they lack enough reserves to rely on; vulnerability is as a daily reality in the life of the low income people. According to Cohen & Sebstad micro insurance can reduce individual vulnerability and poverty.

Another definition of vulnerability is "inability to deal with the losses or costs resulting from a risky event" (Brown & Churchill, 1999). They discuss that insurance can decrease vulnerability of households because they replace the uncertain risk of a natural disaster with certain premium payments Through the risk pooling mechanism of insurance. without insurance Low income households don't engage in high risk and high return activities, don't take new investment opportunities to grow their income, and remain in poverty so it can be

concluded from the discussions of this paper that insurance is a risk transfer tool that provides certainty to low income people and encourages them to engage in higher risk higher profit activities which will increase their wealth level and reduce their poverty

Cohen & Sebstad (2005) and Sharma, Hochrainer, & Mechler ( 2011) have mentioned about the relation between vulnerability and gender. In both papers, it is mentioned that women are more vulnerable to natural disasters due to some reasons like they don't receive warnings and hazard information quickly because of social and cultural constraints that limit them only to stay in their houses and take care of children, women pregnancy or having small children can be another reason of higher vulnerability, and usually women have less assets and less control over them to rely on after a natural disaster, in compare to men.

In this research, vulnerability means social vulnerability and the definition used is the definition of vulnerability by World risk report and index of 2011. this definition is the most complete and comprehensive definition of vulnerability in the context of natural disaster which contains all the other researchers definitions and categorizations of vulnerability with in it, and another strong point of the social vulnerability by world risk index is that, it is both qualitative and quantitative. They have provided indicators for measuring the amount of vulnerability, so the vulnerability of countries, regions, and communities can be calculated and expressed in numbers which is very helpful in for the evaluation of different programs aimed at reducing the vulnerability.

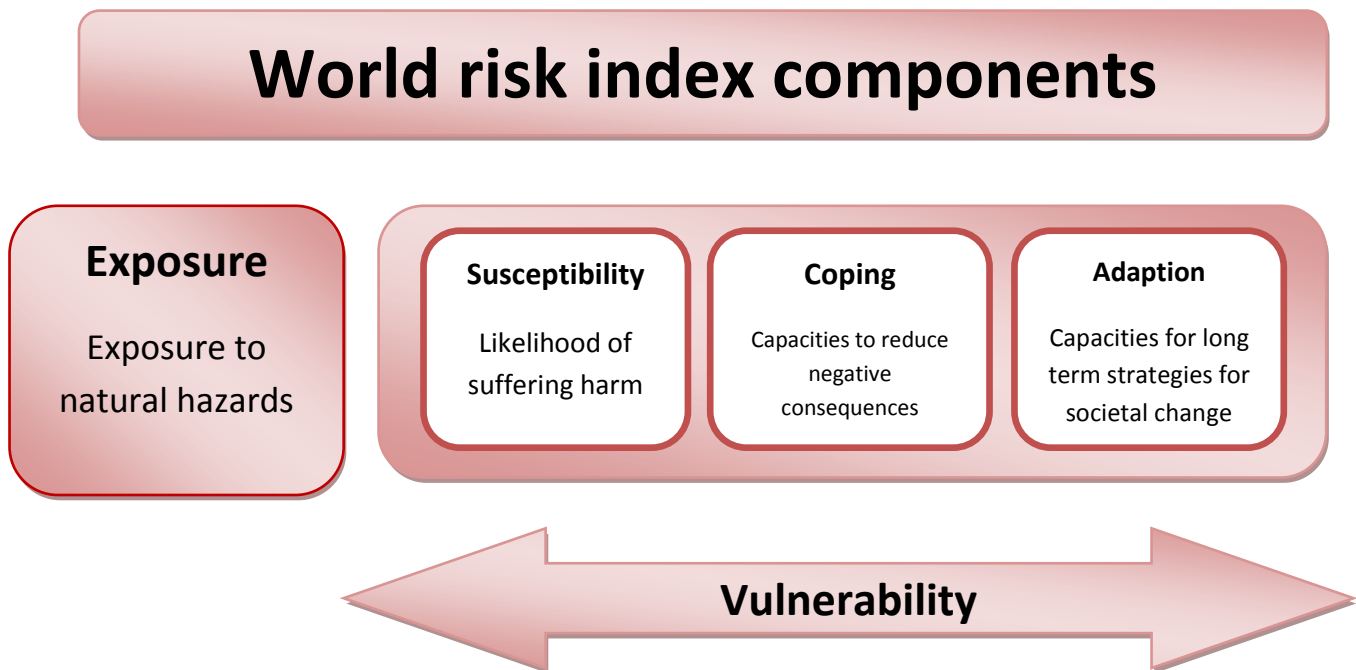
World risk report is published by The Bündnis Entwicklung Hilft (Alliance Development Works) and the risk index is calculated by the United Nations University Institute for Environment and Human Security (UNU-EHS) in Bonn, Germany; they calculated the risk score for 173 countries throughout the world on behalf of Bündnis Entwicklung Hilft.

According to them disaster risk consists of two components of Exposure to natural hazards, and social vulnerability. Vulnerability in this definition is the societal component of disaster risk that can make a natural hazard into a disaster. According to world risk index Vulnerability is consist of three components of susceptibility, coping, and adaptive strategies. It determines how people and societies are susceptible to the impacts of natural hazards, and how capable they are to cope with and adapt to the adverse impacts of natural hazards. Figure 2.2 shows the scheme of the components of world risk index. the index demonstrates that The countries that are highly exposed to natural hazards are not necessarily high at risk of a disaster. Three countries of Japan, Netherlands, and Chile are among the 15 countries with the highest exposure to natural hazards, but they are not among the 15 countries with the highest risk of disaster. In these countries although many natural hazards happen, but the risk that these natural hazards become a disaster is not high. The reason is that, they have very good coping and adaptive strategies that show their preparedness in facing a natural hazard and preventing it to become a disaster. On the other hand a country like Afghanistan which is less exposed to natural hazards and the probability that a natural hazard happens is very low in compare to highly exposed countries like Japan, Netherland and Chile; but it is among the 15 countries with the highest disaster risk. The reason of the high disaster risk in Afghanistan is attributed to its high vulnerability level. Afghanistan is not highly exposed to Natural hazards, but it is the worst country in social vulnerability. Meaning that it is not prepared to face a natural hazard, and is not able to cope with the negative impacts of a natural hazard as a result any simple hazard can become a disaster in this country and affect many people especially those who are economically disadvantaged that's why world risk index identifies Afghanistan among the 15 highest countries at risk of natural disasters (Bündnis Entwicklung

Hilft, et al., 2011). These examples show the important effect of social vulnerability of a country on the risk of a disaster in that country. Countries may be unable to reduce their exposure to the natural hazards for example due to their location that is in hazard prone areas, but they can reduce the social vulnerability by improving the components of vulnerability that are susceptibility, coping and adaptive strategies. If social vulnerability is reduced by any means in a country the probability that a natural hazard become a natural disaster will be decreased accordingly, disaster risk is very important issue especially in low income countries that natural disasters are significant hindrance on the development and growth of country and can severely exacerbate poverty.

Governments, international organizations, NGOs, civil society, etc. can benefit from this index by using it for the evaluation of different projects. They can calculate the effect of the project on reducing the vulnerability and risk of a disaster in a country, they can also know exactly which component of vulnerability the program is mostly affecting by comparing the measurements.

Figure 2.2. scheme of the concept of world risk index



Source: World Risk Report 2011

## 2.2. Post disaster coping strategies by low income people

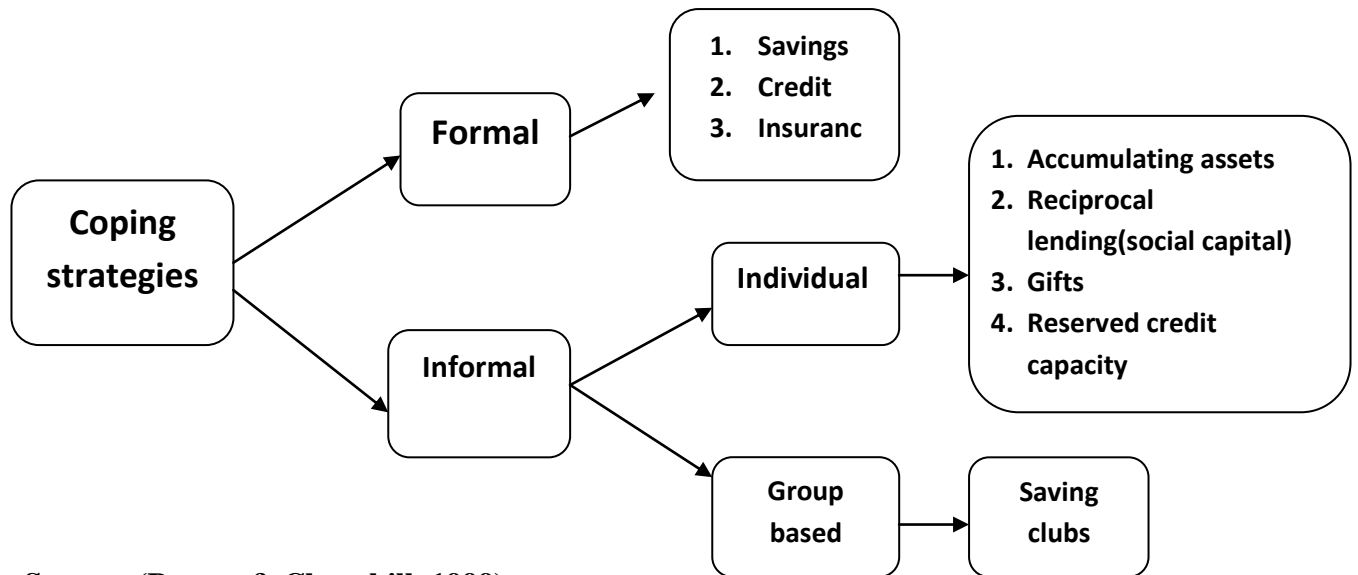
*Low income people for many years have been using informal strategies to cope with catastrophe events that are threats to their livelihood, life, livestock, and food security, they needed to find innovative ways to protect their livelihood, livestock, food, and family from the disasters and engaged in different activities to mitigate the negative impacts of disasters and to raise needed money after a disasters.*

The informal coping strategies by low income people are either ex-ante (before the disaster happens) or ex-post. Ex-ante activities can be savings, but usually the amount of savings by low income people is not sufficient to cover the significant losses of natural disasters (Swiss Re, 2010). according to Dercon & Kirchberger (2008) ex-ante strategies arise from the fact that people are aware of the existence of risk and their vulnerability, so they pick conservative strategies to reduce the negative impacts of future risks. They limit their

activities and investments to low risk and low return activities; they try to accumulate less modern and efficient assets and properties. all of the conservative ex-ante coping strategies trap the low income people in the same income level and prevent them from getting involved into higher risk but higher return activities. Ex-ante coping strategies are very costly for poor people. It is costly because they are losing the profitable investment opportunities that can help them get out of poverty. The ex-post strategies of poor people to cope with the disasters and their effectiveness in reducing the vulnerability of poor people have been analyzed and discussed in several papers some of them that have been used in this research are as follow.

According to Brown & Churchill (1999), after a disaster households engage in activities to reduce the impacts of losses, these activities and strategies by households are called coping strategies. They divide coping strategies into formal and informal, the informal strategies are also divided into individual and group based strategies (Figure 2.3.).

**Figure2.3. Coping strategies categorization according to Brown and Churchill**



Source: (Brown & Churchill, 1999)

In the above figure one of the individual strategies is reserved credit, reserved credits are capacities available for those who have credit from their suppliers, money lenders, etc. although the individual strategies are popular among the low income people but the level of protection is very small and the poorest households receive no protection at all. The degree of protection is higher in group based strategies to cope with the disasters, and The formal coping strategies like insurance, savings, and credits provide the highest protection for the low income people in compare to the informal strategies however poor people usually don't have access to formal coping strategies and they use the informal ways that are not really helpful.

According to Sharma, Hochrainer, & Mechler (2011) the informal coping strategies of people in south Aisa region are, borrowing from money lenders with higher intrest rates than normal times, selling their assets, reducing their farming input, diversifying their activities, and sending the working members of family to work in some where else.

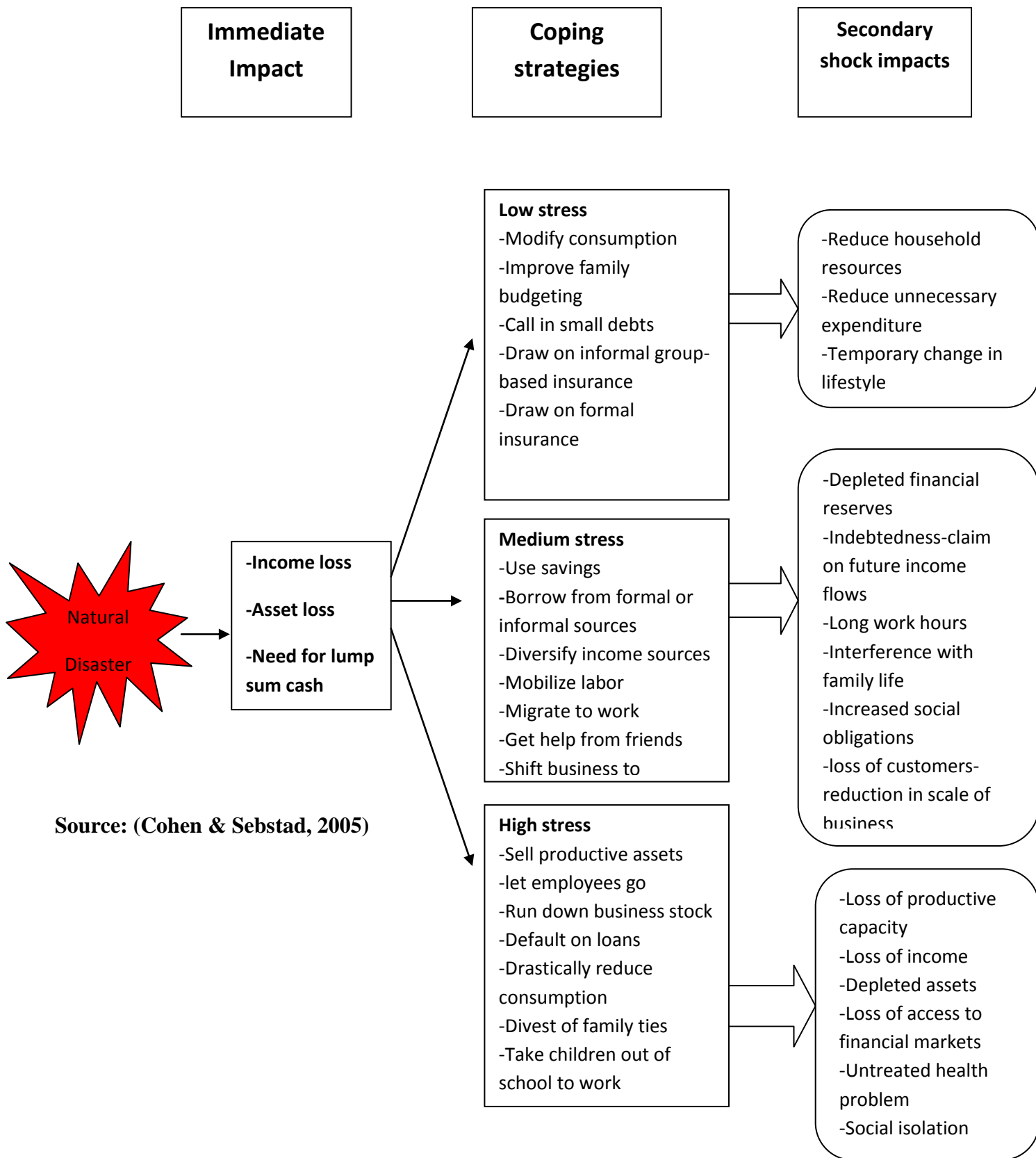
The results of their research in south Asia showed that these informal strategies are not suitable and adequate in coping with the covariant risk of natural disasters and will even increase the vulnerablity of low incomce people in long run.

