



# THE USE OF FINANCIAL PRODUCTS IN MITIGATING NATURAL DISASTER RISK

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## LIST OF ACRONYMS

|              |   |
|--------------|---|
| <b>DRR</b>   | Disaster Risk Reduction                             |
| <b>FAO</b>   | Food and Agriculture Organization                   |
| <b>FSIN</b>  | Food Security Information Network                   |
| <b>ILFAD</b> | Indonesia Liquidity Facility after Disaster program |
| <b>IFPRI</b> | International Food Policy Research Institute        |
| <b>MFI</b> s | Micro-Finance Institutions                          |
| <b>NGO</b> s | Non-Governmental Organizations                      |
| <b>OFDA</b>  | Office of Foreign Disaster Assistance               |
| <b>PPI</b>   | Progress out of Poverty Index                       |
| <b>STAR</b>  | Study of the Tsunami Aftermath and Recovery         |
| <b>TWG</b>   | Resilience Measurement Technical Working Group      |
| <b>USAID</b> | US Agency for International Development             |
| <b>WFP</b>   | World Food Program                                  |

# EXECUTIVE SUMMARY

This report presents key findings and recommendations based on a survey of 600 households in Indonesia on levels of actual and perceived vulnerability to natural disasters, and how this links to the demand for and use of financial products for coping and recovery. This quantitative household survey was conducted in parts of Yogyakarta and West Sumatra that had experienced either earthquakes and/or volcanic eruptions over the last ten years. All households in the survey were clients of financial institutions in these regions, and half of them used financial institutions that offered disaster related financial products.

## The key findings and recommendations are as follows:

**Financial services are more readily used by households to support recovery, but currently do not compensate for relief immediately after disasters.** Relief programs must continue to serve as a critical immediate safety net for basic needs for disaster affected households, but recovery should focus on increasing financial options and allowing households to better leverage their existing financial options towards long-term resilience.

**Existing access to financial services may not translate to use of savings and financial services for disaster risk mitigation.** Development actors and financial institutions must do more to support households with financial planning and understand financial protection options for disaster risk reduction (DRR). The relative barriers for using particular products to manage risk must be better understood.

**Expected losses from disaster are more pronounced for business income than wages, and for households with lower job and asset security.** Financial service providers and development actors supporting financial institutions must place greater emphasis on developing financial products that help business owners mitigate disaster effects.

**There is little demand for commitment savings and insurance products for risk reduction, in contrast to high-demand for flexible savings accounts. The lack of demand for insurance is consistent with global evidence, and may be linked to lack of trust, lack of financial capability and heterogeneity in need for such risk protection.** Development actors working on financial services should focus on savings and loans products that more broadly meet clients' needs, while increasing awareness around the potential use of products for DRR. Insurance should be targeted only to a specific client base with income streams most likely to be impacted by disaster.

**Access to disaster-related financial services can have net psychological and behavioural benefits for investment.** Cost-benefit analyses of disaster-related financial products should consider the broader psychological, productive and other benefits from holding these products.

## 1. INTRODUCTION

Globally, the frequency of natural disasters has steadily increased in recent decades, particularly the devastating storms and floods that many associate with climate change. Asia and the Pacific have borne the brunt of this alarming trend: natural disasters are now four times more likely to affect people in the region than those in Africa, and 25 times more likely than those in Europe. Natural disasters caused around \$45 billion worth of damage in Asia and Pacific in 2015 alone, affecting more than 59 million people, and financial losses from natural disasters continue to increase, with low-income populations feeling the greatest impact. A comprehensive disaster risk financing and insurance strategy can increase the resilience of vulnerable communities against the financial impact of disasters (World Bank, 2014). However, while there is a growing body of literature on the importance of financial products for building household resilience to natural disasters (Cole et al, 2012), research to understand what influences the uptake and use of products for disaster risk mitigation that could help inform the design and reach of these products has been limited.

To help fill this gap, Mercy Corps commissioned a quantitative household survey in two disaster-prone regions in Indonesia. The study was designed to build on Mercy Corps' existing research in this area that highlights

the contribution of savings and formal credit in disaster resilience<sup>3</sup>. Specifically this study examined the factors influencing households' decisions to use financial services as a strategy for coping and recovering from natural disasters, and therefore as a capacity to improve their resilience

Indonesia is located on the Pacific Ring of Fire – an area with high tectonic activity – and has the second longest coastline in the world, making the country particularly vulnerable to earthquakes, volcanic eruptions, and tsunamis as well as to other risks driven by climate change (UNISDR, 2017). With more than half a million people a year affected, the country is considered among the world's most vulnerable nations to natural disasters (UNU, 2016) and therefore an ideal case study.

This research was conducted in conjunction with the evaluation of the Mercy Corps-led Indonesia Liquidity Facility after Disaster (ILFAD) program, funded by the United States Agency for International Development (USAID), Office of Foreign Disaster Assistance (OFDA). ILFAD promoted the design and uptake of unique financial products designed to help households address large-scale natural disasters. Mercy Corps Indonesia implemented the ILFAD initiative to build the operational capacity of 162 microfinance institutions (MFIs) in post-disaster settings and offer a number of disaster related financial products through 15 partner MFIs, which were used by over 2,200 clients. ILFAD implementation areas provided a unique opportunity to improve understanding on what attitudinal, behavioural and product design features most influenced the uptake and use of financial products towards disaster risk mitigation.

In August 2016, a survey with over 2,500 people was conducted in parts of Yogyakarta and West Sumatra that had experienced either earthquakes and/or volcanic eruptions over the last ten years. The survey focused on assessing household vulnerability to losses due to natural disasters, and the related attitudinal, behavioural and product design factors that influenced the use of financial products in enhancing disaster resilience; the sample was therefore targeted at users and potential users of disaster-related financial products. All households in the survey were clients of financial institutions in these regions and half of them, clients of financial institutions supported by Mercy Corps to develop disaster related products. This allowed a comparison to be made between households that were familiar with disaster related products and those that were not. Around 95% of respondents had savings accounts and around three-quarters had loans from financial institutions. As such, the sample is not representative of the country's population as almost half of Indonesians do not use financial institutions (World Bank, 2016).

The next section provides a brief overview of the existing development economics related to financial services, based on literature in this area. This is followed by a description of the methodology that was used to design, implement and analyse the survey. Then the findings of the survey are presented. The final section concludes and provides some recommendations.

## 2. LITERATURE REVIEW

This section provides a brief overview of the academic literature in development economics on the impacts of natural disasters, and the range of capacities employed to help households cope with and recovery from disasters. It also specifically examines the use of savings and insurance, and how this relates to disaster resilience.

Mercy Corps defines resilience as the capacity of households and communities in complex socio-ecological systems to learn, cope, adapt and transform in the face of shocks and stresses.

<sup>3</sup> See the following examples of Mercy Corps' existing research in this area:

In the Philippines after Typhoon Yolanda: [https://www.mercycorps.org/sites/default/files/Philippines%20Resilience%20ToC%20Testing%20Report\\_Final\\_03.06.15.cm\\_.pdf](https://www.mercycorps.org/sites/default/files/Philippines%20Resilience%20ToC%20Testing%20Report_Final_03.06.15.cm_.pdf)

In Nepal after the Gorkha earthquake:

[https://www.mercycorps.org/sites/default/files/NEPAL%20EARTHQUAKE%20REPORT\\_FINAL\\_PRINT.pdf](https://www.mercycorps.org/sites/default/files/NEPAL%20EARTHQUAKE%20REPORT_FINAL_PRINT.pdf)

In Chennai after severe floods:

[https://www.mercycorps.org/sites/default/files/BRIEF\\_Transforming%20Chennai\\_Mercy%20Corps\\_Okapi\\_0.pdf](https://www.mercycorps.org/sites/default/files/BRIEF_Transforming%20Chennai_Mercy%20Corps_Okapi_0.pdf)

Riset Inovasi Edukasi

## Impacts of disasters and disaster response

A growing body of literature in development economics provides quantitative evidence on the short-term and long-term impacts of natural disasters. Such disasters, in particular climate-related disasters, have been increasing in frequency and magnitude. This literature informs policymaking by providing evidence on the magnitude of impacts, and recovery dynamics. Research generally finds that the impacts of major disaster events can be severe and persistent, the latter due to a number of mechanisms, from destruction of capital and loss of supply chains (De Mel et al, 2012), to damage to early-life human capital development of children. Furthermore, relief aid and other interventions can be pivotal in the recovery process (i.e., De Mel et al, 2012; Adhvaryu et al, 2016). One of the most prominent sets of research came from the Study of the Tsunami Aftermath and Recovery (STAR) project, which conducted five rounds of data collection in North Aceh after the 2004 tsunami<sup>4</sup>. Beyond documenting the tsunami's impacts on family, consumption, health, education, and other outcomes, as well as recovery dynamics, these studies also provide novel evidence on less-researched indicators such as stress and mental health (Frankenberg et al, 2012; Frankenberg et al, 2008; De mel, et al 2008). In recent years, as longer-term datasets have come available on weather events and economic outcomes, it has become possible to look at longer-term disaster impacts. Hsiang and Jina (2014), for example, leverage data on 6,700 cyclones worldwide over 1950-2008, to show that on average such disasters cause significant decreases in national income that do not fully recover even after 20 years.

The literature also provides evidence on how households cope with shocks and disasters, even in the absence of outside interventions. Adhvaryu et al (2015) show that when Tanzanian coffee farmers face downturns in global coffee prices, they tend to shift their effort more into non-farm household enterprise activity. Shrader (2016) shows that albacore fishers in the northern Pacific almost completely adapt to forecasted climate variation driven by the El Nino Southern Oscillation, by making decisions about when to employ their fishing boats or pursue other economic activities. These papers and others highlight the critical role of alternative economic options which are not sensitive to the same risks, in supporting resilience. Yet, Bryan et al (2014) show that the presence of options, are not necessarily enough, as their low-cost intervention to increase seasonal migration in Bangladesh during lean seasons (essentially providing the cost of a bus ticket to the nearest urban centre), has significant returns in terms of income.

A large, complementary body of literature in economics shows that there are limits to local coping mechanisms to shocks and stresses, due to major disasters or more frequent and familiar events, pointing more specifically to why disaster impacts are significant and often persistent. One rationale is based on the limits of informal coping strategies in addressing shocks, as it is intuitive that when a disaster hits a local area, many people will be affected, and so attempts to share resources between households may be impossible. In fact, informal coping strategies are limited even when shocks only affect certain members of the community, which is usually attributed to strategic constraints in wealth sharing between households (Townsend 1994; Banerjee and Dulfo 2011, chapter 6). Furthermore, the lack of depth of financial markets in many developing countries means that formal insurance, savings and credit options are not available in amounts and forms that can fully address the needs during disaster events. In addition, when disasters occur financial institutions themselves are often affected and cannot serve clients immediately.

## Insurance and Savings as Strategies to Aid in Disaster Resilience

While there are large and quickly-growing bodies of literatures on credit, savings and insurance in developing countries, there has been less of a focus on how this contributes to disaster mitigation. Even in the case of insurance, perhaps the most pervasive stylized fact in the literature has been the relatively low demand for insurance to date, making it challenging to assess their performance during disaster events. A key part of the research challenge is that major disaster events are rarely observed, hence it can be difficult to carry out empirical studies in which the use of products is tested immediately after a real disaster event. Nonetheless, the literature does provide some relevant lessons, which are briefly summarized below.

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<sup>4</sup> See: <http://stardata.org/research.html>

## › Savings

- » In the context of saving for health shocks, simply providing a safe place to put money can substantially increase savings. Adding earmarking (i.e., labels on funds that can motivate people not to put their savings to other uses, due to ‘mental accounting’<sup>5</sup> effects) can further increase savings if the earmarking is for health emergencies, or for when individuals frequently face social taxation<sup>6</sup>. Group-based savings and credit schemes were also effective in increasing savings, apparently because of social monitoring and accountability (Dupas and Robinson, 2013; Breza and Chandrasekhar, 2015; Kast et al, 2016).
- » Access to savings can have effects on investments in agricultural inputs and subsequent yields, profit and household expenditure (Brune et al, 2016). This aligns with the idea that savings can serve as a form of “self-insurance,” which can encourage people to take on riskier, but higher return, production choices.

## › Insurance

- » Risk can be as important a factor in inhibiting agricultural and business investment as is lack of access to capital. In a randomized control trial study with farmers in Ghana, Karlan et al (2014) find that providing access to credit alone leads to no impacts, while insurance alone leads to intermediate impacts and the two together, to large impacts. One possibility is that settings where farmers or entrepreneurs face significant risk of loss from weather, they may be wary to take on credit, which only amplifies their downside risk from a bad weather year.
- » Demand for insurance is generally low because of the price relative to perceived benefits. However a number of non-price factors – such as higher household income, greater financial literacy, lower income and diversification, trust and familiarity with the insurance provider and insurance product, higher yields and rainfall variability – can increase demand for crop-based insurance (Cole et al, 2013). To the best of our knowledge comparable research does not exist for insurance products focused on natural disasters other than those caused by weather.
- » Promotion of insurance by insurance sellers by focusing on vulnerability, group/family responsibilities or network-based trust may increase demand for insurance (Cole et al, 2012). The reason appears to be that because the events triggering payouts of insurance are relatively infrequent, it can be important to enhance the salience of such events, especially when they are not very recent.
- » Access to insurance can have ex ante benefits (i.e., even before a disaster event is realized), in motivating greater risk-taking in productive activities (i.e., planting cash crops rather than more secure, but less lucrative, subsistence crops) (Janzen and Carter, 2013; Cole et al, 2017; Barrett et al, 2014) as well as in improving peace of mind (Tafere et al, 2015).

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<sup>5</sup> ‘Mental accounting’ refers to people behaving as if money coming from different sources or labelled for different purposes leads them to use those funds in different ways, even if there’s nothing actually preventing them from using the funds for any purpose. For example, creating two identical, fully flexible savings accounts, one called “everyday” and one called “disaster savings” could lead to people being much more likely to use the funds in each account only for the labelled purpose, even if there is nothing formally preventing them from doing otherwise.

<sup>6</sup> ‘Social taxation’ refers to the communal sharing of funds in a social group, usually tied to norms around communal rights to income and wealth. For example, a farmer or business person who is observed to have a particularly good earnings year may be approached by family members and friends to share some of the excess proceeds. In this sense the sharing norms act like a tax, as the producer of the income loses out on a percentage of their earnings, which can reduce their incentive to put in maximum earnings effort, or to make their earnings like publicly visible.

# 3. METHODOLOGY

This section discusses how the quantitative survey was designed, how the respondents were selected and the type of data analysis that was conducted.

## 3.1. Conceptual Basis for Survey Design

This sub-section describes some of the principles that were used to guide the measurement strategy. These are outlined in more detail in Toth et al (2016).

### Measurement of Vulnerability and Resilience

In recent years, as greater attention has been given to the process of disaster prevention and mitigation as opposed to disaster relief alone, development actors, policymakers and researchers have taken a greater interest in measuring *vulnerability* and *resilience*. One way to interpret the distinction between *vulnerability* and *resilience* in the context of disasters is that the former is about the *likelihood and impact of disaster events*, whereas resilience is concerned with *strategies and actions taken to reduce the likelihood of the event happening, or mitigate its severity or negative effects*.

This interest has spurred the emergence of a body of literature on characterizing and measuring these concepts, for use in development, policy and practice. Much of the work at the nexus of academics and practitioners has occurred under the auspices of the Resilience Measurement Technical Working Group (TWG)<sup>7</sup>, which is convened under the Food Security Information Network (FSIN), a joint activity by the Food and Agriculture Organization (FAO), International Food Policy Research Institute (IFPRI) and World Food Program (WFP), of which Mercy Corps is part.

A strand of the research has focused on the *quantitative* measurement of vulnerability and resilience (Constas et al, 2014; Hoddinott and Quisumbing, 2010), which has been guided by theoretical foundations (Barrett and Constas, 2014). This recent literature has provided important foundational principles and guidance for the development of research strategy and survey instrument in the current study (ANNEX A provides further details about these principles and how they were applied in this survey).

### Financial Products as Instruments to Transfer Wealth Over Time

Financial products (i.e., credit, savings, insurance) are fundamental instruments to transfer resources over time in different ways (Toth et al, 2016). For example, credit allows individuals to access resources now and pay them off later. Savings involve putting resources away now so they will be accessible later. Insurance allows the same but in a less accessible sense, as it will only be paid out under certain conditions. The functions of these products can also overlap – i.e., commitment savings<sup>8</sup> starts to look a lot like insurance (permitting withdraw only under certain conditions), while savings can act like “self-credit” and “self-insurance” (permitting lending or bailing out oneself, respectively, if the conditions are right). These payment structures mean that the products have different accessibility – i.e., since savings and insurance involve giving resources up front to an agent only to access them later, they have a much less stringent due diligence process than credit, which cast greater risk on the agent. Furthermore “behavioural” (i.e., psychological) factors may imply that financial products may serve additional functions. For example, a commitment savings product may be valuable because it helps an individual resist the temptation to spent funds on non-essential items.

Hence, products in this sense need not refer to formal products offered by established financial institutions, they can also refer to informal instruments for transferring resources over time, whether that be loans from friends and family or moneylenders, remittances, remunerative opportunities investing in a colleague’s enterprise, or informal insurance provided through social networks. In this research we take this broad

<sup>7</sup> <http://www.fsincop.net/topics/resilience-measurement/technical-working-group/en/>

<sup>8</sup> Savings account that have restrictions, such as not being able to access the funds for a fixed period (for example a term deposit savings account).



perspective, attempting to hone in on the properties of financial products that individuals and households access, desire, and use, rather than focusing on specific, formal financial products (and associated nomenclature).

## Key Research Questions

Survey questions were designed to be able to address the following key research questions (the sections of this report where the findings for these questions are discussed are included in brackets):

1. What is the state of disaster resilience in the target populations? (Section 4.1 and 4.2)
2. What are the various forms of economic and social capital that households have access to in order to mitigate the impact of disasters, maintain well-being during a disaster event and recover quickly afterward? (Section 4.1 and 4.2)
3. How do households' characteristics relate to demand for disaster oriented financial products? (Section 4.2)
4. How does the demand for disaster resilience relate to current levels of economic well-being? (Section 4.2)
5. Are there key differences in respondents' perceptions of vulnerability to disasters even within the same community? How does this relate to resilience-seeking behaviours, including current efforts to mitigate disaster risk through financial products, and/or expressed in doing so in the future or through alternative financial products? (Section 4.1 and 4.2)
6. What role can psychological, cultural or behavioural factors play in demand for financial products? (Section 4.2)
7. What are the potential additional positive benefits of holding disaster resilience products? (Section 4.2)

In line with the questions above, the survey covered the following topics:

- » Section A, B and C – Background Characteristics of Respondents
- » Section D – General Use of Financial Products
- » Section E - Experience and Perceptions in Facing Natural Disasters
- » Section F - Risk Mitigation Practices from Natural Disaster Losses
- » Section G - Preferences for Features of Financial Products
- » Section H - Broader Potential Benefits of Disaster-related Financial Products

The survey questions were kept as simple as possible to minimise the risk of unintended noise in the data due respondents having to make several hypothetical choices.

## 3.2 Survey Respondents

The survey was conducted in Agam and Padang in West Sumatra and Sleman in Yogyakarta. These areas have experienced severe disasters, such as earthquakes and volcanic eruptions over the last 10 years. Through the ILFAD program, Mercy Corps supported MFIs operating in the research target areas. In Indonesia, MFIs include rural banks and cooperatives. This sub-section discusses how the survey respondents were selected from these areas and provides information on their background characteristics.