Cohen & Sebstad (2005) argue that a shocking event like a natural disaster has an immediate impact on people, which forces people to react and pick some strategies to reduce the immediate losses of the disaster. The strategies that people choose to cope with a disaster have also some impacts on people; the impacts resulted from the coping strategies chosen by people are called secondary impacts. Figure2.4. shows the immediate impacts of disasters on poor people, the coping strategies that might be chosen by different households depending on

their resources and the strategies they have access to, and secondary impacts of a disaster resulting from the chosen coping strategies by people.



**Figure 2.4. Shocks and their impacts**



Source: (Cohen & Sebstad, 2005)

Morsink, Geurts, & van Dijk also categorize coping strategies to three groups of low, medium, and high stressful activities based on the degree of irreversibility and their influence on future economic growth of the households. The strategies and reactions of people to shocks in this paper and the paper of Cohen&Sebstad are generally the same but there are some differences. Some of the differences between the strategies in these two papers arise from the fact that location affects the degree of stressfulness of strategies. for example Morsink et al. research was on the people of Philippine, and Cohen&Sebstad did research on three African countries. In Philippine, out migration might be considered very stressful but in Africa it might not be considered very stressful. Both papers have been useful in this research because they provided almost all the possible informal strategies that might be used by poor people.

**Table2.2. Coping strategies based on their stressfulness**

| <b>Stressfulness of coping strategies</b> | <b>Specific coping strategy</b>  |
|---|--|
| Low-stress coping strategies              | Reducing food intake<br>Reducing consumption<br>Earning extra income through additional jobs or casual labor<br>Using savings  |
| Medium-stress Coping strategies           | Asking for donations or loans from family, friends or neighbors<br>Taking a loan from a money-lender<br>Postpone debt repayment<br>Pawn assets such as land or jewellery<br>Selling consumption assets such as jewellery or TV<br>Calling on specific traditional institutions |
| High-stress Coping strategies             | Selling key production assets, such as livestock and land<br>Outmigration<br>Taking children out of school   |

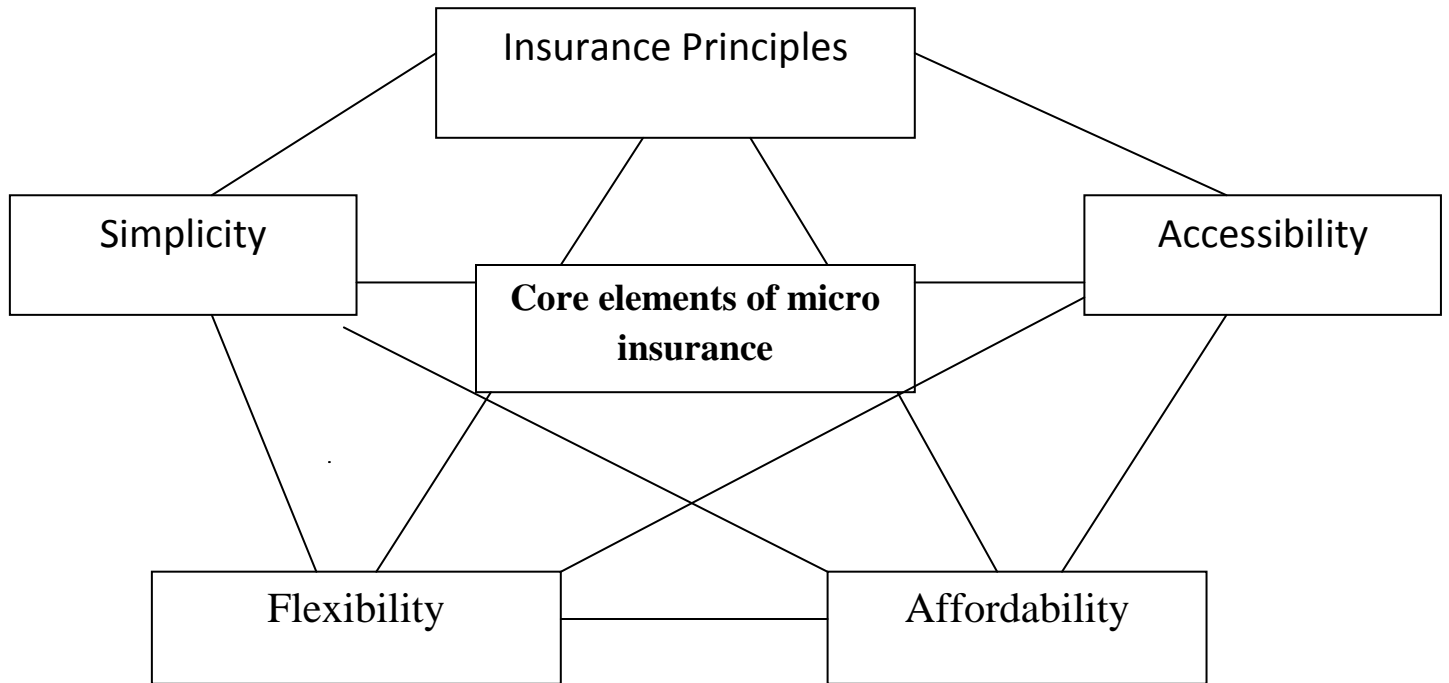
Source: (Morsink, Geurts, & van Dijk)

Several papers have demonstrated that, although these sophisticated coping strategies have been used by poor people since many years ago, but they are very costly and even increase the cost of the loss, they are not adequate and cannot provide a complete protection against the covariant risk of natural disasters that at the same time affect the whole communities and create many losses on many people; they all assert that there is a need to other tools and mechanism like insurance to fill the insufficiency of the informal coping strategies (Dercon, Bold, & Calvo, 2007; Dercon & Kirchberger, 2008; COHEN & SEBSTAD, 2005; Brown & Churchill 1999 ). Dercon & Kirchberger (2008) & Brown & Churchill (1999) state that Insurance is one of the financial instruments that can reduce the impacts of disaster risks on low income people. It helps poor people to cope with the disasters without the need to get involved in all the mentioned ex-ante and ex-post costly coping strategies that most of them even make the poor people poorer. Insurance also help them to decrease the conservatism, and encourages them to engage in higher risk higher profit activities that increase their income level and reduce their poverty.

### **2.3. Micro insurance**

Micro insurance can be defined as “the protection of low-income people against specific perils in exchange for regular premium payments proportionate to the likelihood and cost of the risk involved” (Churchill, 2006), but there is no common acceptance on the definition of micro insurance. Swiss Re in their Sigma Report No. 6 has described and defined micro insurance very precisely by defining it through five core elements as shown in Figure 2.3.

**Figure 2.5. Core elements of micro insurance**



**Source: (Swiss Re, 2010)**

### **Insurance principles**

Micro insurance is based on the principles of insurance that the policy holder pays premiums in exchange for receiving indemnification from insurance company in the event of any loss. The difference is that the premiums might be paid by governments, developmental agencies, and donors on behalf of clients who cannot afford to pay.

## **Accessibility**

The target clients of micro insurance are those with low income level, unstable income, and unable to buy regular insurance. micro insurance is extending the coverage of insurance to the inaccessible sector of the society to make sure that risk protection is available to more sectors of the society.

## **Affordability**

Premiums must be kept in low level to make sure that the product is affordable by the target group, subsidies by government and development organizations help to keep the products affordable.

## **Flexibility**

Because the low income sector is not homogenous micro insurance products must be flexible to meet the needs of the community and be customized to the requirement of communities.

## **Simplicity**

Micro insurance products, policy, claim settlement, etc. must be simple and easy to understand.

### **2.3.1. Types of micro insurance**

There are two types of micro insurance the conventional type that is indemnity insurance and the new type that is called index-based insurance. in indemnity based insurance the amounts of claims payments depend on the actual amount of loss on every policyholder, this type of

insurance requires claims adjusters at the time of loss to assess individual amount of loss case by case which is very time consuming with high administrative and transaction costs, and higher premiums accordingly. Indemnity insurance type has had many fail records especially in low-and middle income countries (Mechler, Bayer, & Peppiatt, 2006 a; Bayer, Mechler, & Stigler, 2011). The index-based insurance has been used in most of the recent innovative disaster micro insurance programs because it complies with the core elements of micro insurance affordability, accessibility, flexibility, and simplicity. in the new type the claim payment is based on an event that triggers the loss, not the amount of actual loss. the payment will be triggered by a predefined index and the policy holders get paid if the index falls below or reaches a certain amount and triggers payment no matter how much the actual loss of individual policy holder (Sharma, Hochrainer, & Mechler, 2011; Bayer & Mechler, 2009 ). the benefits attributed to this type of insurance are, lower transaction costs because there is no need for individual claim assessment, less time required for claim assessment, more affordable premium rates, significant decrease in the problem of moral hazard and adverse selection (Skees, 2007).

Index-based products can reduce moral hazard and risky behavior of clients because the claim payments are not dependant on individual amount of loss, so every policy holder tries to reduce their individual losses.

There is one main disadvantage attributed to this type of insurance that is the problem of basis risk. when the amount of claim payment is not proportionate to the actual amount of loss for example a farmer actual amount of loss has been US \$ 1000 but the amount of triggered payment in the region based on the data stations is only US\$500 so the farmer has to bear the difference himself the effect of this problem is more significant on low income

people because they purchase the insurance to pay them but basis risk will create the sense of distrust to insurance and clients might not want to extend their contracts (Bayer & Mechler, 2009; Mechler, Bayer, & Peppiatt, 2006 a).

Although micro insurance mostly offers life and health products but the demand for agriculture products has increased. agriculture Index-based insurance offers new opportunities in low- and middle income countries but it still needs to show scalability and sustainability .

agriculture Index-based insurance is a solution for facing catastrophe risks like droughts, floods, etc in the agriculture sector (CUMMINS & MAHUL, 2009; LLOYD'S). Micro insurance programs and index-based weather insurance have proven more efficient in developing countries due to their fast pay out time and low administrative times (Reichenmiller, Spiegel, Bresch, & Schnarwiler, 2010).

According to Swiss Re (2010) index-based insurance products are innovative products that help to solve the challenges of traditional agriculture insurance .agricultural insurance includes crop, livestock insurance. a number of index-based agricultural insurance have been started in many countries like Ethiopia, Tanzania, Kenya, Rwanda. the payment in agriculture insurance is dependent on an index that is correlated with the risky event, the index can be amount of rainfall that can cause flood or drought and a loss to the farmer's crops. In index-based type access to historical data and efficient weather stations is important. Index insurance is appropriate for risks like floods, typhoons, drought, and earthquakes in agricultural sector.

Index-based programs have shown their effect on increasing the creditworthiness of the farmers (Mechler, Bayer, & Peppiatt, 2006 b). Insurers and investors prefer index-based insurance because it reduces the risk of moral hazard and adverse selection. But policy holders prefer the old model of insurance indemnity-based which they will be paid based on the amount of loss not the event triggering the loss (World Bank, 2011).

### **2.3.2. Micro insurance institutional models**

According to Cohen & McCord (2003), there are four institutional models for providing micro insurance:

1. **Community-based model:** local communities manage the risk pool, take the risks, design and distribute the products themselves without the help of commercial insurers.
2. **Full service model:** insurance sector will provide full insurance services.
3. **Provider model:** bank or other credit providers can offer insurance for example credit life insurance which is provided mostly to protect micro finance institutions against the risk of default of the borrower.
4. **Social protection model:** national government provides coverage through social insurance programs
5. **Partner-agent model:** collaboration between commercial insurers, microfinance institutions and NGOs, the insurers will take the risk while the MFI and NGOs distribute the products through their already established networks this system will decrease the cost of distribution and makes the micro insurance more affordable



for poor people. this model allows the partner institutions involved to focus on their area of expertise and do what they are good at as a result in this model time for product development and scale up is reduced. And because it is in form of partnership the initial investment is also reduced, however the limitation of this model is lack of potential partners. According to Brown & Churchill (2000); Cohen & McCord (2003); Dercon, Bold, & Calvo, (2007) partner agent model is the preferred model that can provide effective and beneficial access to huge low income sectors and Mechler, Bayer, & Peppiatt (2006) in their paper “Disaster Insurance for the Poor? A review of microinsurance for natural disaster risks in developing countries” argue that micro insurance schemes cannot be possible without appropriate public-private partnerships, especially the government of developing countries cannot absorb the risk of natural disasters and there must be effective partnerships for a sustainable micro insurance program.

### **2.3.3. Natural disaster insurance for low income people**

*There are different views about providing disaster insurance to low income people, in this part several studies and their arguments are demonstrated*

Mechler, Bayer, & Peppiatt (2006) in their paper “Micro insurance for Natural Disaster Risks in Developing Countries Benefits, Limitations and Viability” believe that micro insurance can be an integral part of disaster risk reduction and management, and an insurance contract is a more dignified coping strategy than relying on arbitrary post disaster donor aids. They list the benefits of disaster micro insurance as:

1. Disaster micro insurance can break the cycle of poverty by providing low income households, farmers and businesses post disaster liquidity which provides them livelihood security and help them to reconstruct. Bayer & Mechler (2009) also mentioned this point as a benefit of micro insurance
2. It encourages low income people to engage in higher risk higher profit investments

Limitations of disaster micro insurance:

1. High costs of insuring covariant risk of natural disasters makes disaster micro insurance product very expensive for poor people, without subsidies from government and donors disaster micro insurance schemes cannot be viable.
2. Moral hazard, they believe providing disaster insurance increases moral hazard and reduces the incentive to avoid losses and mitigate risk, how ever there are different ideas on the role of insurance in reducing or increasing moral hazard, even the same authors later in another paper “A review of micro insurance for natural disaster risks in developing countries” mentioned that insurance might encourage risk mitigation behaviors by offering premium discounts for risk mitigation activities, and listed it as one of the benefits of disaster micro insurance. Bayer & Mechler (2009) argue that well planned insurance schemes can even encourage the clients to reduce the risky behaviors for example by relating the amount of premium payment to their risk mitigation measures, those who increase the safety of their houses will pay less premium.