Respondents were drawn from clients of MFIs as they were the target market of disaster related financial products. Specifically, respondents were drawn from three categories:

| ILFAD product users  | ILFAD non-users   | Non-members of ILFAD MFIs  |
|--|---|--|
| <p>Users of the disaster related financial products that were developed during the ILFAD program and offered by Mercy Corps partner MFIs. Respondents were selected from the 5 MFIs with the highest number of clients using ILFAD supported products.</p> | <p>Members of Mercy Corps partner MFIs who did not chose to use the disaster-related financial products. This group of people would have most likely heard about ILFAD supported products through communication from their MFI, but did not elect to purchase them.</p> | <p>Within this category there are two groups:</p> <p><u>Neighbours of ILFAD product users</u> – Immediate neighbouring household to ILFAD users, who had an active bank account with a non-ILFAD formal financial institution. This ensured that they would be similar in many respects to ILFAD MFI members.</p> <p><u>Clients of MFIs that do not provide ILFAD products</u> – Clients of MFIs that Mercy Corps had relationships with but the MFIs had chosen not to participate in the ILFAD program. They share some characteristics with Mercy Corps partner MFIs’ members as they are clients of similar MFIs.</p> <p>Both groups within this category were unlikely to have heard about specific disaster related financial products, such as those offered through the ILFAD program.</p> |

The survey was conducted with a total of 600 respondents: 150 ILFAD product users, 150 ILFAD non-users in financial institutions offering ILFAD products, and 300 non-members. The principles guiding this sampling design were as follows: First, to focus the sample on a subset of the population that is likely to form the base of ongoing or next potential customers for disaster-oriented financial products. Hence, we limited the sample to individuals who already have a relationship with a financial institution, including users and non-users of ILFAD products in institutions offering ILFAD supported products (half the sample), and individuals from financial institutions not currently offering disaster-oriented financial products. Second, the sample size was as large as possible given the limited resources available for this study. Representativeness of the sample was maintained through random sampling of clients *within* the financial institutions that were selected.

From each of the five participating Mercy Corps partner MFIs, 30 users and 30 non-users were randomly selected (this was stratified by province so that roughly equal numbers were drawn from Yogyakarta and West Sumatra). The 300 non-members were selected as follows: 150 were a neighbouring household for each of the 150 ILFAD users. The other 150 were selected from six MFIs that do not offer ILFAD products. From each of these MFIs, 25 people were randomly drawn from their client base (this was stratified by province). More details about the sampling strategy can be found in ANNEX B.

The sampling strategy affects how representative the findings of the survey are as relying on the clients of Mercy Corps partner MFIs led to a concentration of respondents that used various types of MFIs in different areas. In Yogyakarta, 77% of respondents used cooperatives as these were the predominant type of MFIs available in this location, while only 2% used rural banks. Similarly, 71% of respondents in West Sumatra used rural banks (the type of ILFAD MFIs in this location) and only 6% used cooperatives.

Basic background information about the survey respondents are shown in the box below. As intended by the sampling strategy, the respondents had similar background characteristics across all MFI users listed above (ILFAD product users, ILFAD non-users and non-members).

## Background Characteristics of Respondents

The following provides a basic overview of the households that participated in the survey:

- Gender (Head of Household)
  - 87% of respondents were male
- Education (Head of Household)
  - 15% tertiary education
  - 47% secondary education
  - 38% primary or no education
- Employment (Head of Household)
  - 40% work in formal sector
  - 50% work in informal sector
  - 10% are not working
- Household size
  - 68% of households had 3 to 5 people<sup>9</sup>.
- Poverty
  - Just over 25% of households have more than a 70% probability as being categorised as poor according to the Progress out of Poverty Index (PPI)<sup>10</sup>.

## 3.3 Survey Analysis

Two main types of analysis - descriptive statistics and multivariate regression – were conducted to analyse the survey data to answer the questions discussed in 3.1.

### Descriptive statistics

This type of analysis aggregates the findings of the survey. The researchers were able to make useful inferences by understanding the fraction of respondents that used or intended to use different types of financial products, the vulnerability to disasters that households believed they faced, and their preferences for different types of financial products. As part of this analysis, the researchers made comparisons as to whether statistically significant differences existed between ILFAD product users, non-users, and non-members for all questions in the survey.

### Multivariate regression

The multivariate regression is a more sophisticated form of analysis whereby relationships between multiple variables are determined. Specifically, multivariate logit regressions were conducted to determine the marginal influence of one variable after controlling for the effect of others. For example, by using this approach it is possible to determine how expectations about losses in income from disasters in the future are likely to influence the demand for disaster-related financial products after taking into account household assets and education. In this example, household assets and education are 'controlled for' or held constant so that just the relationship between expectations about losses in income from disasters in the future can be compared with the demand for disaster related financial products. It is essential to control for factors such as education and assets as it is anticipated they vary with expectations about losses in income from disasters in the future (i.e., lower education and assets are positively related with expecting significant losses in income from disasters in the future). These are considered control variables. The variables that were controlled for in all multivariate regressions in this report are shown in the table below.

<sup>9</sup> ILFAD product users tend to have slightly larger households compared to non-ILFAD users and non-members (4.37 people compared to 4.01 and 3.93).

<sup>10</sup> ILFAD product users tend to be slightly poorer and made up 39.8% of the bottom 20% of the entire distribution (based on the Progress out of Poverty Index), while non-users made up 33.5% and non-members made up 26.7%.

**TABLE 3.1 – VARIABLES USED IN THE MULTIVARIATE REGRESSION ANALYSIS**

| Independent Variables  |
|--|
| ILFAD product user, non-user or non-member   |
| Location (either West Sumatra or Yogyakarta)   |
| Age of head of household   |
| Sex of head of household   |
| Education of head of household   |
| Occupation of head of household  |
| PPI score of household   |
| Assets of household  |
| Income of household  |
| Believed probability of severe disaster in next five years (just include earthquake and volcanic eruption) |
| Expected impact on current primary labour income   |
| Expected impact on current business income   |
| Use of formal savings  |
| Use of formal loans  |
| Previous help from Government or NGO to recover from disaster  |
| Previous help from local community to recover from disaster  |
| Previous withdraw of savings from financial institutions to recover from disaster                          |
| Situation now compared to before previous disaster   |
| Attitude about importance of financial products to protect against disaster                                |
| Preference for flexible savings  |



The results of the descriptive analysis and multivariate regressions are intertwined in the discussion of the findings of the survey in the following section. Where references are made to characteristics being associated with or related to aspects of behaviour or preferences these have been determined using the multivariate regression method. All associations that are reported are statistically significant at conventional levels<sup>11</sup>. The relative magnitude of the impact of different variables is not discussed as this varies depending on what assumptions are made about the control variables. As much as possible, the discussion is kept simple so that it remains accessible for a wide audience of readers.

## 4. SURVEY FINDINGS

This section of the report presents the findings of the survey in two main sub-sections. The first examines the use of financial products in past disasters and the second section discusses the potential for greater use of financial products in future disasters. Background information about the general use of financial products by respondents can be found in ANNEX C.

### 4.1 Role of Financial Products in Past Disasters

**Key Finding:** Expected losses from disaster are more pronounced for business income than wages.

**Recommendation:** Financial service providers and development actors supporting financial institutions must place greater emphasis on developing financial products that help business owners mitigate disaster effects.

<sup>11</sup> p-value of 0.05 and t-statistic of 1.96

**Key Finding:** Financial services are more readily used by households to support recovery, but currently do not compensate for relief immediately after disasters.

**Recommendation:** Relief programs must continue to serve as a critical immediate safety net for basic needs for disaster affected households, but recovery should focus on increasing financial options and allowing households to better leverage their existing financial options towards long-term resilience.

Over 95% of respondents in the survey reported having had experienced at least one severe<sup>12</sup> disaster in the last five years and financial products provided an important role for many in coping with and recovering from disasters. Financial institutions are accessible in these areas with 95% of respondents stating cost or distance are not major barriers to access. This section provides an outline of the vulnerability to disasters respondents faced as well as illustrates how financial products were used to respond to past disasters.

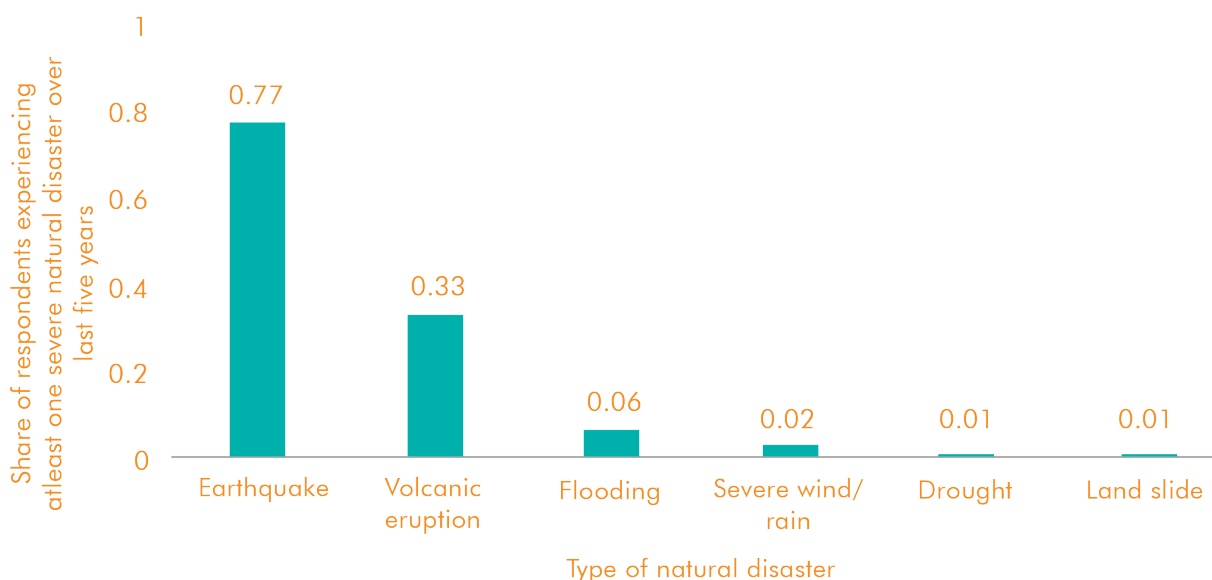
### 4.1.1 Vulnerability to Disasters and Disaster Occurrence

The main types of catastrophic disasters that have occurred in Yogyakarta are earthquakes and volcanic eruptions, whereas earthquakes and tsunamis were the primary disasters that occurred in West Sumatra. These disasters have had significant impact on the income and livelihood of those living in these locations. The frequency and expected impact of disasters on respondents to this survey are discussed below.