And there is consensus among almost all the authors that, the problem of moral hazard is significantly reduced in the new index-based insurance type because the amount of insurance payment is not based on the actual amount of loss it is based on

the data from weather stations and a predefined index which will be triggered under certain circumstances.

3. They argue that insurers providing disaster micro insurance are at high risk of insolvency and default especially if the events are very large and happen very frequently like the floods in Bangladesh.

P.Morsink, Geurts, & van Dijk argue that Micro insurance can have ex-ante and ex-post effects, the ex-ante effect for people below the poverty line is that it can encourage them to engage in higher risk higher profit activities, and it helps them to reach to higher economic level and move above poverty line. the ex-post effect according to them is that it prevents people from depleting their assets after a natural disaster however if they are very poor and don't have any assets there will be no ex-post effect. For those above the poverty line the effect of micro insurance is more significant because it prevents them from depleting their productive assets and falling below poverty line.

While there is hope toward disaster micro insurance but the growth in this area has been limited. There have been several innovative programs in this area, lessons learned from these programs can be helpful in improving disaster micro insurance product for the poor people. Different Public private partnerships have been testing several disaster micro insurance programs some have been successful, some not; however innovative ideas and plans can help in solving the issues in providing insurance to the low-income sector of the society (World Bank, 2011).

Sharma, Hochrainer, & Mechler (2011) did a research, that is the first large empirical cross country assessment of the benefits of disaster micro insurance in south Asia which is an area

highly vulnerable to several disasters, in this paper the clients of five disaster micro insurance programs in south Asia region are surveyed and their answers are compared to a non client control group answers. The results of their research are as follow:

1. A large majority of the surveyed people felt that they can afford the amount of premiums, 77% found the amount ok, 11% felt it is too little, and less than 7% said the amount is too much. Generally there is willingness to pay for micro insurance products but there may still be a group of people in severe poverty that might need the micro insurance products but are not able to pay for it. Swiss Re distinguishes this group as those who are at the bottom of the pyramid and living with the income of less than \$ 1.25 per day. according to Swiss Re, report NO. 6 (2011) providing micro insurance to this group can be possible by subsidies from government and donors. Insuring this group of very poor clients is not commercially viable, but they are highly vulnerable to different risks.
2. Providing quick liquidity after a disaster is very important to prevent low income people from engaging in stressful activities that can exacerbate their poverty level. 44% of the respondents received their claims within one month, however 26% after two month, and 30% three months. Reports show that claims reach clients very late; the amount of payment is not enough to fully recover, and claim process is difficult and complicated the last point violates the principles of micro insurance.
3. Windows of opportunity? Are disasters opportunities for improvement? The answer is positive. this study shows that the housing condition of the clients was improved to a more robust type after a disaster in compare to the housing of non clients.

4. There is a positive perception that insurance can reduce poverty, 90% of the insured clients felt that insurance has helped them in reducing their poverty.
5. There is a perception that micro insurance creates economic benefits.
6. Many clients prefer having insurance than relying on post disaster relief because insurance is guaranteed but post disaster relief is arbitrary.
7. One of the factors showing the success of disaster micro insurance programs is the rate of clients referrals, 81% think that insurance must be scaled up and promoted to others as well.
8. Awareness about the insurance product and poverty are correlated meaning that the poorer the less aware of the available products, this shows the importance of increasing product awareness among poor people. Awareness and information is the key to promoting the disaster micro insurance. the non clients after being informed about the product and its benefits showed high demand for the product.
9. The study shows high demand for disaster micro insurance.
10. The effect of disaster micro insurance on reducing risks is a critical unanswered question.
11. Opportunity cost of disaster micro insurance is reducing amount of food consumption and the expenses related to livelihood
12. The clients of disaster micro insurance significantly engage more in disaster reduction activities(risk mitigation measures) in compare to non clients

Mechler, Bayer, & Peppiatt, 2006 b) believe that natural disasters are not uninsurable but they just need more careful considerations and partner ships. According to them one important factor for the viability of disaster micro insurance program is to balance the

financial sustainability of the program with its affordability, the program must neither be very expensive to make low income people unable to purchase it, nor should it be totally free to stop it from development and scaling up. And there are few arguments against disaster insurance for the low income people:

Brown & Churchill (1999) discuss that insurance can decrease the vulnerability of households because they replace the uncertain risk of an event with certain premium payments Through the risk pooling mechanism of insurance. without insurance Low income households don't engage in high risk and high return activities, don't take new investment opportunities to grow their income, and remain in poverty so it can be concluded from the discussions of this paper that insurance is a risk transfer tool that provides certainty to low income people and encourages them to engage in higher risk higher profit activities which will increase their wealth level and reduce their poverty how ever In their paper they argue that insurance is not an effective risk management tool for Mass covariant risks as a result most of the natural disasters are uninsurable according to them. Insuring natural disasters requires expensive premiums which makes it unattractive and unaffordable for low income people.

N. Mechler, Bayer, & Peppiatt (2006 b) in their paper argue that disaster protection must be provided as a national social protection need by the governments without the need to pay the premiums. However, this argument creates many questions like how about the developing countries that the government is not strong enough to provide post disaster relief and relies highly on donor supports? And another point that questions this argument is that the probability that people engage in risky behavior will be increased because they are relying on government support without any payments and any encouragement to engage in risk

mitigation activities. (Cohen & SEBSTAD, 2005) in their paper argue that poor people should not bear the risk of natural disasters. It is the responsibility of the government to provide adequate post disaster recovery and access to social protection scheme for free, they also argue that one major reason of the increase in number and intensity of natural disasters is climate change resulting from emission of green house gases by developed countries so they argue that this is the responsibility of developed countries to bear the burden of natural disasters and pay for the post disaster coping strategies.

Micro insurance is a new topic and so far no study has analyzed the impacts of micro insurance on the welfare of the individual like their health, nutrition, education, etc (Young, 2006). The numbers of researches on the impact of micro insurance products are limited, and unbalanced between different types of insurances. The main emphasis has been on different types of health insurance schemes (Dercon & Kirchberger, LITERATURE REVIEW ON MICROINSURANCE, 2008). Some 30 studies have been done on the impact of micro insurance, 28 of which focus on health insurance (Cai, Chen, Fang, & Zhouy, 2010). I did not find any studies on the impact of disaster micro insurance on social vulnerability and disaster risk.

# Chapter3

## Case review analysis

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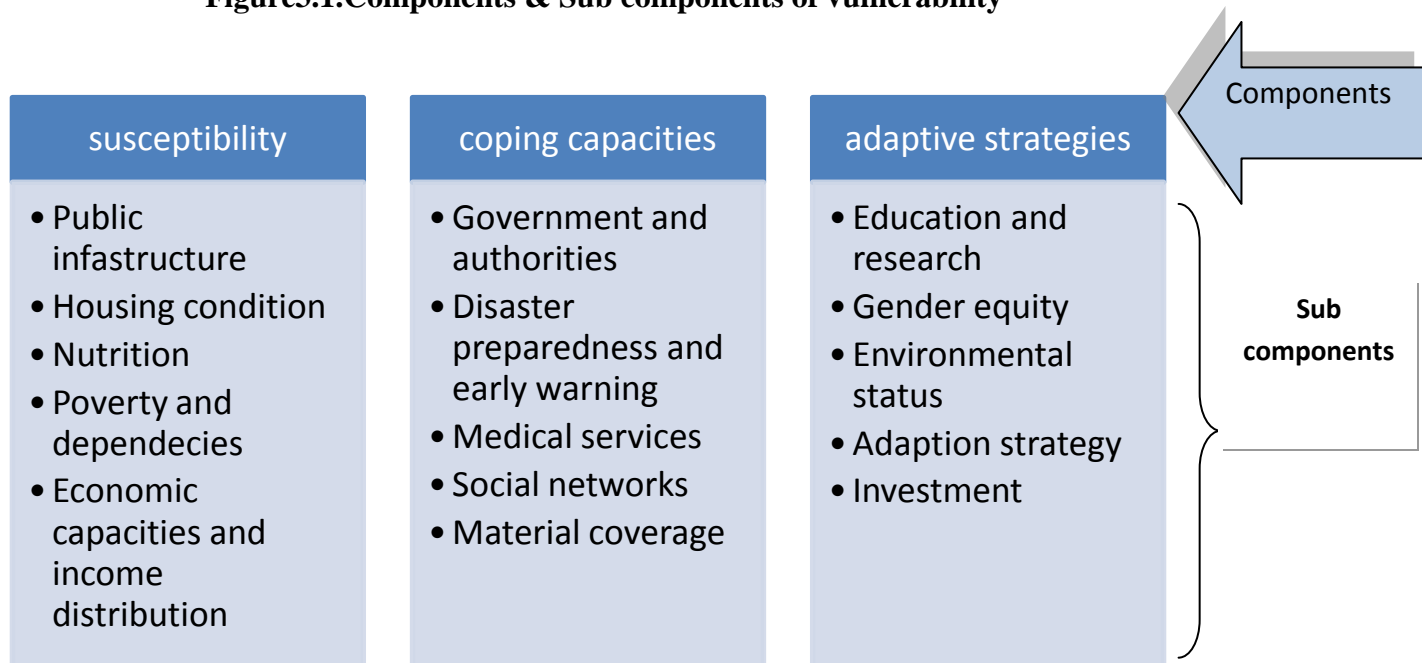
*This chapter represents the main analysis of the research. five cases of disaster micro insurance products have been carefully chosen based on different criteria that will be explained afterward. The cases were scrutinized to find out their possible impacts on the subcomponents of social vulnerability of their target clients group. The result from these analyses will be the answer to two research questions of what are the possible impacts of disaster micro insurance products on micro level meaning low income people, and what is the impact of disaster micro insurance products on macro level that is the whole country. The impacts on micro level will represent how different disaster micro insurance products affect poor people considering several indicators, and the impacts on macro level will represent how disaster micro insurance products can affect the vulnerability of the country to natural disasters and correspondingly the disaster risk of the country. The corner stone of this research is the concept of world risk index and its vulnerability components. The chapter will start with precise definition and explanation of the subcomponents of vulnerability that are the basis of the arguments of this research. after defining all the subcomponents that will be the basis of evaluation, the next part will start by introducing several cases and precise analysis of every case.*

### **3.1. Social vulnerability**

Vulnerability consists of three components of susceptibility, coping strategies and adaptive strategies; every component is composed of several subcomponents that are shown in figure 3.1.



**Figure 3.1. Components & Sub components of vulnerability**



Source: World Risk Report 2011

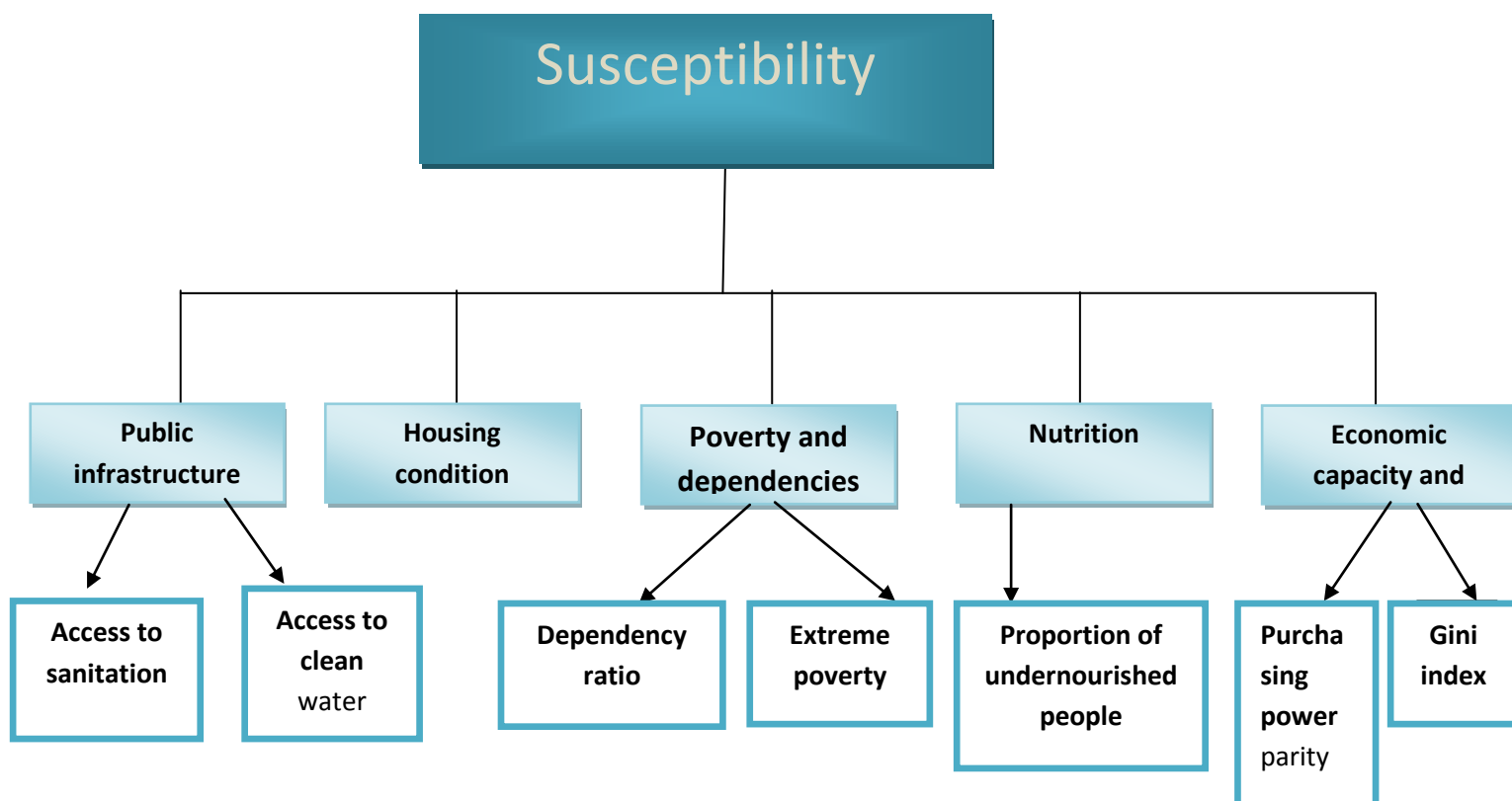
For measuring the vulnerability, every subcomponent is given several indicators to be measured. The indicators are understandable, easy to explain, and comparable (Concept for a World Risk Index).