#### Disaster occurrence and future vulnerability

A large share of respondents had experienced either an earthquake or volcanic eruption over the last five years. Almost 80% of respondents had experienced at least one earth-quake, and two-thirds of respondents in Yogyakarta had experienced at least one volcanic eruption. Surprisingly, few other severe natural disasters are reported to have occurred in the last five years, as can be seen in the chart below.

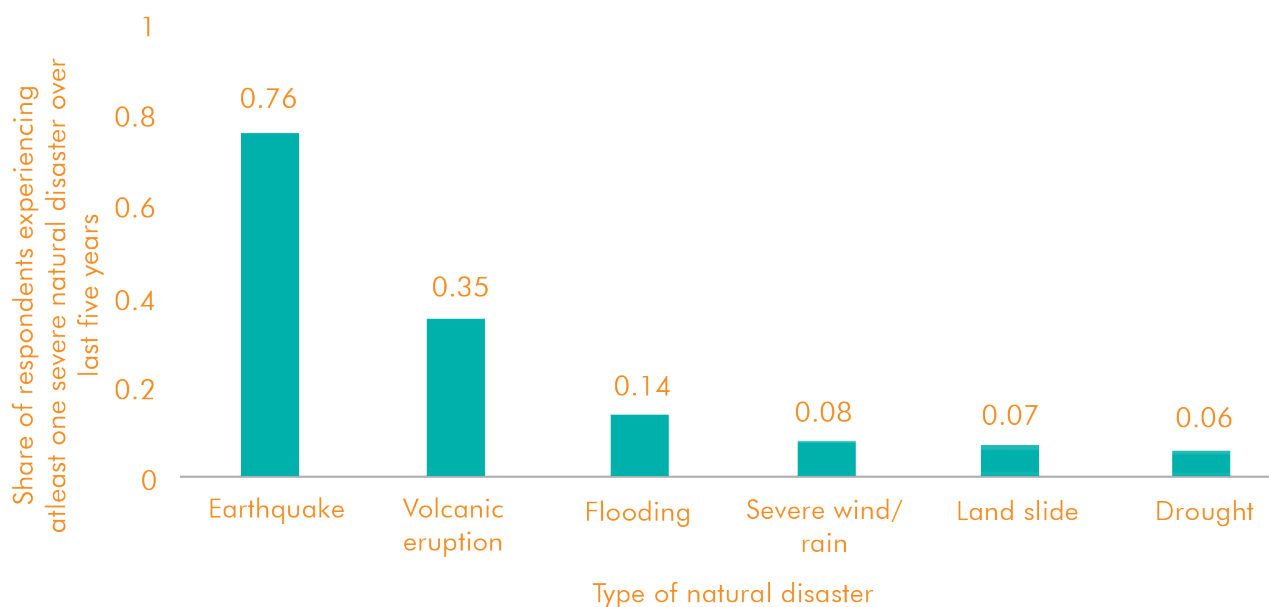
FIGURE 4.1 – FREQUENCY OF PAST NATURAL DISASTERS



There was a high correlation between respondents' past experience of severe disasters and their perceived likelihood of experiencing disasters in the near future. This can be seen in the chart below that shows a very similar pattern to Figure 4.1 above. This was particularly the case in Yogyakarta where the correlation between past experience of severe natural disasters and perceived likelihood of future disasters was over 0.6. In West Sumatra, a similar fraction of respondents expected at least one earthquake in the next five years as had experienced an earthquake over in the last five years.

<sup>12</sup> 'Severe' was defined as causing monetary damage, or some disruption of productive activity for at least 100 people within one kilometer of the respondents' household.

**FIGURE 4.2 – EXPECTATIONS ABOUT FUTURE DISASTERS**



### Impact of disaster

In general, respondents expected that disasters would have larger impact on their business income than their labour income. This can be seen in the table below that summarises the severity of the expected loss from disasters by labour and business income sources. It is important to note that the expected losses are relative to their current level of income as opposed to the absolute loss in income, which is likely to be larger for richer respondents.

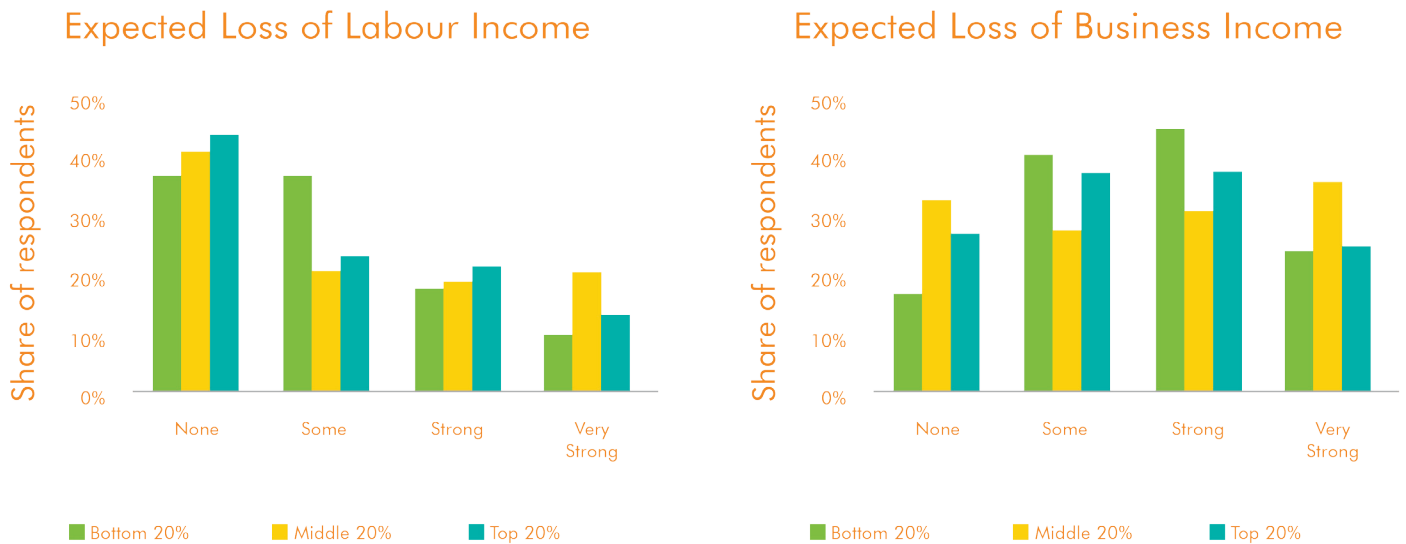
**TABLE 4.1 – EXPECTED LOSS BY INCOME SOURCE**

| Expected loss | Labour Income  |                  |                 | Business Income |                  |                 |
|---------------|----------------|------------------|-----------------|-----------------|------------------|-----------------|
|               | Primary source | Secondary source | Tertiary source | Primary source  | Secondary source | Tertiary source |
| None          | 39.2%          | 43.7%            | 34.7%           | 17.2%           | 11.1%            | 18.2%           |
| Some          | 27.8%          | 29.7%            | 26.5%           | 28.6%           | 20%              | 22.7%           |
| Strong        | 20.4%          | 18.4%            | 30.6%           | 30.6%           | 34.7%            | 38.6%           |
| Very Strong   | 12.5%          | 8.2%             | 8.2%            | 23.6%           | 34.2%            | 20.5%           |

The expected loss of income from disasters is negatively associated with key household characteristics. In regards to business income, expecting a larger business income loss was positively associated with having lower household assets. A larger expected loss from labour income was positively associated with not having post-secondary education and working in the informal sector. Additionally, respondents who expected bigger losses were less likely to have received help from the government/NGOs or withdraw savings from financial institutions during past disasters. This evidence would suggest that key household characteristics may contribute to resilience and are related to their expected income loss.

Poorer respondents are slightly more likely to report expecting some impact on their level of income from natural disasters than wealthier respondents, but were less likely to expect severe impacts. This can be seen in the charts below. The poorest 40% of respondents also reported being more likely to be worried about sharp drops in prices for their crops and livestock following disasters compared to other respondents (25% compared to 18%).

**FIGURE 4.3 – EXPECTED LOSS FROM NATURAL DISASTERS**



### Differences within communities and between sub-groups

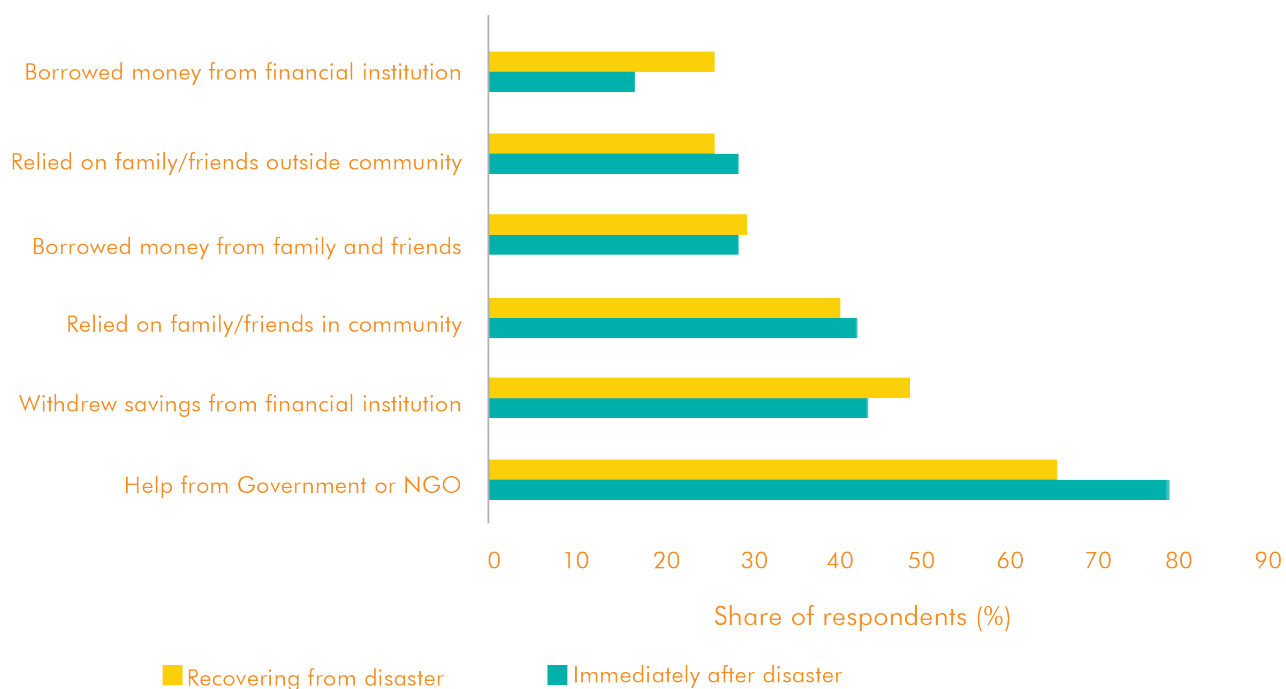
There were relatively few differences within communities regarding the frequency of past natural disasters, expectations about the future likelihood of disasters and expected loss of income. Only a few communities in Yogyakarta (Mlati, Pakem, Turi) had reported having experienced volcanic eruptions. At least one respondent in all communities in the survey reported having experienced an earthquake during the last five years. There was relatively small variance within communities of having experienced a disaster in the past and a larger variance between communities. In other words, most respondents in communities that have experienced a greater number of disasters reported this to be the case and vice versa. In general, there tended to be larger variation within communities in terms of the expected loss of labour income compared to business income.