### **Susceptibility**

Susceptibility determines the likelihood that a society suffers damage and harm from a natural hazard due to its weak infrastructure and framework condition. Susceptibility has several sub-components that reflect the living condition of people within a country. The sub-components are public infrastructure, housing conditions, nutrition, poverty and dependencies, economic capacity, and income distribution in Figure 3.2.

Among the susceptibility subcomponents poverty in particular is an important factor in determining the vulnerability of society, and the focus of micro insurance programs is also on poor people and poverty alleviation (Entwicklung Hilft Bündnis, et al., 2011).

**Figure 3.2. Sub Components and Indicators of Susceptibility**



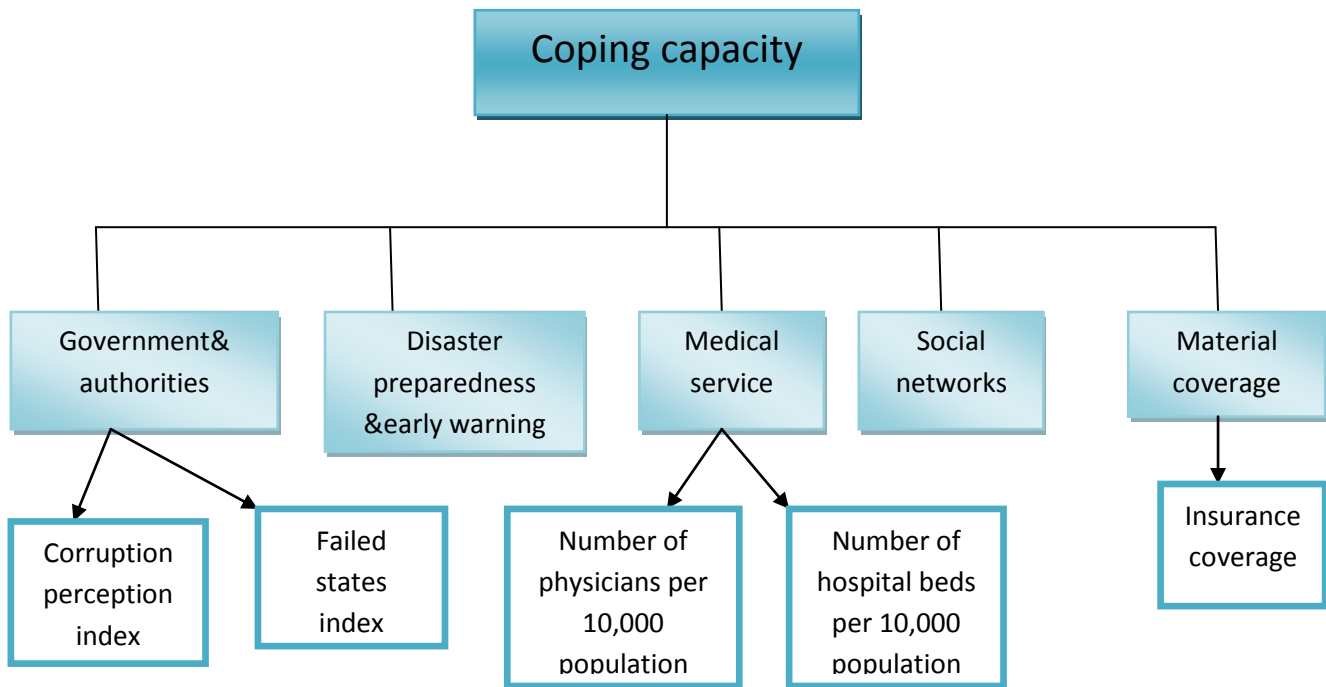
**Source: World Risk Index 2011**

### **Coping strategies**

Coping strategies are the capacity of the society and exposed entities to minimize and avert the negative impacts of natural disasters through direct actions. It is based on the direct effects of natural disaster and the direct reactions shortly after the disaster. Time is an important factor in capability to cope, after a disaster providing timely and quick assistance is

very important in reduce the negative impacts of a disaster. The sub components of coping strategies are Government and authorities, disaster preparedness and early warning, medical services, social networks, and material coverage not all the subcomponents are measurable (Entwicklung Hilft Bündnis, et al., 2011).

**Figure 3.3. Sub Components and Indicators of Coping Strategies**



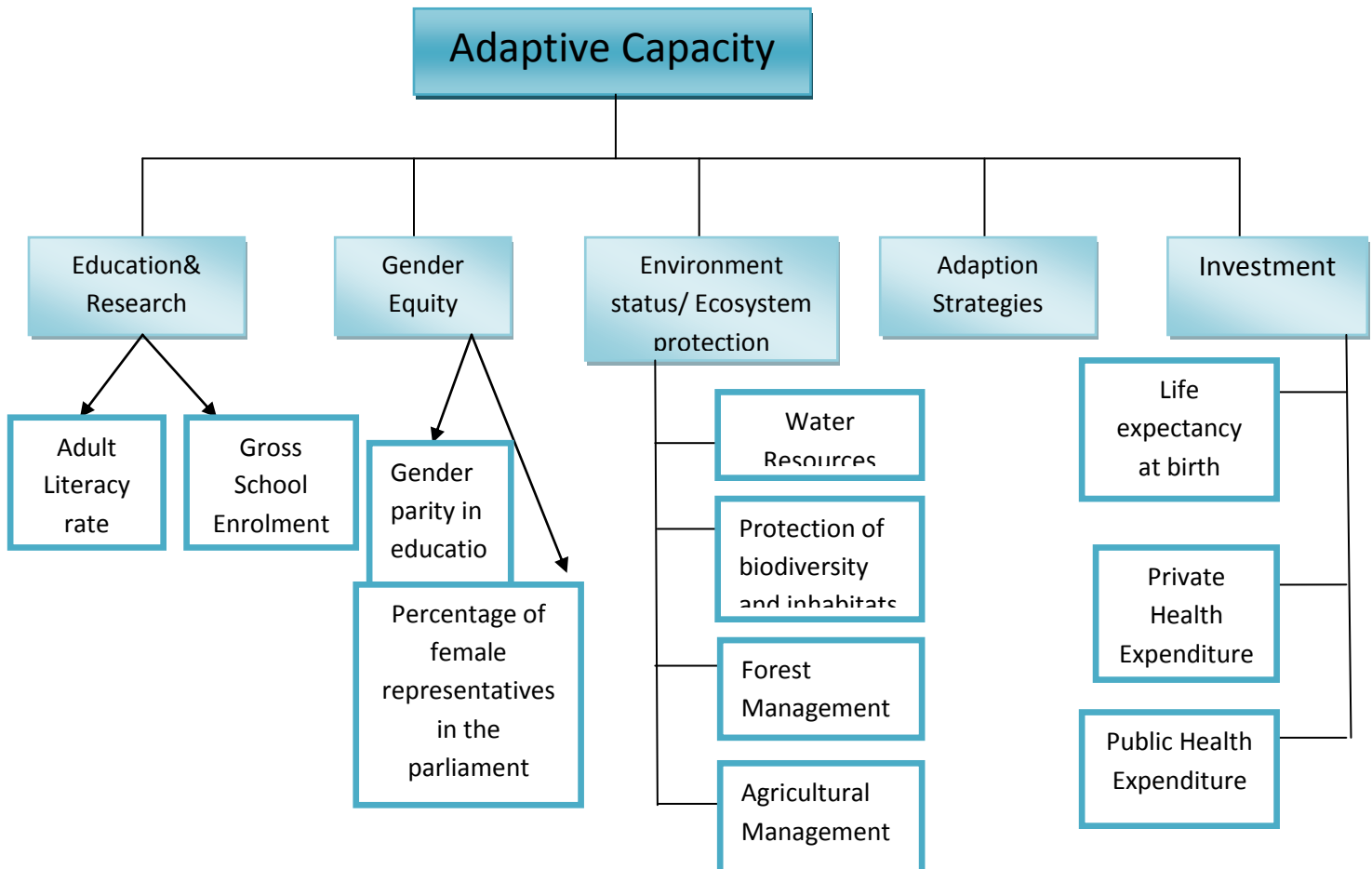
**Source: World Risk Index 2011**

### **Adaptive strategies**

Adaptive strategies are the capacities, measures, and changes that enable a community to change the current structures in order to address the negative impacts of natural disasters. Adaptive strategies are to ensure that the society has changed, and is stronger and prepared before a hazard happens and if a natural hazard happens the need to cope with it is less than before. The sub components of adaptive strategy are education and research, gender equity,

environment status/ eco system protection, adaption strategies, and investments. The difference between coping and adaptive strategies is that Coping capacities are direct short term actions for turning away or preventing the adverse impacts of a natural disaster, and adaptive strategies are long term permanent changes that help to adapt to the environment and climate change. The sub components are chosen according to the Millennium Development Goals and Hyogo Frame work for Action of the UN (Entwicklung Hilft Bündnis, et al., 2011).

**Figure 3.4. Subcomponents and indicators of adaptive strategies**



Source: World Risk Index 2011

### **3.2. Disaster micro insurance case analysis**

In the previous part the vulnerability and its sub components were defined, in this part of the research five disaster micro insurance programs will be introduced and their impacts on the sub components of vulnerability will be analyzed.

The numbers of viable and sustainable disaster micro insurance programs are limited. It was quite challenging to find appropriate cases for the analysis of this research. more than 20 disaster micro insurance schemes were examined from which only 5 cases were appropriate for the purpose of this research, there are several reasons for the inapplicability of other cases that are:

Many of the disaster micro insurance products are in pilot stage and the product hasn't shown its viability and sustainability yet, some of them have very short operation life and are new products that haven't had the experience of any natural disasters yet, so it's not clear if they work out in the event of a catastrophe event, some are very small in the number of their policy holders analyzing such small products cannot provide reliable and comprehensive results, some other programs have failed and stopped operating, some didn't provide enough detailed information of their product and how it works, and etc. The issues mentioned limit to some extent a comprehensive evaluation of the disaster micro insurance programs in the world (Mechler, Bayer, & Peppiatt, 2006 b).

The cases in this research are not chosen randomly, in this research it has been tried to choose cases that have been successful in their years of operation, have proven to be viable, and have been scaled up since their beginning, all of them had the experience of a natural hazard and have been able to provide coverage, they all can be replicable and some of them

are already replicated in other countries, all the cases have some unique features which create several positive effects, the cases chosen are diversified in the type of products and hazards they cover, their target group, the country of their operation, and the technology used by them, the reason of the effort to pick diversified cases has been to reflect a more comprehensive and reliable analysis, and to enhance the argument of the research. The first case to be introduced is a natural disaster micro insurance program called HARITA for the farmers in Ethiopia.

### **3.3. HARITA**

In 2007 Oxfam America together with local and international organizations started a pilot program in Tigray northern state of Ethiopia. The program is called Horn of Africa Risk Transfer for Adaption (HARITA), and It is an innovative agricultural Micro insurance program, that addresses the needs of rural farmers through a risk management package that is composed of three components of risk transfer (insurance), risk reduction (e.g., improved agricultural practices and conservation activities), and prudent risk taking (credit). All the information obtained is from several annual,quarterly, and impact reports of HARITA available in the Oxfam website.

Ethiopia is a country with low level of development and food security, that almost 85% of the population depends on rain-fed farming for their living. Drought is a serious threat to many families in Ethiopia not only for rural families but also for the whole country. And the problem of climate change and underinvestment in agriculture has added to the number and intensity of climate related extreme events like drought in Ethiopia and other countries as well.

Insurance industry in Ethiopia is really unprepared to face a natural disaster and provide timely and adequate recovery. They only cover a small group of clients, most of the population of Ethiopia are poor farmers, that are uninsured and inaccessible by insurance companies in a cost effective way. HARITA however has created this opportunity to engage insurers in the program and to reach previously inaccessible and uninsured people.

In 2007 HARITA started an index-based pilot program with 200 households in one village, and in 2011 the number was expanded more than 10 times to 13000 farmers signing for insurance in 43 villages. Because of the success and progress of this program for three years in Ethiopia, this innovative program will be expanded and replicated in Senegal and three more countries through a program called Oxfam's Rural Resilience Initiative or R4 which will enable the poor people to strengthen their food and income security. HARITA program has been able to reach very poor people who were considered uninsurable and removed from the world of financial services.

### **3.3.1. How does HARITA program work?**

HARITA is a new model aimed for sustainable development on the principle of collaboration and mutual support from public and private organizations, community and government. HARITA works as index-based weather insurance and the amount of rain is the trigger for payment. If the amount of rain has not been enough and a drought may happen which threatens farmer's crops HARITA pays for the crop losses and in this way prevents the poor farmers to sell their productive assets, drop their children from school, and migrate to find food all of which are stressful activities by poor people which are a threat to these families and make their poverty worse than before. HARITA provides help and cover for community-based risk

and the local disasters like droughts that are not big enough to attract international help and support but have adverse impacts on farmers and local people. The uptake rate of previous index-based weather insurance programs were not very successful mostly due to unfamiliarity of poor communities with the concepts of insurance however HARITA uptake rate has been quite successful and almost in the same level like Micro finance programs that have a longer history of operation. Below are three main strengths and unique features of HARITA program that have made it successful and replicable.

### **1. Giving poor farmers access to insurance**

HARITA provides insurance to all farmers even those who are very poor and uninsurable. It has an innovative model that is Insurance for Work (IFW). In this model poor farmers can trade their labor for insurance and pay the insurance premiums by their labor that is poor people's asset, because mostly poor families don't have enough cash and are not able to pay the premiums. HARITA allows them to work in community risk reduction activities like building irrigation systems, making compost to fertilize the fields, planting trees for reclaiming degraded environment in exchange for insurance cover and being paid for their crop loss if a drought happens. This model is very useful in providing insurance cover to all the farmers regardless of their income level, because one of the issues and obstacles for both insurers and poor people is that poor people don't have enough cash to pay the premiums but they have labor and can work. In the IFW model not only poor people can have access to insurance but also their work will promote and boost local agriculture, reduce disaster impact, and help them adapt to climate change. It is expected that very poor people pay by their labor and as their income increases they



can pay by cash. Due to this innovative program of Insurance for Work the uptake of HARITA has reached those of Micro credit programs with longer operation life than HARITA.

## **2. Educating farmers about disaster risk reduction**

Uptake of previous weather insurance pilots have always been disappointing, one reason is that poor communities are not familiar with concepts like insurance and risk management and it's difficult for them to understand complex financial products. HARITA have tried to develop culturally appropriate educational tools like storytelling, participation games and financial literacy training through workshops and risk simulation sessions, so that farmers can make informed decision whether to buy insurance or not. HARITA has provided the farmers with the education and tool to make stable livelihood even in hard times facing climate related extreme events. In HARITA program farmers are participating in program and their ideas and requests are reflected in the better operation of the program for example the idea of Insurance for Work was suggested by farmers themselves.

## **3. Demand driven product**

HARITA is a demand driven product that mostly focus on the needs of poor people and farmers but previous pilot programs were mostly supply driven, focused on the interest of program providers themselves.