There was some variation between Mercy Corps partner MFI members and non-members as well as across the income distribution. Mercy Corps partner MFI members were more likely to have experienced a disaster (98%) compared to non-members (90%). This may be due to Mercy Corps partner MFIs being more closely located to the centre of disasters. Interestingly, the poorest 20% of the distribution was less likely to report or expect a volcanic eruption (23% compared to 35%) and more likely to report or expect an earthquake compared to the rest of the distribution (86% compared to 75%).

### 4.1.2 Role of Financial Products Immediately After and While Recovering From Disasters

Despite having experienced severe disasters, over 80% of respondents thought that their family conditions had recovered or were better than before the last disaster they experienced. The ways households have coped during and recovered from disasters tends to be by relying on help from the Government, Non-Government Organisations (NGOs), family and friends as well as by drawing savings from financial institutions. Figure 4.4 below shows that this does not vary greatly between coping immediately after and while recovering from disasters, except for the fall in respondents relying on help from the Government or NGOs and the increase in the use of savings and loans from financial institutions. The characteristics associated with the ways people respond to disasters are discussed below.

**FIGURE 4.4 – MOST COMMON WAYS TO COPE IMMEDIATELY AFTER AND RECOVER FROM DISASTERS**



### Help from the Government or NGOs

Receiving help from the government or an NGO was by far the most common way to cope immediately after disasters with around 80% of respondents benefiting from their assistance which was positively associated with not having post-secondary education and expecting a bigger business income loss from disaster. Interestingly, poorer respondents were less likely to have received help.

Around two-thirds of respondents relied upon help from the government or NGOs to recover from disasters. In addition to the factors outlined above, having a female and younger head of household was positively related to receiving assistance.

### Withdrawing from financial institutions

Almost half of the respondents withdrew existing savings from financial institutions to cope immediately after and recover from disasters. However, the poorest quintile of respondents were less likely to withdraw savings to recover from disasters (36%) compared to the rest of the distribution (53%), even though they were just as likely to have a savings account.

Withdrawing savings immediately after or to recover from natural disasters was positively associated with having greater than primary school education attainment, working in the informal sector and expecting a smaller impact on labour income during disasters. This would suggest that certain household characteristics make them more or less predisposed to use their savings for coping and recovery. In addition, savings appears to be used as a coping strategy when there are lower expected effects on respondents' labour income.

### Relied upon family and friends

More than 40% of respondents relied upon family and friends in the local community and around 30% relied on family and friends elsewhere in Indonesia, pointing to the importance of both bonding and bridging social capital for disaster coping and recovery. Assistance from family and friends in the local community was positively related to being more likely to expect a disaster in the next five years, which suggests that households with higher perceived vulnerability invest greater effort in maintaining social networks, or social capital, that can protect them after a disaster event. Assistance from family and friends elsewhere in Indonesia is positively associated with expecting a larger loss of labour or business income from disaster,



and working in the informal sector. These are natural implications of the fact that large disasters are more likely to weaken the ability of local risk-sharing institutions to shoulder the loss when many households in the community are affected, so households with the greatest disaster risk exposure will seek to develop sources of assistance outside the immediate disaster zone.

## Loans

Borrowing from financial institutions was more common among respondents to assist them in recovering from disasters (26%) as opposed to coping immediately after natural disasters (17%). Borrowing is positively associated with being more likely to work in the formal sector and expecting disasters to have a smaller impact on business income. This is consistent with respondents who are more confident that they can repay loans following disasters pursuing this option.

## Insurance

Only 2% of respondents used insurance to help them cope in the immediate aftermath or to recover from disasters. ILFAD product users represented the vast majority of respondents who reported using insurance. This is likely due to insurance being sold bundled with other financial products under Mercy Corps partner cooperatives. Around 7% of ILFAD product users reported claiming insurance immediately following disasters in the past compared to just 1% of non-users and non-members. Respondents in the bottom 20% or top 20% of the income distribution were half as likely to claim insurance to recover from a disaster compared to others.

# 4.2 Factors Influencing the Future Use of Formal Financial Products to Cope With and Recover From Future Disasters



**Key Finding:** Existing access to financial services may not translate to use of savings and financial services for disaster risk mitigation.

**Recommendation:** Development actors and financial institutions must do more to support households with financial planning and understand financial protection options for DRR. The relative barriers for using particular products to manage risk must be better understood.



**Key Finding:** There is little demand for commitment savings and insurance products for risk reduction, in contrast to high-demand for flexible savings accounts. The lack of demand for insurance is consistent with global evidence, and may be linked to lack of trust, lack of financial capability and heterogeneity in need for such risk protection.

**Recommendation:** Development actors working on financial services should focus on savings and loans products that more broadly meet clients' needs, while increasing awareness around the potential use of products for DRR. Insurance should be targeted only to a specific client base with income streams most likely to be impacted by disaster.



**Key Finding:** Access to disaster-related financial services can have net psychological and behavioural benefits for investment.

**Recommendation:** Cost-benefit analyses of disaster-related financial products should consider the broader psychological, productive and other benefits from holding these products.

Greater use of formal financial products by households to cope with and recover from severe disasters is often considered more desirable than informal financial alternatives. This sub-section presents the ways respondents plan to financially protect against future disasters, what they would like greater access to, the features of financial products respondents find most appealing, and how psychological aspects affect the demand for financial products.

## 4.2.1 Demand for The Use of Financial Products to Prepare for Future Disasters

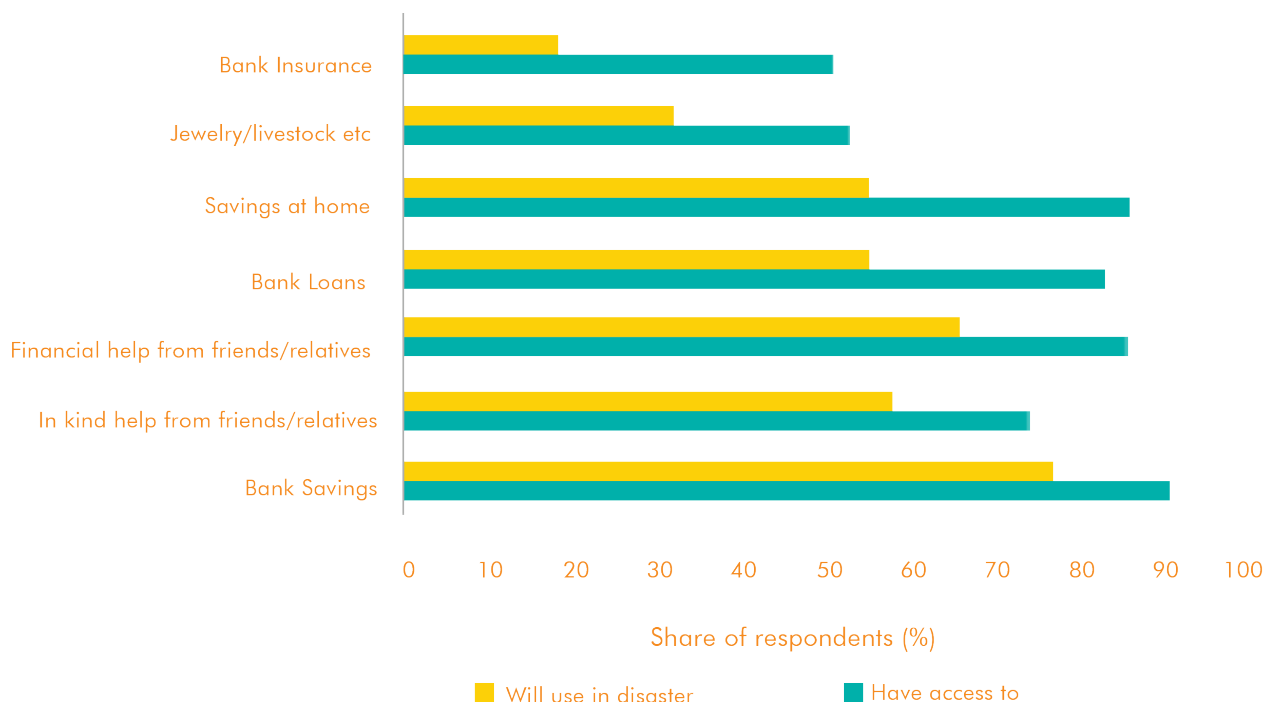
This segment of the report outlines the strategies that respondents anticipate they will use to protect their family finances from future disasters and what they would like to have greater access to.

### Existing strategies to protect finances and their relative use for mitigating disaster impacts

The survey shows that respondents have access to many financial options but they do not plan on using them all to mitigate the negative impacts on disaster (section F of the survey includes questions on this topic). The most common options that respondents have access to is savings at a financial institution (91%), savings at home (86%) and relying on family and friends for financial support (85%). There were not significant differences between ILFAD users, non-users and non-members, except that ILFAD product users were slightly more likely to use formal financial products.