### **3.4. The effects of HARITA program on the subcomponents of vulnerability**

#### **3.4.1. HARITA and susceptibility**

As poverty is one of the most important factors that affect vulnerability and affects other sub components accordingly, the effect of HARITA program on poverty will be first analyzed. 90% of the population of Ethiopia is living in Multidimensional poverty and 39% live with less than \$1.25 daily income (Multidimensional Poverty Index (MPI), 2011). Multidimensional poverty index is a new international measurement of poverty which supplements the human poverty index and it reflects different deprivations of people in three areas of health, education and living standard. 85% of this poor population are farmers that their livelihood is highly dependent on the amount of rainfall. Drought is the main threat to the people of Ethiopia and these climate- related risks like drought are the main reasons that trap poor people in poverty (Alderman & Haque, 2007). The first effect of HARITA program on poverty is that it prevents farmers from getting further into poverty by giving them stable livelihood and food security.

It pays the farmers if they suffer crop loss due to lack of rainfall and/or drought so farmers' livelihood and food security will not be at risk due to climate related hazards out of their control. On the other hand Farmers without the insurance cover if the rainfall is not enough and/or drought happens they will suffer from crop loss, and the first direct negative impact will be on their food security and nutrition, they will not have food to survive, in order to survive they need to engage in high stress activities that make them poorer and are not appropriate for example they will sell their productive assets or livestock, they will drop their

children from school and they may need to migrate in search of food. So HARITA program prevents all these negative scenarios.

HARITA program not only prevents poor farmers from falling further into poverty but it also reduces poverty. It gives the poor farmers credit and confidence to engage in higher risk and higher profit activities. When poor farmers know that they will get paid if they lose their crops due to climate related hazards they will be more confident and willing to buy better quality seeds and engage in other activities which will end up in higher yield crops so this will help them to grow their savings and incomes and in hard times they will not need to engage in activities that worsen their poverty.

HARITA program helps poor farmer by giving them credit, and acting as a guarantee between poor farmers and lenders like banks and financial institutions. Usually poor farmers and lenders are reluctant to interact, lenders are not willing to lend money to poor people because of the high risk of default, and poor people are also afraid of the risk of default and the legal consequences and punishment associated with it. The risk of default is quite high for poor farmers because if an extreme event happens they will lose their crop and they don't have reserves to rely on so they will be unable to pay back the loan and money borrowed. But with an appropriate insurance cover if any extreme events happen the insurance will cover the losses and pay for them, in this way the farmer risk of default is reduced as a result they can receive loans from banks or other financial institution under the guarantee of HARITA and can secure the credit they need to buy the equipment, fertilizer, and drought resistant seeds that promise higher yield crops. They can even start small businesses that can help them to boost their economic condition, feed their families, and keep their children in

school. So HARITA can positively reduce poverty of farmers, their families and the community.

Poverty as one of the most important factors affecting the susceptibility of a society to natural hazards, also affects the other sub components of susceptibility that are public infrastructure, Housing condition, nutrition, and economic capacity and income distribution. HARITA program by getting people involved in risk reduction activities can improve the infrastructure of the community as people engage in activities like building irrigation system which will increase the share of the population that have access to a water source, planting trees to reclaim degraded environment, and other risk reduction activities which reduces disaster impacts. The other sub component of susceptibility is housing condition which will be affected by HARITA program through poverty alleviation capability of HARITA. Because HARITA helps the poor farmers have stable livelihoods, better economic condition, and their poverty will be reduced so they can improve their housing condition as well. The nutrition sub component of susceptibility is one of the main objectives of HARITA program that is to create food security for the poor farmers. And the last but not the least the effect of HARITA program on economic capacity and income is that this program by reducing poverty will also increase the purchasing power parity of individual farmer, every farmer can engage in higher yield activities and increase their savings and economical level. Also the risk reduction activities of farmers and higher yield crops will boost the local agriculture as 85% of the country population are farmers so it will also affect the economy of the country.

### **3.4.2. HARITA and coping strategies**

One of the main objectives of providing natural disaster insurance cover to poor people is to make them the less susceptible to the negative impacts of natural disasters, and to increase the capabilities of the society to cope with the natural disasters once they happen, so coping strategies and susceptibility cannot be separated as mentioned in the world risk report 2011, both components are interlinked and in practice is not possible to separate them. Coping strategies are the second component of societal vulnerability. HARITA improves coping capacities by providing timely financial assistance if a drought happens. it affects mainly two subcomponents of coping strategies, disaster preparedness & early warning, and the other is material coverage. The whole program is a disaster preparedness especially the innovative program of insurance for work(IFW) model of HARITA which requires farmers to do risk reduction activities. The activities of the farmers add to the disaster preparedness of the community.

Regarding the early warning system, although it is not clearly stated about the HARITA program but most of the weather-index insurance programs have weather stations in different part in order to measure the indicator that triggers payment. In the case of HARITA the indicator that triggers payment is the amount of rainfall and HARITA have some stations to measure the amount of rainfall continually, through this regular measurements and reports they can notice the early warning and signs of a drought happening.

Another subcomponent of coping strategies is material coverage which means insurance coverage. HARITA program gets local insurers involved in managing the risk. Nyala insurance company which is one of the Ethiopia's private insurers since the beginning of

HARITA was cooperating in this program and offering HARITA's risk management package (Oxfam America, 2010). And in the HARITA quarterly report it is stated that weather index insurance options were offered by two Ethiopian insurance companies, Nyala and Africa insurance company. So a micro insurance program like HARITA can get the private insurers involved and can boost the insurance industry because for commercial insurers it's very difficult to reach poor clients and provide them coverage but HARITA is creating the opportunity for them to access the inaccessible poor people. The improvement in insurance industry of the country can also affect the economy as the insurance affects the GDP of the country. Poor sectors of the society are potential markets and opportunity for commercial insurers but finding cost effective ways to serve this sector of the society is quite challenging for insurance companies and it needs support and partnership with different organizations and donors. If the culture of insurance spreads between poor communities it can be beneficial for poor people, insurers and the country as well. Insurance companies may not profit substantially from micro insurance but they can build their client base and trust. In the future today's poor customers may become middle income customers with the capability to purchase insurance .

### **3.4.3. HARITA and adaptive strategies**

One of the subcomponents of adaptive strategies is education and research; HARITA program itself provides educational tools, workshops, seminars, and training sessions for the poor farmers to educate them about risk management, risk reduction, and insurance concept. This by itself adds to the knowledge and understanding of poor people about risk and natural hazards with the gained knowledge they better understand the concept of risk and how to

mitigate the negative impacts of possible future extreme climate related risks according to the HARITA quarterly report of July 2011— September 2011 approximately 6200 farmers in 43 project villages received financial education. In addition to the internal education program that HARITA provides to the poor farmers it also improves the education level in the country by decreasing the rate of children drop from school one of the most stressful informal coping strategies by poor families is dropping children from school to reduce the costs however HARITA by providing them liquidity after a disaster prevents such a stressful activity, 90% of the country are living In Multidimensional Poverty change in their education level changes the country's education level.

Another sub component of adaptive strategies that HARITA program affects positively is the Environment status/ Ecosystem protection, the risk reduction activities of the farmers like building irrigation systems, making compost to fertilize the fields, planting trees for reclaiming degraded environment boost the local agriculture and the environment status. These risk reduction activities that HARITA program created for farmers improves the adaption strategies which are another subcomponent of adaptive strategies and help farmers to adapt to climate change and the risks of extreme events from climate change. The more the adaption and preparedness of farmers to climate risks the less the risk of negative impacts from climate related risks. So the risk reduction activities that are done by the farmers in order to pay the premiums, even if no drought or rain fall shortage happens in the end these risk reduction activities are beneficial in reducing the risk of the community to future disasters.

#### **3.4.4. HARITA program from poor farmer's point of view:**

Gebru Kahsay is a 52-year-old farmer in the Adi Ha area of Tigray in northern Ethiopia, he relies on rainfall for his crops grow. In 2009 rain was very late but he had backup plan weather insurance. He believes that this insurance program can protect them from migrating in search of food if a drought happens.

Biru, a 50-year-old mother of six children, was among the first farmers who joined the program believes that investing in this program is a smart decision it saves their assets in bad years and must be scaled up to other villages of Ethiopia. From the confident she got from the insurance program she is investing in riskier investments but higher profit and bild a more secure future for her family.

Reda, 45, is a farmer in Adi Ha. Because of the repeated droughts that were affecting the crops and her family food and security she joined the program with the hope that it can solve her problems. Reda was among those farmers who were not able to pay by cash and her only asset was her labor she worked to receive the insurance coverage. She works on activities that benefit her village Adi ha, the activities like planting trees and grasses to pay for her premiums. She really wants her children to have what she never had, education she doesn't want to drop her children from education she wants them to be educated and get jobs even Reda her self has registered for an adult literacy program (McCabe, 2009).

Recent Swiss Re news released on November 2011, reported the success of HARITA program in paying 1800 farmers who suffered drought. Gebre Kiros Teklehaimanot was among 1,800 farmers who recently experienced drought conditions that triggered



payouts. He got a share \$17,392 in payouts. He thinks that the insurance is good and although it doesn't pay all the losses he suffered, but enables him to pay the loan he took for buying fertilizer. he is very happy with this insurance program and will encourage others to join this program (Swiss Re, 2011).

HARITA program affects several subcomponents of vulnerability and reduces the social vulnerability. Providing insurance to poor people was believed to be impossible and poor people were inaccessible sectors for insurance companies but HARITA could access the most vulnerable and poor farmers who were at high risk of drought and their livelihood, food, family, education and totally their life was dependant on their farming crops which can be negatively destroyed by lack of rainfall or a drought. HARITA program has been a very successful micro insurance program and contributed to increasing resiliency among the poor farmers, alleviating poverty, and disaster risk management. This program can be a good example of how a micro program can have positive effects starting from the poor families and broadening to the community and then the whole country. The effects start from bottom to top it starts by reducing the vulnerability of the farmer, their family, their community, and the country. As social vulnerability decreases the risk of a natural disaster is decreased in Ethiopia. This program may be called micro but the effects are not micro it reduces the risk of a disaster, it reduces the risk of repetition of another catastrophic famine which happened twenty five years ago in Ethiopia, and caused more than half a million fatalities! (Dercon & Porter, 2010). The next case to be reviewed is Kilimo Salama case in Kenya, which is an index-based insurance for farmers in Kenya with the use of mobile technology.

### **3.5. Kilimo Salama**

Kilimo Salama “safe agriculture” in Swahili language was started in 2009, as a partnership between UAP insurance, Syngenta foundation for sustainable agriculture, and Safaricom mobile provider. It is the largest agricultural micro insurance program in Africa and the first to use mobile phone technology (Haskins, Ondigo & Lumiti, 2011).The program was designed for maize and wheat farmers in Kenya to insure their inputs like seeds, fertilizer, and chemicals against drought and excess rain. The way this program provides insurance coverage for poor farmers and its unique features are explained below.

The insurance model used in Kilimo program is “Pay-As-You-Plant”, this model allows the farmers to try out insurance which is a product that farmers never bought before and they don’t trust it in Kenya. The program allows the farmers to insure their inputs which just requires them a small upfront investment only 5% of the price of the input they purchase, if a weather extreme like drought happens and they get compensated by the insurance then they would trust it and increase the amount of purchase and coverage. Mostly the low-income farmers are illiterate and don’t know about insurance so Kilimo let the poor farmers to try insurance with just a small investment and to develop sense of trust among them to this program.

The other innovative feature of Kilimo is the distribution method it is used. Kilimo is the first agriculture micro insurance programs that have used this distribution method. The product is distributed and sold through local agro-stockist or agro-dealers that sell farming inputs like fertilizer and so on. These local dealers sell the insurance to the farmers when they buy the inputs for their farms. When the farmers buy the inputs they also buy the insurance which

costs them only 5 % of the input they purchase. The local dealer and farmers already know each other because farmers usually buy the inputs from the same dealers who are geographically close to them and the dealers not only sell inputs to farmers but they also give advices to them for better managing their farms and increasing the productivity, so it's not difficult for these local dealers to suggest insurance product to the farmers, that already trust the dealer and pay for their inputs to them this method of distribution is useful in accessing the poor farmers which have been an issue for insurance companies to access them and persuade them. Another feature of this program is the affordability of premiums which is made available through partnership with the private sector. The amount of actual premium to be paid by the farmers is 10% of the purchased amount of inputs however 5% of the premium is paid by the agribusiness which according to Kilimo fact sheet are MEA Limited (fertilizer), Syngenta Chemicals East Africa Limited, and Seed Co. a number of other agribusinesses have indicated their interest in participating in the scheme.

And the last but not the least innovative feature of Kilimo is the extensive use of mobile phones technology. A low-cost mobile phone system and data system which is connected to solar weather stations, the distribution, purchase, issue and compensation processes are quickly done by only using mobile phone technology, and the farmers quickly get paid if they lose their inputs due to drought or excess of rain. This quick payment is very important in providing recovery and help especially to poor people to prevent them from selling their productive assets and livestock. The agro-dealers, use a camera phone which has an innovative application developed by the Syngenta Foundation installed on it they can scan an especial product barcode that sends the policy to UAP insurance company and a text (SMS) message will be sent to the farmer's mobile phone to confirm their purchase. There

are 30 weather stations that regularly broadcast the weather and rainfall and if data from one station reveals that there might be a weather related extreme events that can affect farmers' yield, farmers in that station territory will be automatically paid for the loss of their inputs invested in the farm. Even The payments are through the mobile by using Safaricom's M-PESA mobile money transfer service. The M-PESA is combined and connected with the automated weather stations and the farmers get paid without the need for any claim assessment or any agent visiting the farm and measuring the losses.

M-PESA payment system is already a well established and trusted system for money transfer in rural Kenya ( Kilimo Salama factsheet; World Bank, 2011; Haskins, Ondigo & Lumiti, 2011). The use of mobile phone technology is very useful in reducing the time and transaction costs which has been an issue for the insurance companies to provide affordable coverage to low-income people but the use of mobile phones considerably reduces the transaction costs and accordingly the premiums. the details about the technology system used in Kilimo program are available in the fact sheet of Kilimo Salama program which can be accessed through (<http://kilimosalama.files.wordpress.com/2010/02/kilimo-salama-fact-sheet-final11.pdf>).

### **3.5.1. Kilimo Salama and susceptibility**

The effect of Kilimo Salama on the most important sub component of susceptibility which is poverty will be first analyzed; poverty can affect other sub components as well. Kilimo is a mobile micro insurance program which uses the information and communication technology (ICT) comprehensively. The program can alleviate poverty in different ways which will be explained below.

The target group of this program are small holder farmers who are considered uninsurable and inaccessible from a commercial insurer's point of view, however Kilimo has been able to reach this group of the society. the farmers in Kenya and many other cities in Africa are very sensitive to weather changes and the extreme events happening accordingly like drought or excess of rainfall. A natural hazard like drought can be a serious threat to the farmer's livelihood, their family, food security, children education and so on. When an extreme event happens and the farmers lose their crops they get poorer, because the farm and its yield is the source of income for them, and livelihood for a farmer so by a weather extreme they easily get poorer and they cannot afford to buy high quality seeds, fertilizer, and chemical which help them to get higher yields and profits. Kilimo program protects farmers input in the event of any severe weather condition and it can efficiently reduce the negative impacts of weather extremes. Farmers with this insurance cover as soon as a weather extreme happens get paid and they can buy inputs however those without the insurance coverage cannot afford to buy inputs again and they will get further into poverty. The program can alleviate the poverty of farmers because farmers keep on purchasing high quality seeds, fertilizer and chemical with the confident of insurance protection so their fields will have better and higher yields and their income will increase. As mentioned before poverty can directly affect other subcomponents like nutrition and housing condition the farmers who have insurance coverage have food security and as a result the share of the poor farmers and their families who are undernourished will be decreased. As the farmer's income level increases they can improve their housing condition.

Kilimo can positively affect the economic capacity because it affects many groups , the first target group as explained are the poor farmers when their income level increases and they are

better off so they can have positive impact on the economy of the country. The other group involved in this program are the agro dealer who not only sell the farming inputs but they also sell insurance. The agro-dealers job is closely related to the weather condition and extreme weather related events. The reason is that when an extreme event happens and the farmer lose their crops they get poorer and they cannot afford buying inputs from the agro-dealer or they will buy cheaper or less amounts of inputs so the agro-dealer business will be stopped accordingly, but with this micro insurance program even if an extreme event happens the farmers get paid for the inputs and can buy inputs from the dealers and if no extreme event happens the farmers get better off and higher income so they increase the amount of their investment and purchase.

The third group involved are the private sectors, like those selling fertilizer, seeds, chemical, and the mobile provider Safaricom; as farmers living conditions get better and higher and their livelihood is secure the demand for the products of these companies will be increased as well so the program contributes to the economic growth of the country by getting involved different groups within the society.

This is how Kilimo Salam micro insurance program can decrease the susceptibility component of vulnerability and make the society less vulnerable to the natural hazards like drought. In the next part the effect of Kilimo on coping strategies will be analyzed.

### **3.5.2. Kilimo Salama and coping capacities**

One of the main objectives of providing insurance and micro insurance is to increase the capabilities of the society to cope with the negative impacts of a natural disaster and provide timely assistance and recovery. One of the sub components of coping capacities that will be

positively affected by the program is disaster preparedness and early warning, the mobile phone mobile phone system and data system which are connected to solar 30 weather stations; these weather stations transmit weather data every 15 minutes via GPRS connection and automatically broadcast the weather condition and amount of rainfall. The payouts will be made to farmers based on these stations measurement and a predefined formula of crops rainfall need. If a payout must be made to the farmers no claim process is required and all the farmers who are in area of the weather stations will be paid immediately via the mobile technology of M-PESA and receive a confirmation SMS. The automated weather stations and mobile phone technology helps farmers and insurer have up-to-date complete weather data which allows in disaster prediction and risk reduction activities to prevent possible negative impacts from disasters and weather extremes, and farmers receive up to date text messages that enable them to improve their farms, yields, food security, and productivity. According to World Economic Forum (2011) the use of ICT in this program changes the role of poor-farmers from being a passive user of mobile phone technology to an active user. According to this paper vulnerability and access to information are related, poor people don't have access to information that are crucial in their life and livelihood. Kilimo program is helping in reducing the vulnerability of poor people by providing them the opportunity to have updated information about the weather condition which is critical for their farming and livelihood. To cope with disasters time is of high importance, meaning that after a natural disaster happens quick recovery and help to poor people is very important that most of the indemnity based insurance lack this ability due to the time consuming process of claim assessment however the use of technology enables the insurers to pay farmers immediately

usually post disaster pay outs are not quick which force poor people to engage in stressful activities that make them poorer and deep into poverty cycle.

An example of how Kilimo program helped farmers was in September 2010 in Kenya's Embu according to World Economic Forum (2011). regular weather data showed that rainfall has fallen below average so Kilimo didn't wait that the farmers lose all their crops instead they immediately paid them and encouraged farmers to invest and not to lose their crops. This example shows the importance of regular weather data update which make both the insurers and the farmers prepared for the disaster and also shows the effectiveness of an on time quick compensation which is vital for the livelihood of farmers.

However according to World Economic Forum (2011) it is still early to directly relate the use of mobile phone technology to poverty alleviation however there is a promising potential in disaster micro insurance programs to alleviate poverty by using the mobile phone technology. The other impact of the Kilimo program is on insurance, the farmers in Kenya don't have access to insurance because of the high transaction costs of insurance for insurers and accordingly higher premium requirements, which makes the poor farmers unable to approach insurance.

The farmers in Kenya haven't had any ways to protect against the weather extreme events except praying for rain however Kilimo by using innovative ways that has created the opportunity of having insurance cover for the poor farmers. Before the beginning of the Kilimo farmers didn't trust insurance but after receiving compensation for their input losses they started to trust insurance and expand their purchase and coverage.



### **3.5.3. Kilimo Salama and adaptive capacities**

Kilimo program improves the adaptive capacities through two components of environmental status/Eco system protection and adaption strategies.

Use of regular weather update helps in predicting climate extreme events like severe drought, lack/excess of rainfall, the weather information helps Kilimo to pay the farmers before they significantly lose their crops and get trapped into poverty, this can be considered part of the adaptive capacities because it is reducing the need for post-disaster coping strategies and is a pre-disaster strategy. Another factor of this program which improves the adaptive capacity is that regular text messages are sent to farmers according to the weather data and suggest them pre disaster actions and some other ways to increase the productivity of their crops and better adaption to the climate related risks. According to Haskins, Ondigo & Lumiti (2011) in Kilimo program there is a helping group consisting of agriculture experts who freely advise farmers on how to increase the productivity of their farms and protect their investments. All these features of the program help in better adaption to climate related risk and also improve in agriculture management.

Kilimo Salama has been a successful mobile micro insurance program that has the capability of reducing the social vulnerability and accordingly the risk of a disaster in Kenya. The partners of the program have announced the expansion of the program due to it's successful result they have expanded the product to cover not only the inputs but also the expected value of farm harvest, more variety of crops will be covered against drought and also flood more over the loss of livestock will also be covered. The new program will be based on the same innovative features of the old program. *Marco Ferroni, Executive Director of the Syngenta*

*Foundation, said, "We have seen 12,000 farmers in Kenya take advantage of the original Kilimo Salama and we should be able to reach 50,000 farmers with Kilimo Salama Plus this year and provide far more insurance options." (Haskins, Ondigo & Lumiti 2011)* the next to be reviewed is an index-based livestock insurance (IBLI) in Mongolia.

### **3.6. Index-based Livestock insurance (IBLI):**

All the information about this program are retrieved from three main sources, a paper created by the founder of this program Mahul & Skees (2007) , a report of this program by (GFDRR), and a paper by Bayer & Mechler ( 2009. Mongolia is a country that almost 30% of its population are herders, growing cattles, cows, horses, goats, and sheeps for their daily life, food, and livelihood.

Livestock herding contributes 85% to the country GDP (Smith, 2011). The country is at the risk of weather related extreme events called Dzud that are very cold winters which cause dead of livestock, For many years the extreme events have caused loss of many heads of livestock, also had negative impacts on the GDP of the country and could somehow stop the economic growth of Mongolia(GFDRR). One third of country's population is poor which makes the negative impacts of natural hazards more severe because poor people are more vulnerable to the negative consequences of extreme events.

World Bank has helped the government of Mongolia to develop an innovative index-based livestock insurance program in 2005 in a form of public-private partnership with domestic insurance companies. The program has three objectives of reducing the negative impacts of loss of livestock on herder's livelihood by setting a structure that pays for losses before they occur, providing timely liquidity after the extreme event, and limiting the fiscal exposure of

government budget by allowing the Mongolian government to transfer part of the risk to international financial markets.

The program is structured in three layers of “self-insurance, Market-based insurance and social insurance” (Mahul & Skees, 2007). Herders bear the small amount of losses that don't affect the feasibility of their business (6% of livestock mortality), the bigger amount of losses will be transferred to private insurance industry, and the last layer of losses which are extreme or catastrophic losses will be transferred to the government of Mongolia. The program is based on a mortality rate index of livestock and maintained by the national statistics office of Mongolia, the index encourages the herders to try to reduce the number of their livestock mortality because the index is based on local mortality rate of livestock not based on individual herder's loss..

The program reduces the moral hazard like other index-based insurance products, and has the problem of basis risk because the payments are not based on the individual herder's amount of loss, sometimes one herder may lose several livestock and suffers significant amount of loss, but the local rate of livestock mortality is not triggering the index for payment, and the herder will not be paid. The problem of basis risk is almost observable in all the index-based products simply meaning that the amount of payment and loss are not matched.

The participation in this program is not compulsory, the herders buy policies and if the rate of livestock mortality is between 6-30% they will be paid and the payment is made through a reserve fund, the Livestock Insurance Indemnity Pool (LIIP), the government of Mongolia acts as a reinsurer for this fund, for the losses more than 30% the government will bear the

losses . The government has access to a contingent credit by World Bank in the case that the LIIP fund is exhausted by extreme losses.

In 2009-2010 the program experienced the highest payout and losses ever, the country lost 22% of the livestock because of a harsh winter, the LIIP fund was almost exhausted and most of the payouts (85%) were made through the contingent credit provided by the World Bank. For the 2010-2011 the program has been expanded to 9 provinces it was started in 3 provinces of Mongolia, and it has been purchased by 7000 herders. by 2012 it is expected that the program will be extended to cover 21 provinces.

Although provision of micro insurance is a major step in achieving the Millennium Development Goals in Mongolia but for the program to be scaled up to national level some improvements must be made like, increasing risk transfer to global financial markets and reinsurers, this will guarantee the viability of the program (GFDRR), there is need for government supporting the program by provision of a legal frame work and regulatory system that supports and encourages micro insurance, in Mongolia there are some regulatory restrictions on the way of micro insurance expansion (Asian Development Bank (ADB), 2010) the government must also encourage the public-private partnerships, product awareness is one important factor in encouraging more herders to join the program. in most of the countries that don't have the culture of insurance the uptake of micro insurance is small due to the lack of awareness, so increasing product awareness is of high importance, the need to an efficient and reliable data management system for secure data measurements because fraud ulent animal census is one issue in Mongolia program which can stop the expected outcomes of the program (Bayer & Mechler, 2009; Bayer, Mechler, & Stigler, 2011 ).

In 2010 ADB provided technical assistance to Mongolia program to erase and remove some barriers on the development way of the program and it is expected that the technical assistance to be useful in improving the regulatory and political system in Mongolia (Asian Development Bank (ADB), 2010).

### **3.6.1. IBLI and susceptibility**

IBLI program reduces the likelihood that the society suffers from the losses of extreme events through affecting some of the sub components of the susceptibility. One of the main target groups in this program are herders which represent 30% of the population of Mongolia. Their living condition and livelihood is dependent on the herds, if they lose their herds, it means they lose their source of income, their food, and their apparel. These are just the direct impacts of losing the herds however the losses are beyond the direct impacts losing their source of income implies getting poorer and trapped into poverty cycle, poverty brings other negative impacts with it, like malnutrition, children dropped from school and working, worse life condition. And in a broader view, mass loss of livestock affects the country economy because the herders are 30% of the country, so they contribute to the GDP. Mongolia has experienced the negative impacts of loss of livestock on the economic growth of the country for example between the years 1999-2002 the country experienced severe droughts and winters and lost almost 35% of the livestock the losses had significant negative impacts on the GDP of the country and almost stopped the economic growth (GFDRR). in 2009-2010 again another severe winter caused loss of almost 22% of the livestock but this time the country and herders were compensated by the IBLI program and received significant support from the World Bank.

IBLI pays out the herders if the local number of loss of herds reaches a number that triggers the payment, so the herders will be able to buy livestock again and restart their life and their business, the program prevents them from falling into poverty, and getting engaged in stressful activities that make them poorer and are costly like dropping children from school, reducing consumption and food intake, etc. the program reduces the susceptibility of the herders and prevents negative impacts on the economy of the country as well.

### **3.6.2. IBLI and coping strategies:**

The product increases the coping capabilities of the society by affecting two subcomponents, Government and material coverage (insurance industry). The traditional coping strategies of Mongolia government were not adequate and the country suffered from the loss of almost 35% of the livestock during 1999-2002 because the government didn't have any strong efficient coping strategies to diminish the losses, and also the traditional indemnity-based insurance of Mongolia was ineffective due to some reasons like high cost of claim assessment, moral hazard problem, and the fraudulent report of animal deaths (Bayer & Mechler, 2009; Bayer, Mechler, & Stigler, 2011). IBLI has improved the capability of the government to cope with natural hazards.

The risk transfer mechanism of IBLI program is in three layers, first layer will be covered by the herders themselves which is very small amount of loss that doesn't affect their business, the second layer of losses will be covered by commercial insurers, this layer will increase the penetration rate of insurance in the country and will improve the insurance industry of Mongolia. When the insurance coverage and products are developed it means the ability to cope with the disasters is increased.

And the third layer of losses will be transferred to government, third layer represent extreme and catastrophic losses. the government will transfer the risk to the global financial markets and reinsurers which limits the exposure of the fiscal budget of the country, government also has access to contingent credit supported by the World bank. The increased capability of the government, and more involvement of insurance industry are two important factors in coping with the natural hazards, and providing timely assistance and recovery.

### **3.6.3. IBLI and adaptive capacities**

The program contributes to the adaptive capacities by affecting two subcomponents of education and research, and adaptive strategies. The program will indirectly affect the education through poverty alleviation and livelihood security that the program creates for the herders. if herder's livelihood is secured they will not need to drop children from school and the rate of the children dropped from school will be decreased.

And the program improves adaptive strategies through awareness campaigns that the program provides to train the herders about the insurance, risk management, and teach them the ways to better manage and minimize the risk of livestock losses. The program also increase the adaptive strategies by encouraging risk mitigation behavior among herders and creating incentives for the herders to try to decrease the risk of livestock loss, and adapt to the climate related risks.

So far in this research the effect of program only on this two subcomponents can be discussed due to the lack of information and researches on the direct effect of this program on the other subcomponents of adaptive capacities for example how the program can affect gender equity or can affect the environment status is not clear yet.