The discrepancy between having access and actually using to options to cope with and recover from disaster can be seen in Figure 4.5 (respondents could select more than one strategy). Withdrawing savings from a financial institution and getting financial support from family and friends remain popular (85% and 79% respectively of people who have these options will use them), however planning on using informal savings (savings at home) following a disaster is far less popular (only 64% of people who have access to this type of option plan on using it).

**FIGURE 4.5 – WAYS RESPONDENTS HAVE ACCESS TO AND PLAN ON USING FINANCES FOR COPING AND RECOVERY IN THE EVENT OF DISASTERS IN THE FUTURE**



Interestingly, while insurance from banks and cooperatives are accessible to around half of respondents, less than 20% of all respondents plan on actually using this type of financial product in a disaster. This would seem to indicate that even if access to these kinds of more sophisticated products were increased it would not necessarily lead to a dramatic increase in the share of the population that would actually take them up. This finding is consistent with existing literature on insurance, which suggests potential mechanisms such as lack of trust, lack of familiarity and financial literacy to appreciate the value of such products, and heterogeneity in need for the product (e.g., some households are more exposed than others), as barriers to take-up (e.g., Cole et al, 2013), though the survey does not allow us to tease out these mechanisms in great depth. The exception is in regards to trust, whereby only 2 out of the 600 respondents included in the survey stated that they did not trust financial institutions. As such it is unlikely that a lack of trust is leading to low demand for

insurance. It is important to note that the survey questions on demand for financial products didn't use words like "insurance" rather the function of insurance was described in words (i.e., "something you pay for that only pays out under certain conditions"). As such it is unlikely that low demand from insurance is being driven by a lack of familiarity with the terminology. Hence further research would be warranted to tease out barriers such as financial product design and heterogeneous perceived need, is constraining take-up of disaster-oriented financial products.

## Unavailable financial options desired by respondents so they can prepare for future financial disasters

The scope for further developing and increasing the use of financial products to protect from disasters depends upon the level of untapped demand. This survey sheds some light on this by asking respondents what options they would like to have access to but currently do not so they are able to better prepare their family finances for future disasters. The most common responses were savings in the form of jewellery and livestock (assets) (17%), financial support from family and friends (15%) and savings at home (14%). Interestingly, the survey points to a greater demand for informal and relatively low-risk financial access as opposed to formal financial services. Table 4.2 below shows the fraction of respondents lacking access to specific options to financially protect and the fraction that would like to have these options.

**TABLE 4.2 – WAYS RESPONDENTS CURRENTLY LACK ACCESS TO AND WOULD LIKE TO HAVE ACCESS TO FINANCIALLY PROTECT THEMSELVES FOR FUTURE DISASTERS**

|   | Lack access to | Would like to have access |
|---|----------------|---------------------------|
| Formal Bank Savings                         | 9.0            | 9.0                       |
| Informal Savings at home                    | 13.7           | 13.7                      |
| Financial support from friends/relatives    | 14.8           | 14.8                      |
| Formal Bank Loans                           | 17.0           | 10.8                      |
| In kind support from friends/relatives      | 26.5           | 10.7                      |
| Informal savings, such as jewelry/livestock | 46.7           | 17.1                      |
| Formal Coop Saving                          | 38.8           | 9.9                       |
| Formal Coop Loan                            | 39.2           | 9.8                       |
| Formal Bank Insurance                       | 48.7           | 9.9                       |
| Formal Coop Insurance                       | 55.0           | 8.2                       |

All respondents that did not have savings at a bank, savings at home and could not rely on family and friends would like these options available to them. As discussed in the previous section, these were among the most common options that respondents had access to. Gaining access to formal loans was also highly desirable among respondents who currently do not have access.

Beyond the four most popular options, the degree of untapped demand is surprisingly low. For example, interest in insurance products from banks or cooperatives is very low, while half of respondents lack access to these products, only 20% of them would like access. However even if this group of respondents had access this would not necessarily lead to use. The previous section showed the gap between having access to insurance and using insurance is larger than all the other options to financially protect, which is consistent with literature that documents barriers to uptake of insurance such as lack of familiar with literacy with these relatively complex products, and heterogeneous perceived risk (Cole et al, 2013).

### 4.2.2 Features of Disaster-Related Financial Products

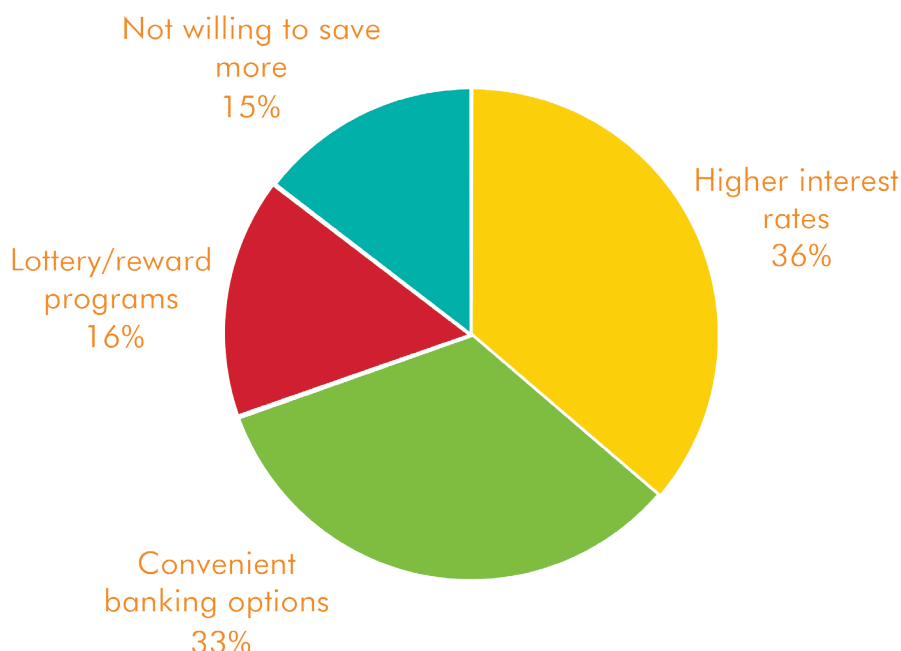
Almost all respondents take action to financially protect themselves for future disasters, however only around one third explicitly allocate funds for natural disasters. This is roughly the same across the income distribution and more common among ILFAD product users, which may be due to the location of Mercy Corps partner MFIs being closer to the epicentre of disasters. The following discusses the features of disaster related financial products that respondents prefer.

## Features of disaster-related savings products

Respondents overwhelmingly prioritise having savings accounts that are very flexible. Almost 90% of respondents indicated they strongly prefer savings products where funds could be withdrawn at any time rather than commitment or term-deposit accounts. The main reasons for this was 'flexibility in withdrawing is most important for me' and 'I like to be the one decides what and when to use my money'. These preferences did not vary with household income, level of assets or likelihood of being in poverty.

There were only a small number of popular ways to entice respondents to save more (see figure 4.6 below). Over one third of respondents listed receiving higher interest rates as their first preference for what would lead them to save more. This was followed by more convenient banking options (around 33%) (mobile banking or bank representatives visiting households) and lottery/reward programs (around 15%). Preferring higher interest rates was positively correlated with being more likely to expect a disaster in the future. Lower income households preferred savings being collected from their house whereas richer and more educated respondents preferred mobile money banking. A preference for lottery/rewards programs was more popular among people with no or primary school education.

**FIGURE 4.6 – FEATURES OF SAVINGS ACCOUNTS THAT WOULD ENTICE RESPONDENTS TO SAVE MORE (% OF RESPONDENTS)**



There were notable differences between ILFAD product users, non-users and non-members. ILFAD product users were more likely to prefer having a flexible savings account compared to non-users and non-members. This suggests that they found disaster-specific savings restrictive. Non-members of Mercy Corps partner MFIs were more likely to prefer not to have any type of disaster related savings product compared to members of Mercy Corps partner MFIs. These findings do not seem to be driven by concerns about the reliability of financial institutions. Only 2 out of the 600 respondents mentioned they didn't trust financial institutions. Hence it may be that in the case of complex products, familiarity may help breed demand (e.g., Dupas, 2014).

## Features of disaster-related insurance products

Households that expected larger losses to their current income (both labour and business) due to disasters were more likely to prefer insurance products specifically designed for disasters. However respondents in the top 40% of the distribution were more than twice as likely to prefer not to have this type of financial product compared to the rest of the distribution (10% vs 5%). As expected, ILFAD product users were more likely to show interest in insurance products just for disasters compared to non-users and non-members.

Preferences for the nature of premiums and payout combination of insurance products varied based upon respondents' expectations of the likelihood of future disasters. More than two thirds of respondents selected insurance products that require lower monthly premiums (but had lower payouts) as their first preference making this option by far the most popular. There was a positive relationship between low premiums being most important and being more likely to expect a disaster in the future, perhaps due to more vulnerable households feeling less able to invest in disaster resilience. 4

Respondents also expressed different preferences for the timing of when they are required to pay premiums for disaster related insurance products. ILFAD product users were more likely to prefer to pay insurance premiums regularly, whereas households with lower incomes and those that more likely to expect a disaster in the future preferred to pay one off premiums when they received a windfall. This may again be a product of familiarity: existing ILFAD product users familiar with comfortable with a consistent payment stream (and having internalized the necessary discipline to allocate smaller, more regular premium payments). Whereas non-users may be more pessimistic about their ability to make regular, disciplined payments, consistent with a broad set of literature on savings in developing countries (see Banerjee and Dulfo, 2011).