IBLI program is an example of viable livestock insurance for the low-income herder of Mongolia. as discussed in previous parts it can decrease the social vulnerability and the risk of disaster in the country of Mongolia, if the program can be scaled up to cover more herders the effect will also be more comprehensive. In order to scale up the program increasing awareness about the program among the poor herders is very important especially in countries like Mongolia with weak culture of insurance, for the problem of fraudulent report of animal death the program can make use of the technology and learn from the experience of the livestock insurance program in India piloted by the *IFFCO-Tokio General Insurance Co. Ltd. (ITGI)* which uses an identification device placed under the hide of the animal based on *RFID (Radio Frequency Identification) technology*. Use of this technology helps in decreasing the fraudulent report of animal death, it also can decrease the required amount of premium, the information of the animal like time of vaccination can be saved on an electronic chip, and can in a cost effective way allow access to very inaccessible rural clients and their livestock (*Cattle insurance through electronic identification chip technology: Microinsurance innovation facility, 2011*). The next program to be examined is Afat Vimo in the country of India.

### **3.7. Afat Vimo**

India is the 7<sup>th</sup> largest country in the world with population of over one billion (**1,170,938,000**, World Bank database). India is one of the most hazard prone countries of the world which is at risk of several natural hazards like earthquake, flood, drought, and cyclone. these natural hazards are major threats to lives and property of billions of people within the country especially the most vulnerable group that are the poor people (MICRODIS, n.d.). the country has a multidimensional poverty index of 29.6 % and 41% of the population live with



less than \$1.25 income per day (MPI, 2011), According to MPI only eight states of India have multidimensional poverty index of over 32% and are home to 421million people.

The 2001 Gujarat earthquake affected directly and indirectly 15 million people. The affected population even after receiving the relief support was still suffering from the financial losses caused by the disaster. a survey revealed that only 2% had insurance coverage during that disastrous earthquake (Inclusive Risk Transfer Initiative, n.d.). Afat Vimo micro insurance was started in 2004 by All India Disaster Mitigation Institute(AIDMI) to enhance the AIDMI's ongoing Livelihood Relief Fund activities, the Livelihood Relief Fund (LRF) of AIDMI was Established after the 1998 Kandla cyclone (UNDP/ISDR, 2007).

The main purpose of Afat Vimo program is to protect property and livelihood of its low-income household clients. Afat Vimo covers households and small businesses in the state of Gujarat and covers more than 19 different disasters, including floods, earthquakes, cyclones, storms, hurricanes, tornados, landslides, etc. and the policy holders are covered for the amount of loss equal to 1,744 US dollars for non-life assets and 465 US dollars for loss of life, for an annual premium of less than 5 US dollars. Afat Vimo has 5054 low-income clients, and it has been carried out in different states of Gujarat, Tamil Nadu, Pondicherry, and Jammu and Kashmir and the lessons learned from the program have been shared with other countries like, Pakistan, Sri Lanka, Iran, and other Asian countries (UNDP/ISDR, 2007).

Afat Vimo reaches its clients through AIDMI and volunteers of LRF who have made trust over time, and the high uptake rate of the program is attributed to the long-term trust relation between AIDMI and low-income people. Many low-income people have received support

from LRF before, otherwise poor people usually don't trust insurance and it is very difficult to persuade low-income people to pay for future losses that have not yet happened.

This micro insurance product like others has its own challenges in micro & Macro level that needs to be improved for the expansion and growth of program, some issues that need to be solved are lack of awareness especially among the rural poor about the product, products mismatch with the real needs of people, distribution and delivery, affordability and viability of the program (Sharma, Hochrainer, & Mechler, 2011). It is a challenging issue for Afat Vimo and other disaster micro insurance programs to offer a product that is affordable for poor clients and at the same time doesn't violate the viability and profitability of the program; for example the cost of adding a new client for Afat Vimo is equal to the amount of premium and the cost of assessing claims is three times the amount of premium (Bayer & Mechler, 2009; Bayer, Mechler, & Stigler, 2011).

### **3.7.1. Good practices of Afat Vimo**

The good practices of Afat Vimo are available in detail in the book "Building Disaster Resilient Communities" by UNDP/ISDR, 2007:

1. It transfers the risk from individual level to broader level and community groups. This helps the program to have clients that are in different hazard prone areas and prevents disastrous financial shocks suddenly on the program, this portfolio diversification feature of the program makes it more attractive for the investors and adds to the viability of the program,
2. Afat Vimo is the most comprehensive program in India which covers 19 risks, Based on the recent study by International Labor Organization(ILO) on the micro insurance

policies, 45% of micro insurance programs cover only one type of risk and 16% cover three types of risks. This feature of Afat Vimo adds to its attractiveness to both clients and investors.

3. It provides its clients risk mitigation measures and practices like fire safety trainings, and safe construction, and services for developing business activities among its low income clients.

### **3.7.2. Feedback of the program**

According to UNDP/ISDR (2007) a 2006 international evaluation survey of Afat Vimo program showed that 100% of the clients were willing to renew their contract, 75% felt that Afat Vimo gave them more protection, and 24% said Afat Vimo gave them considerable protection. All the clients surveyed believed that the program must be extended to more people that are in disaster prone and affected areas because they believed having insurance in critical times is very important, insurance decreases their dependency on donor and outside help, and also the affordability of the program was one of the reasons.

A review of the Regional Risk Transfer Initiative conducted in 2007 by the international consultant also found that the program is liked by the clients and there is request for its extension, it was also found that the insurance companies were quite quick in paying the claims, and flexible in explaining and arranging the terms of the insurance, and the review showed that the main value of this micro insurance program is in reducing the liability that can happen after a natural disaster to especially poor people.

### **3.7.3. Afat Vimo and susceptibility**

The main objective of Afat Vimo as explained above is to protect poor people's property and livelihood after a disaster. and as different surveys and reviews about the program proved that poor people found it very helpful in the time of disaster and one of the major effect of program was discovered as reducing the indebtedness that usually arise after a natural disaster and makes the poor people even poorer. It helps the poor people not to lose their livelihood and get trapped in poverty cycle after a disaster. for example after Gujarat earthquake in 2001 even after 2 years there were still people who were suffering from financial losses of that earthquake.

Insurance coverage makes the low-income less vulnerable and as explained in previous sections poverty and vulnerability are reversely correlated. When the people have the confidence and protection of insurance even after a disaster they can still continue their life and small businesses, some of them will engage in higher risk activities and will increase the standard of their living. Poverty is one direct subcomponent of susceptibility which is positively affected by this program some poor people claim that the payout from Afat Vimo is not enough for fully recovering the livelihood it's just enough for not falling into debt, it might be true that the insurance is not for making poor people rich it helps them to move out of poverty cycle by giving them confidence, credit, and security.

The other subcomponents that can possibly be affected by Afat Vimo are the housing condition and nutrition. Afat Vimo has some risk mitigation measure and training for the poor people on how to construct safe building, after a disaster that the victims get paid by the

insurance they can rebuild their houses in a better condition and with safety standards supported by the training team of the Afat Vimo.

The effect of the program on the nutrition is that one of the reactions of people especially low income people to disasters is to decrease their amount of consumption and food intake which in serious condition can even cause malnutrition but Afat Vimo by providing livelihood security for the poor people prevent them from engaging in such stressful coping strategies.

The program might affect the economic capacity and income distribution subcomponent of the susceptibility by affecting two indicators of Purchasing Power Parity (ppp) and Gini index. Afat Vimo by providing livelihood security to poor people, preventing them from indebtedness, and allowing them to engage in higher risk higher profit investments can possibly increase the Purchasing Power Parity(PPP) of the low-income people and decrease the income disparity in the country (Gini index).

#### **3.7.4. Afat Vimo and coping capacities**

The possible effects of the program on two subcomponents of coping capacities are disaster preparedness and early warning and material coverage (insurance). Afat Vimo increases the disaster preparedness among the poor people by training them and making them aware of risk mitigation activities this is one of the features of the program, however it doesn't adjust premium to risk reduction behavior and doesn't encourage the insured to take risk reduction activities the problem moral hazard by the clients (Bayer & Mechler, 2009; Bayer, Mechler, & Stigler, 2011). Afat Vimo needs to improve this problem because it offsets the positive risk mitigation measures it has. And the second subcomponent affected by the program is the insurance, Afat Vimo increases the involvement of the insurance companies and boost the

insurance industry, public insurance companies oriental insurance company and life insurance corporation of India provide insurance to the program. The insurance companies and AIDMI design the product and set the premiums in a cooperative manner (Mechler, Bayer, & Peppiatt, 2006). According to UNDP/ISDR (2007) before the start of Afat Vimo program 94% of the clients didn't have any other insurance, and since the time Afat Vimo has started 98% of them have no other insurance beside Afat Vimo. Afat Vimo increases the capacity of the society to cope with the disasters by providing them insurance which acts as a risk transfer mechanism for the clients.

### **3.7.5. Afat Vimo and adaptive capacities**

The program has some mitigation measures and training for the low income people which enables them and train them how to adapt to risk of disasters. The low income people are trained about the safety rules, dangerous behaviors, and safe construction so they can decrease the risk of a disaster. however the contribution of Afat Vimo to adaption strategies would be more significant if they could adjust the amount of premium to the risk reduction behavior and could create more incentives for the clients to adapt to the risk of natural disasters.

Another subcomponent of adaptive strategies that can possibly be affected by the program is the education, after a disaster poor people get involved in activities that can make them poorer and decrease their standard of living one of these activities can be dropping children from school however Afat Vimo can possibly prevent this type of stressful activities, and if not increasing the education in the country at least it prevents it's reduction.

India is one of the most populous countries of the world and 41.6% of the population live with the daily income of less than \$ 1.25. this population is highly at risk of many hazards, and they need a guaranteed support and cover other than merely relying on government and donor aid. The India pro poor regulatory system is creating a good environment and opportunity for the growth of micro insurance in this country and for keeping affordable premiums, since 2000 the Indian regulatory has made it compulsory for the insurers to provide insurance services for the low income people and they will be fined if they don't comply with the rules. The last case to be reviewed is one of the most recent innovative disaster insurance programs that is performed in Haiti.

### **3.8. MiCRO in Haiti**

Haiti is a country which is frequently exposed to different natural hazards, one of the most disastrous events that recently happened in Haiti in 2010 was an earthquake with the magnitude scale of 7.0 Richter, the earthquake caused fatalities of 220,000 ( CRED EM-DAT 2011).

The Multidimensional Poverty Index of Haiti is 0.306 and 54.9 % of the country live in daily income of less than \$ 1.25. after the devastating earthquake in 2010 Fokonze which is Haiti's leading microfinance institution realized the urgent need of a disaster insurance for its clients, Fokonze CEO Anne Hastings describes the condition of their 50000 clients in Haiti as follow: their housing condition is very weak that a simple wind can ruin the house completely and government doesn't support any housing program for them, most of the clients job is selling in marketplace so if a natural hazard happens it can ruin not only their houses but their merchandise and source of income all of these scenarios happened in the

devastating Haiti earthquake.

Many of them lost both their homes and their merchandise, and many people lost their lives.

As a result of the identified urgent need of Haitian people to disaster insurance, Micro insurance Catastrophe Risk Organization (MICRO) started in January 2011. It is an innovative micro insurance program to protect the micro entrepreneurs in Haiti from the financial losses of natural disasters. This program is the first of its own in Haiti. It targets informal sector, the low income people who have started their own small businesses for their income source and stability.

The experience of different natural disasters have proven that this group of people in the country are very vulnerable to natural disasters and they may lose the business and income they have made for years in just a moment. MICRO program has several founding partners and the main investors of the program are Mercy Corps and Fokonze microfinance institution which is already covering 50000 clients for catastrophic risks, it is one of the famous microfinance companies which uses innovative ways to reach low income people that are very difficult to access.

MiCRO program has an innovative claim settlement way, it uses a combination of both indemnity and index-based insurance. Because both types of insurance had some advantages and disadvantages, in order to pay the low income people according to the actual amount of loss they suffer, MiCRO uses the combination of both methods in addressing claim payments. Index-based insurance which the payments of a claims depend on a parameter to be triggered have the disadvantage of basis risk, which is the poor people may suffer amount of loss which is higher than the amount of triggered payment in this case the coverage will be in two part one part is parametric coverage, which has an addition the amount of basis risk will

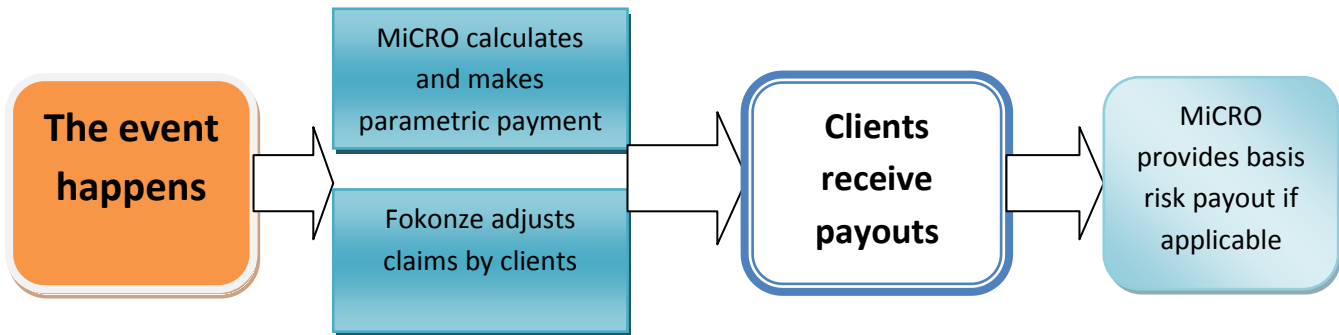


be paid by conventional indemnity insurance, in this way poor people will be paid for the actual amount of losses while still benefiting from the advantages of an index-based product, like affordable premium, less administration time& cost, faster payout.

The start of this model has been in Haiti, the program can be replicated in other parts of world as well. the MiCRO program in Haiti works through the microfinance institution Fokonze, All the clients of Fokonze have compulsory natural catastrophe insurance which protects their business if any natural disasters happen and devastate their business and livelihood.

When an event happens that triggers payment, the payment will be made after being calculated by MiCRO and adjusted by Fokonze depending on client's condition and amount of loss suffered. The parametric payouts will be paid to each client, and if the amount of payout is less than the actual amount of loss suffered by the client MiCRO will pay the amount of basis risk. This feature of the program is very innovative and is a solution to the problem of basis risk that is an issue in almost all the index-based products, basis risk can leave the client unpaid or underpaid and would create mistrust toward insurance products among poor people. Figure 3.5.shows the payment procedure in Haiti.

**Figure 3.5. MiCRO's payout procedure in Haiti**



**Source: MiCRO, overview of products and solutions**

The general procedure is that once a disaster happens and the amount of losses are paid by MiCRO to Fokonze, and Fokonze after adjusting the amount of loss per client will pay them.

The adjustment method is that solidarity group consisting of 5 members are formed, 6 of these groups make a center and each center has a chief that is trained by Fokonze, after a disaster it is the duty of the chief to check and report the losses suffered by every group and the decision is to be made through consensus within center groups as to whom the payment must be made, however this method is somehow controversial and can make the program into troubles although the leaders of the program claim that it is very viable program that can be capable of replication but this type of adjustment system can cause disputes, fraudulent reports, distrust, the probability of making mistake can be high, usually consensus within groups may be affected by emotional biasness, there might be personal relation between the chief and some members that may affect the correct and fair report, and there might be some distrust and quarrel between some members and the chief that can again affect the correct and fair report of the losses. This can be a threat to the financial viability of the program if they keep on paying for the losses that are fraudulently reported.

When a natural disaster happens the clients will be forgiven of their current loan balance and no need to pay for their loans, and they will be paid an average amount of cash for reconstruction based, and a new loan will be made available as soon as the client is ready and recovered.

Some natural hazards have happened in Haiti which the program demonstrated to be viable and able to make payouts to the clients and help them to recover more quickly. For example in early June 2011 a heavy rainfall happened which caused floods and mudslides and caused a number of fatalities, 3900 Fonkoze clients received payments to recover their businesses, to rebuild their houses, and to replace their assets. In 2011 hurricane season 6000 clients suffered losses and MiCRO provided loan and cash to the clients, the average amount for every client was \$ 270 (MiCRO ). All the information about MiCRO program has been achieved through several resources that are addressed completely in the bibliography section of the research. (MiCRO; microfinance focus: Fonkoze Rebuilding Haiti with Microinsurance, 2011; Swiss Re documents; Murphy, 2011).

### **3.8.1. MiCRO and susceptibility**

The focus of the program is mainly to help poor people to recover and restart their life and business after a natural disaster, so the main factor of susceptibility in this program is also on poverty. The program helps poor people trapped in poverty cycle especially after the devastating earthquake in Haiti to get out of the cycle. it is an innovative program which is believed to be scalable and replicable in other countries as well.

In Haiti as mentioned in previous part people live in very fragile houses that can easily be broken and gone with a simple natural disaster this was completely noticed after the

devastating earthquake of 2010. So people in Haiti especially those who are economically disadvantaged and don't have access to formal financial markets are at high risk of losing their house or their source of income they usually sell in stock market so they can lose their stocks and merchandise and get trapped in the poverty cycle. The program by providing quick recovery and payout help them to reconstruct again and to restart their business.

The program prevents poor people from engaging in stressful activities that make them, for example it prevents them from decreasing the amount of food intake , so the program can indirectly affect another factor of susceptibility which is Nutrition.

Another factor that the MiCRO program directly affects is the housing condition of the people of Haiti, the program not only helps them to reconstruct their houses after a natural disaster but also help them to build safer construction. The program is using he disaster as an opportunity for improving the living condition of poor people.

Although there is not any direct result of MiCRO program on the economic factor because the program is still new, but according to Murphy (2011) The MiCRO program gives the informal low income sector of Haiti the chance to build a foundation for future economic development. The program can possibly increase the purchasing power parity of the low income sector and reduce the income disparity in the country. So MiCRO program can decrease the susceptibility component of the social vulnerability by affecting four factors of Poverty, Nutrition, Housing condition, and Economic capacity either directly or indirectly.

### **3.8.2. MiCRO and coping capacities**

The program is mainly a coping strategy program, it is created to increase the capabilities to cope with natural hazards and prevent them from becoming disasters that affect in a destructive way the life and livelihood of the most vulnerable group within the country. to analyze the effects of program on coping capacities, there can be Two factors that MiCRO program directly improves that are, disaster preparedness and material coverage (insurance). MiCRO is a disaster preparedness program and is contributing to the disaster reduction programs of the country, and the effect of MiCRO on the insurance industry is that, it is increasing and opening a potential market for commercial insurers by creating a culture of trust and awareness among poor people about insurance products and performance. it is a challenging job to persuade poor people to pay for something that may happen in future and the benefit may come in future, MiCRO has taken the initiative as the first program in Haiti and it is paving the way for more growth of insurance sector in Haiti.

### **3.8.3. MiCRO and adaptive strategies**

The focus of the program is mostly on post disaster relief and recovery, however the program might have a positive effect on education because MiCRO provides quick post disaster help and payout to the poor people so they will not be affected negatively by the post disaster financial losses and will not need to drop the children from the school to reduce the costs so the education among low income people if not improved at least will be kept at the same rate and will not be dropped after disaster.

Another indicator that MiCRO can possibly improve is the adaption strategies, by helping the poor people and giving them the financial support to build safer houses actually they are

improving the adaptive capabilities and will reduce the need to coping strategies if for example the houses are stronger and more stable to the natural hazards so the number of people who lose their houses will be decreased, however the program can still increase and strengthen the adaptive strategies by applying other successful methods used in other programs that really improve the adaptive capability of the society.

The world leaders in the area of catastrophe risk solutions like Swiss Re believe that this program represents a viable model for micro insurance that can be replicable and scaled up in other developing countries of the world. The long-term vision of the program in Haiti is to protect them from more number of risks than just extreme natural hazards, and to expand the program to other countries. However, the program is quite new and still needs more consideration by the founders to improve it and make sure about the viability of the program especially if scaled up and if an extreme event like the earthquake in Haiti happens again are they really sustainable?

# Chapter Four

## Results and Discussion

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### **4. Results of the analyses**

The main objectives of this research were to find out the micro and macro impacts of disaster micro insurance. The micro impacts were on the poor people, and the macro impact was on the vulnerability of the country, moreover by finding the macro impact of disaster micro insurance on vulnerability, another impact of this product was also perceived that was the impact on reducing the risk of a disaster in a country.

According to Radermacher, Ashok, Zabel, & Dror (2009) Policy makers in the government, development organizations, civil society are considering if investing in disaster micro insurance products is beneficial? The results found in this research might be of some help in developing disaster micro insurance products.

Over all the analyses of the five products of disaster micro insurance led to three groups of results:

1. The impacts of disaster micro insurance on the poor people (micro impacts)
2. The impact of disaster micro insurance on reducing the social vulnerability of the country(macro impact)
3. The impact of disaster micro insurance in reducing disaster risk

## 4.1. The impacts on the poor people

Analyzing the five diversified cases of disaster micro insurance revealed how these products affect poor people, a summary of impacts are provided below however the in detail impacts of every case on the subcomponents are available in the previous chapter. All the reviewed cases had a significant impact on poverty alleviation. They can reduce poverty in different ways like.

1. By providing timely liquidity after a disaster they insured the livelihood security of poor families, and prevent poor families from engaging in informal stressful activities that are inadequate and a serious threat to poverty
2. By giving the sense of confidence and protection they encourage poor people to engage in higher risk higher benefit activities, for example in Kilimo Salama program farmers had the sense of confidence that if any hazard happens the insurance will pay for their input as a result they bought higher quality yields, fertilizer, chemicals that all of which increased their yield and income level, The clients without insurance coverage however remained poor and couldn't increase their income level, and a disaster could exacerbate the situation for them
3. By increasing the credibility of poor people, usually financial institutions like banks don't trust poor people and are not willing to give loans to poor people because of the risk of default, however insurance by acting as a guarantee between poor people and lenders will remove this problem and poor people can borrow money and loans. By having access to money ad loans poor people can invest in higher profit investments



and if a natural disaster happens the insurance will pay the loan, as is the case of MiCRO in Haiti.

Reduction in poverty will improve other factors:

1. Housing condition
2. Nutrition
3. Education
4. Purchasing power parity
5. Reduction in income disparity

All the reviewed cases provide products through different public- private partnerships; they all get the insurance companies involved. This will increase the trust to insurance companies and will increase the culture of insurance among poor people. Micro insurance is an untapped market for the insurers those who get involved in this area will benefit from the long term benefits of this product, will make client base and reliance that is useful for their future operation and more involvement of insurance companies will affect and boost the insurance industry of the country. All the cases to some extent have tried to increase adaption to climate change among poor people how ever this area still needs more strategies and encouragement from insurers, for example by giving discounts to those who have risk mitigation activities.

Most of the programs have increased the awareness about insurance, risk management, and the ways to decrease the risk of natural disasters among poor people through different ways like teaching campaign, brochures, SMS, etc.

Poor people usually are not aware of the risks that might happen to them, they also don't know how to protect against them and what are the available products, they may use some traditional risk protection strategies that are not adequate for the covariant risk of natural disasters. The index-based insurance products that have access to weather station and receive regular information of the weather condition can help and share the information with poor people as in Kilimo Salama that they send regular information about the probable risky events and give them suggestions to protect themselves.

In low and middle income countries that there are many poor people change in their income level, and increase in their investments and profitable activities can affect the economy of the country. For example in a country that 50% of population are farmers, improvement in farming practices and higher yield crops will affect the economy of the country.

#### **4.2. The impact of disaster micro insurance on social vulnerability**

The results show that a micro program can have a macro impact on the country. The analyses of cases demonstrate that disaster micro insurance programs can reduce the social vulnerability of a country by affecting its subcomponent of susceptibility, coping capacity, and adaptive strategies. The programs could decrease the likelihood of suffering loss and harm( susceptibility), they all increased and developed strategies to reduce negative consequences of disasters(coping capacity), and they encouraged adaptive strategies for long term societal change and a building a resilience community (adaptive strategies). Low and middle income countries are very vulnerable to natural disasters a well designed, viable, and sustainable disaster micro insurance for the poor people not only has several affects on different indicators but we can also reduce the vulnerability of the country.

### **4.3. The impact of disaster micro insurance on disasters risk**

A major consideration for the disaster risk management community is whether and how micro insurance programs can reduce the risk of a disaster.

The results of the analyses show that disaster micro insurance products can reduce the risk of a disaster in a country. Risk of a disaster according to world risk index is a function of social vulnerability and exposure to natural hazards. Simply disaster micro insurance by having the potential to decrease the social vulnerability can directly reduce the risk of a disaster. countries may not be able to decrease the exposure to natural hazards for example due to their hazard prone location but there are some ways to reduce the risk that hazard becomes a disaster, one of these ways can be through disaster micro insurance products.

### **4.4. Challenges of disaster micro insurance growth**

Although this research has tried to demonstrate the positive impacts of disaster micro insurance but an impotent point is that, disaster micro insurance e is a new product and insuring the covariant risk of natural disasters as explained in chapter one is very challenging. There are many cases of disaster micro insurance that failed and were not successful. Brown & Churchill (2000 b) almost 11 years ago listed the challenges for the growth of micro insurance, interestingly almost all of these challenges still remain. some of these issues were also observed in the cases reviewed in this paper. Considering these points is of high importance for growing and developing a sustainable and viable product.

1. The regulatory environment is restrictive for providing insurance to low income people in developing countries. Some rules like the minimum investment requirement,

licensing, and investment restriction are unintentionally biased toward the large commercial insurers serving the middle, and rich sector of the courtiers. Recently there have been movements toward the improvement of regulatory system for development of micro insurance, like in India, Philippines, and African countries that the government has shown interest in promoting of micro insurance for example in India since 2000 the Indian regulatory has made it compulsory for the insurers to provide insurance services for the low income people and they will be fined if they don't comply with the rules. But still in many developing countries the rules are not in favor of micro insurance growth.

2. Commercial insurers in developing countries are one major source of micro insurance development, due to their expertise and customer base however they are not willing to serve the low income sector of the society and this sector is not attractive for them and seems unprofitable, but the truth is that low income sector is a potential growth market for insurers. Micro insurance is an untapped growth market for insurance companies the insurers who are in micro insurance sector are not only helping to serve the unmet needs of the poor people but they are also creating a strong credibility and customer base which can be beneficial for their future it is expected that the current low income clients are future middle income clients who will be able to purchase commercial insurance; It is estimated that 5 trillion USD of the global consumer market is made up low-income people (Swiss Re, 2010) which shows this sector is a great market opportunity for the financial service providers like insurers.
3. Transaction costs, high transaction cost can be a threat to the sustainability of micro insurance programs from the insurer's point of view, high transaction costs may

require them to ask for higher premiums which also makes the product unattractive to the poor people how ever this problem has significantly been removed in the new model of insurance index-based insurance.

4. Lack of awareness about insurance products is one major obstacle that has been observed in all the cases reviewed in this research, and the difficulty of persuading the low income people to pay regular premiums for an event that might happen in future, so if no event happens the poor people feel that their money was wasted and they don't have extra money to waste some of them don't even have enough money for their basic needs. This problem has been tried to approach by different micro insurance programs for example the HARITA program which uses the pay as you work model that enables the poor people to pay by their labor.
5. Affordability of premiums: one challenge for provider of micro insurance products is keeping the premium amounts affordable for the clients and also at a level that doesn't threaten the viability of the program and insurers. If the program is not financially viable for the insurers and other partners it cannot continue its operation this problem has been noticed in Afat Vimo case that needs consideration.
6. Micro insurance products must be an answer to the needs of the poor people not based on the needs of the providers of the programs for example life and credit life products are for the benefit of micro finance to protect against the risk of default resulting from the death of loan takers! So are they really a product for the poor people?

# Chapter Five

## Conclusion

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This research has analyzed five disaster micro insurance products to find out the possible impacts of disaster micro insurance on poor people (micro impact), and the impact of this product on reducing the social vulnerability of a country (macro impact).

The study found that natural disaster micro insurance can enhance the social framework condition of the society, and can increase the capacity of the people and the country to cope with disasters and prevent a natural hazard to become a natural disaster.

The reviewed cases all showed the potential to improve post disaster recovery in low income countries which are highly reliant on arbitrary post disaster donor aids, they all could prevent poor people from engaging in high stressful activities that are a major threat to poverty and can trap them into the vicious cycle of poverty, all the cases were effective in reducing the poverty of people, and helped them to increase their income level by engaging in higher risk higher profit investments.

In the time that natural disasters have risen in both number and intensity, the vulnerability of low and middle-income countries and especially the poor people with in these countries is of high importance. Low and middle income countries usually rely substantially on the post disaster donor help which is not any more adequate with the substantial rise in the number and intensity of disasters, this research by showing the potential impacts of disaster micro insurance has tried to encourage the provision of disaster micro insurance for post disaster

recovery and risk management. Although the research has demonstrated the positive impacts of disaster micro insurance but it also emphasize that not all the disaster micro insurance products create the positive results shown in this research, there are many number of disaster micro insurance programs that failed and were not sustainable when a disaster happened. Providing a disaster micro insurance product requires a perfect, professional design of the product, and cooperation between different parties, insurance companies can support the program by their expertise, governments can create favorable regulatory for provision of micro insurance products. Disaster micro insurance products have to reach to a balance point of being both affordable for the poor client and viable to face the risk of covariant natural disasters, not too expensive to make it unattractive and not very free to make in unsustainable.

Efficient public-private partnership and subsidies from government and donors are very important for the affordability and sustainability of the product.

In low-income countries, the culture of insurance is almost nil, increasing the awareness of the product among low-income people is very important for the growth of the product, also cultural changes about insurance is required. Insurers need to know their low-income clients and their needs; low-income people must know and get familiar with the products and benefits of insurance.

Disaster micro insurance like many other financial services has its pros and cons, but well designed products can help in reduce poverty (Millennium Development Goals), and create resilient nations to natural disasters (HFA).

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