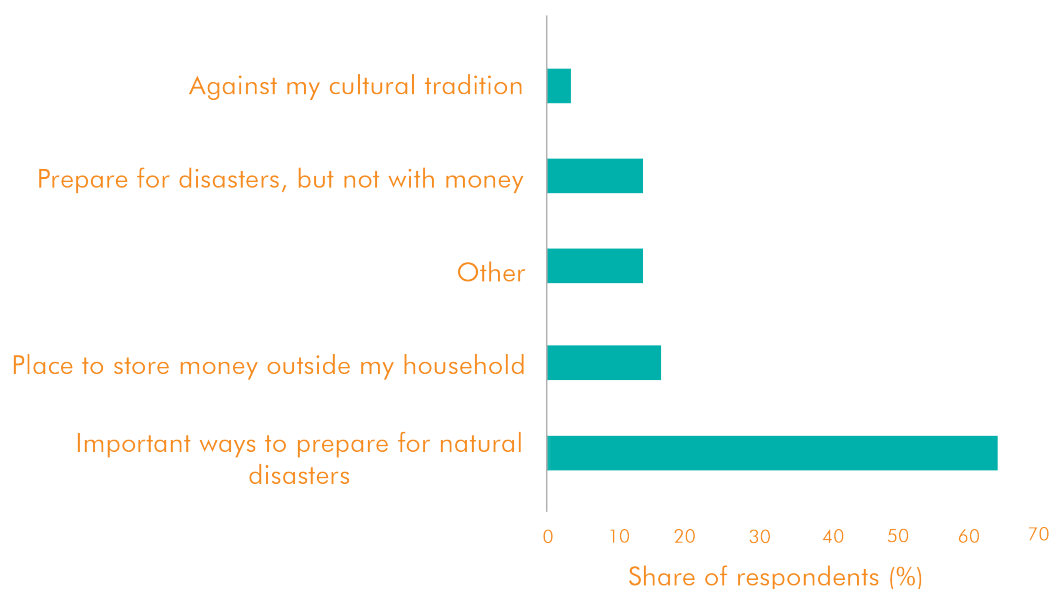
### 4.2.3 Psychological Aspects of the Demand For Disaster-Related Financial Products

Respondents' beliefs about disaster-related financial products and cultural context effects their preferences for specific products. The following two sub-sections provide details about respondents' beliefs about the importance of disaster related financial products and the broader psychological benefits they would expect them to bring about.

#### Beliefs around importance of disaster related financial products

Respondents were asked what they believed about disaster-related financial products and the most popular responses are discussed below along with a discussion about the limited role that karma played in affecting demand for these products (see Figure 4.7).

FIGURE 4.7 – BELIEFS ABOUT THE IMPORTANCE OF DISASTER-RELATED FINANCIAL PRODUCTS<sup>13</sup>



*Financial products are an important way to prepare for disasters* - Almost two-thirds of respondents selected this response and around half believe the community thinks this is the case. Having a lower household income is associated with this belief. ILFAD users were also more likely to report that financial products are important ways to prepare for disasters compared to non-users and non-members (89% compared to 61% and 52%), again consistent with salience and familiarity effects that have been suggested previously.

<sup>13</sup> Respondents could select more than one option

*I need places to store money for natural disaster outside my household* - 16% of respondents selected this response and only 12% believe the wider community holds this view. This perspective was positively correlated with having a male head of household, having a higher level of income, being more likely to expect a disaster in the future and being more likely to expect larger losses of labour income from disasters.

*Prepare for disasters, but not with money* - Around 14% of respondents selected this response whereas 19% believe the community agrees. This belief is associated with being poorer, less likely to expect a disaster and not preferring liquid savings products. Non-users and non-members were much more likely to select this belief compared with ILFAD product users (17% and 18% compared to 2%).

*The limited role of karma* - Contrary to anecdotal evidence, concerns about potential bad Karma by investing or planning for a disaster and going against cultural traditions<sup>14</sup> was not a major issue. Only 4% of respondents mentioned this.

## Broader psychological benefits of financial products

The survey suggests that there are a number of broader psychological benefits from disaster related financial products (see Table 4.3 below). The most popular were less anxiety and stress in life (86%), more motivation to invest in business or farm (76%) and more motivation to invest in the household (67%). There was a positive relationship between being more motivated to invest in one's household due to disaster related financial products and being more likely to expect a disaster in the future as well as being a member of a Mercy Corps partner MFI. Poorer households were also more likely to report that disaster related financial products lead them to feel 'less of a need to rely on other sources of assistance during a disaster situation', which is consistent with poorer households feeling more vulnerable to disaster events.

**TABLE 4.3 – BROADER PSYCHOLOGICAL BENEFITS FROM HOLDING FINANCIAL PRODUCTS**

| Broader benefits from disaster focused financial products | Share of respondents |
|---|----------------------|
| Less stress and anxiety                                   | 86%                  |
| More likely to invest in business or farm                 | 76%                  |
| More likely to invest in household                        | 67%                  |
| Less need to rely on others                               | 58%                  |
| No significant effect on behavior or life                 | 12%                  |

Note: Respondents could select more than one option

<sup>14</sup> Anecdotal evidence had suggested that in some of the study areas people subscribe to the belief that if they talk about or actively prepare for a disaster (e.g., by investing in an explicitly disaster-oriented financial product), then they increase the chances of experiencing such adverse event in the future.

## 5. RECOMMENDATIONS

The proceeding analysis leads us to a few salient findings. We find that formal financial services are underutilized relative to the potential market for these products as a safety net during disasters. However these products are often unfamiliar to potential users who often have low financial literacy, hence it is critical to adapt the product mix to users' current demands, while continuing to build financial literacy that can support a more sophisticated product mix. In a setting in which users have only a couple years of experience with disaster-related financial products, we see a particularly strong preference for simple, flexible products. It is important to recognize that different users have different needs, particularly due to the risk exposure of their income sources, which means that some products may only be of interest to a particularly sub-population. Finally, we see that potential users find a value in disaster-related products above and beyond the prospective benefit of enhancing financial resources in the wake of a disaster, as the mere presence of such risk protection leads to psychological benefits that can motivate additional investment in activities that are subject to disaster risk. These findings lead us to the following targeted recommendations:

1. Relief programs must continue to serve as a safety net for disaster affected households, but recovery should focus on supporting better leveraging formal financial services to support long-term resilience.
2. Development actors and financial institutions must do more to support households with understanding the potential benefits financial protection options for disaster risk reduction. The relative barriers for using particular products to manage risk must be better understood.
3. Financial services providers, and development actors supporting financial institutions, should place greater emphasis on developing and marketing financial products for business owners to mitigate disaster effects
4. Development actors working on financial services should focus on savings and loans products that more broadly meet clients' needs, while increasing awareness around the potential use of insurance and more complex savings products for disaster risk reduction.
5. Cost-benefit analyses of disaster-related financial products should consider the broader productive and psychological benefits from holding these products, such as more investment in productive activities due to greater peace of mind. These benefits to disaster-related financial products occur even if a disaster event does not trigger a payout, yielding socio-economic benefits even if the targeted disaster event is relatively rare.

## 6. CONCLUSIONS

This report has shown the overall importance of supporting financial inclusion by meeting client preferences while also more closely building client disaster risk awareness. Some conclusions that emerge are the following:

**There is broad-based demand for standard, unrestricted savings accounts.** However, there is variability in demand for different features of savings accounts, such as higher interest rates, convenience of access, and lottery/reward programs.

**Insurance should be targeted to a specific client base, particularly small businesses and employees in the informal sector who are more vulnerable to disaster.** This may suggest greater tailoring of insurance products to a more focused, but still sufficiently large, subset of clients, and meeting their other product preferences, e.g., lower monthly payments (and lower corresponding payoffs). Other findings suggest that such a subset of clients is more likely to be made up of business owners than laborers.

**Cost-benefit analyses of investing in financial inclusion should consider the broader psychological and productive benefits from holding these products.** Cost-benefit analyses of disaster-related financial products usually focus on the benefits they bring after a disaster event has occurred – in mitigating loss in the immediate aftermath of a disaster, and in enabling rapid recovery. Study findings on psychological and productive benefits of disaster-related financial products suggest strongly that such products can bring benefits

even in the absence of disaster – in reducing anxiety and stress, and in motivating productive investment in enterprises, farms and households. While these benefits have not been quantified in monetary terms in this study, the results suggest that these benefits should receive consideration, if not efforts to quantify them, in the future.

Finally, the study points to the need for more in-depth research on the **barriers and potential spillover effects of using financial services for disaster risk recovery, once access is secured**. The results show that study respondents still have high dependency on friends and neighbors for coping with and recovering from previous disasters. In addition, many people in the study who have access to financial products report they may not use them to cope or recovery from disasters. For example, less than 40% of respondents who have access to insurance plan on actually using this type of financial product in the event of a disaster. Hence it is possible that as long as disaster-related products have sufficient penetration at community level, natural social sharing mechanisms will ensure broader resource coverage, in a kind of “blanket effect”. However, it is also possible that as such products reach higher penetration rates, they can crowd out these social institutions and hence dampen this effect.





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## 8. ANNEXES

### ANNEX A – Measurement of Vulnerability and Resilience in this Survey

Constas et al (2014) provide a set of ten principles for the measurement of vulnerability and resilience, which is discussed in more detail in the research plan for this project (Toth et al, 2016). Measurement of vulnerability and resilience in the survey drew upon the principles from Constas et al (2014) in particular in the following ways:

- » Measurement Principle 2: “The role played by subjective states in resilience, such as perceptions of shocks, perceived utility of actions taken or not taken, and general expectations of future states, should be included as key components of resilience measurement. The potential value of qualitative indicators should be included as an element of such subjective assessments.”
  - » We include modules to collect subjective perceptions of vulnerability to shocks and potential losses from catastrophic events.<sup>15</sup> In addition we include questions on qualitative measures of well-being and peace of mind in the final section of the survey.
- » Measurement Principle 4: “Resilience measures should be sensitive to the specific types of shocks and/or stressors that are seen as threatening a given development outcome. The necessity of highly detailed, technically sound shock modules is therefore central to resilience measurement.”
  - » We carefully calibrated the shock modules to precisely define the catastrophic events and the magnitude of impact into terms of number of nearby citizens affected in production or mortality.
- » Measurement Principle 8: “The time points at which data on resilience capacity, and shocks and stressors are collected should be informed by knowledge of expected rates of change/growth associated with a particular unit or scale of measurement for resilience capacity.”
  - » We used qualitative investigation prior to fielding the quantitative survey to calibrate recovery timelines and important recovery indicators.
- » Measurement Principle 9: “Resilience measures should build on the knowledge gained from studies of vulnerability and the contents of existing vulnerability measures and coping measures should be used as key points of reference for constructing resilience measures.”
  - » We used qualitative investigation prior to fielding the quantitative survey to calibrate appropriate measures of vulnerability and resilience in the study settings.
- » Measurement Principle 10: “The ability to explain heterogeneous effects of vulnerability conditions that lead to food insecurity represents one of the key challenges of measurement and analysis. The ability to measure resilience should facilitate efforts to explain heterogeneous response to shocks and stresses observed in households and communities with different and similar levels of vulnerability. Measures of resilience should assess the way in which resilience capacities mediate the consequences of shocks.”
  - » We collected a number of key covariates in the surveys and report on heterogeneity along these dimensions where they are salient in the analysis.

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<sup>15</sup> In doing so we also draw on state-of-the-art technical literature, e.g., Delavande, A., Gine, X., & McKenzie, D. 2011. “Eliciting Probabilistic Expectations with Visual Aids in Developing Countries: How Sensitive Are Answers to Variations in Elicitation Design?” *Journal Applied Econometrics*, 26, 479-497; Delavande, A., McKenzie, D., & Gine, X. 2010. “Measuring Subjective Expectations in Developing Countries: A Critical Review and New Evidence.” *Journal of Development Economics*, 94(2), 151-63.

## **ANNEX B – Further Details about the Sampling Method**

Selection of the samples from the disaster specific product user and the non-product users was conducted using Stratified Random Sampling. Stratification was based on clusters of clients' residence to lessen the potential of spread of respondents in logistically inefficient areas.

One rural bank and two cooperatives were selected to participate in this study in each province, totalling to six Non-Mercy Corps partner MFIs.

Since the selection of the cooperatives in West Sumatra from among the Mercy Corps-trained MFI list were not possible (all trained MFIs were rural banks), cooperatives were selected from the network of the researchers and Mercy Corps staff.

### **ILFAD product users**

For the stratified random sampling for ILFAD product users, clusters were first formed by sorting the clients by residence (sub-district) using the data of product users and their residential address as provided by the participating MFIs. The clusters were then sorted into three types based on their proximity to the head office: Close (<10 km), Medium (10 km – 20 km), Far ( $\geq 20$  km). From each category one cluster was selected randomly, totalling three clusters.

### **ILFAD product non-users**

Sampling of ILFAD non-users was conducted in the same area as the area of sample for the ILFAD users. Together with the MFI staff, the research team developed a list of non-ILFAD users residing in the area. A random sampling was then conducted to select 10 primary samples and five secondary samples using this list.

### **Mercy Corps partner MFI non-members**

Sampling of non-members was conducted in two different manners depending on the source of the sample.

- » Neighbours of ILFAD product users - Sampling was conducted randomly from among neighbours of the sample of ILFAD-users who are clients of a non-Mercy Corps partner MFIs. Criteria of clients of formal financial institutions were those who have an active account at a formal financial institution. Active was defined as conducting any transaction during the past year. In total, 10 clients of commercial banks were selected from each of the areas of the product-users respondent area<sup>16</sup>.
- » Clients of MFIs that do not offer ILFAD products - Sampling was conducted in a similar way of the sampling of ILFAD users. Eight to nine primary samples and three secondary samples were selected. A total of 25 clients were selected from each of the MFIs not offering ILFAD supported products.

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<sup>16</sup> In the case of unavailability, the next households were then visited, until the research team found an available respondent.

## ANNEX C - General Use of Financial Products

This annex provides background on the general use of financial products by respondents in the survey. Table 4.4 below summarises the most common types of financial products by respondents in this survey.

**TABLE 4.3 – MOST COMMON TYPES OF FINANCIAL PRODUCTS (PERCENTAGE OF ALL RESPONDENTS USING THIS TYPE OF PRODUCT IS INCLUDED IN BRACKETS)**

|                                     | <b>Informal</b>  | <b>Formal</b>  |
|-------------------------------------|--|--|
| Savings                             | Rotating savings and loans (47%)<br>Don't save (30%)<br>Community groups (25%)       | Bank (50%)<br>Rural bank (43%)<br>Savings Cooperatives (34%) |
| Loans                               | Family and friends (45%)<br>Don't borrow (40%)<br>Rotating loans (17%)               | Bank (37%)<br>Cooperative (30%)<br>Don't borrow (27%)        |
| Mitigation Strategies <sup>18</sup> | Family and friends (51%)<br>Don't mitigate (38%)<br>Rotating savings and loans (10%) | Bank (33%)<br>Don't mitigate (32%)<br>Cooperative (27%)      |

### › Savings

Savings, particularly formal saving products, was by far the most common financial behaviour by respondents.

#### Informal savings

Around 70% of respondents saved informally; however, there was significant variation in the types of informal savings between Yogyakarta and West Sumatra. The most common type of informal saving across the board was rotating savings and loans groups, with around half of respondents using this approach. However, rotating savings and community savings groups were far more common in Yogyakarta with 68% and 60% of respondents respectively using this form of informal savings compared to 33% and 2% in West Sumatra. Relying on other types of informal savings or not saving informally was far more common in West Sumatra with 41% and 39% of respondents respectively compared to 7% and 17% in Yogyakarta. The differences between regions may be due to differences in the types of financial institutions that exist and cultural differences in pre-existing informal savings practices.

The main characteristics that are associated with informal savings are having greater than primary school education and being in poverty. Poorer households were more likely to rely on family and friends for not just informal savings, but also for informal loans and migration activities. For example, around 15% of the poorest 20% of households relied on family and friends for informal savings, compared to only 4% of the richest 20% of households.

#### Formal savings

Around 95% of respondents saved formally from a range of types of financial institutions, and one-third had a savings account with at least two types of financial institutions.<sup>18</sup> Saving at standard banks (ie. not rural banks) was the most common approach with half of respondents using this strategy. Savings at cooperatives was very common among respondents from Yogyakarta (77%) and savings at rural banks was very common among those from West Sumatra (71%).

<sup>17</sup> This includes all possible options that exist for households to mitigate risk, such as mitigating or building a strong social networks with family and friends

<sup>18</sup> Anecdotal evidence suggests that this is mainly because people lack complete trust in financial institutions and hence diversifying their formal finances beyond one institution provides a way to diversify risk. Further anecdotal evidence suggests that these motivations are particularly strong around disaster events, i.e., people worry that certain financial institutions will not be accessible immediately following a disaster event. Of course other explanations are also possible, e.g., financial institutions may offer different products, social and other connections may motivate relationships with multiple financial institutions, etc.

The very high use of formal savings means that respondents from a range of backgrounds were using this type of financial product and there is only limited evidence to suggest that certain characteristics are leading people to be less likely to save formally. The 5% of respondents that did not use formal savings was effectively entirely made up of non-members in Yogyakarta. There is some evidence to suggest these respondents are more likely to have beyond primary school education; however, given the small number of people who do not save, there needs to be caution interpreting the results.

## Loans

There was a moderate use of loans among respondents from a range of backgrounds, with formal loans being more common than informal loans.

### Informal loans

Only around 60% of respondents borrowed informally; of these respondents 75% relied on family and friends. In West Sumatra, over 90% of respondents who borrowed informally relied on family and friends, compared to just over half in Yogyakarta. Rotating loans and community groups were much more common in Yogyakarta with 32% and 22% respectively of all respondents using these types of financial products compared to just 8% and 1% in West Sumatra. This is similar to the case for informal savings and may reflect the relative sophistication of the financial sector in these areas<sup>19</sup>.

The use of informal loans was positively associated with having a female and younger head of household, having a lower level of income and being poorer. In fact, only around half (52%) of respondents in the two richest quintiles borrow informally compared with almost two thirds (65%) of the bottom three quintiles of the distribution.

### Formal loans

Around 75% of respondents borrowed formally, mainly through standard banks (37%) and MFIs divided between cooperatives (30%) and rural banks (26%). There were significant differences in the characteristics of the clients at the various institutions. Poorer households were much more likely to use rural banks for loans and richer households were more likely to use standard banks. Over a third (34%) of the households in the poorest quintile of respondents borrowed from rural banks compared with less than a quarter (23%) for rest of distribution. Whereas over 40% of the richest three quintiles of respondents borrowed from standard banks compared with almost a third (32%) of the poorest two quintiles of respondents. This clearly suggests that richer households have stronger relationships with standard commercial banks, which could be due to a number of reasons such as greater likelihood of having linkages to formal employers who facilitate payments or linkages to commercial banks, or having greater education levels, facilitating greater willingness to interact with large, commercial banks (and having that willingness reciprocated by commercial banks, which may be more eager to do business with richer, more educated clients).

Differences exist between the clients of the various types of financial institutions beyond income. Members of Mercy Corps partner MFIs (both users and non-users) were more likely to use formal loans as were those working in the informal sector<sup>20</sup>. This may be because individuals working in the informal sector are more likely to run a business and were able to use business equipment as collateral to be able to get access to loans. Standard banks were more likely to loan to people with post-secondary education, which may be because they are less inclined to lend to riskier clients.

## Mitigation

Beyond accessing savings and loans, there are a range of other risk mitigation options that households can employ to be able to smooth and improve their level of consumption. Mitigation strategies allow households

<sup>19</sup> Yogyakarta is a more urban setting than West Sumatra, which may mean that community savings and loan groups are more common and family and friends do not need to be relied on as heavily as in West Sumatra.

<sup>20</sup> There is a positive relationship between working in the informal sector and owning a business (correlation co-efficient 0.45), which may be driving this result.

to minimize the impact of risks, maintain consumption, schooling, health and other standards of living as close as possible to the level under normal times. In this section we explore the extent to which households rely on formal institutions and informal sources to mitigate risk (drawing on responses to section D of the questionnaire). The findings show that only a significant minority of respondents (30 to 40%) do not use informal or formal mitigation strategies. Those that do tend to follow a similar pattern to the types of households that use informal and formal loans.

## **Use of Informal strategies to mitigate for risk**

Around 60% of respondents used informal strategies to mitigate risk, but the type of strategy varied considerably between Yogyakarta and West Sumatra. As was the case in regards to informal savings and loans, family and friends are heavily relied upon as an informal source of risk mitigation in West Sumatra (59%) compared with Yogyakarta (40%). In aggregate, around half of respondents rely on family and friends for any kind of informal mitigation of risk (the most common strategy). The next most common strategies were rotating savings groups and community groups with only 10% and 6% of respondents respectively. However, these respondents were also exclusively in Yogyakarta.

The higher a household's standard of living (whether measured by income, assets or PPI score) the less likely they are to rely on family or friends for access to finance to mitigate risks. In other words, being poorer appears to make it more likely that family and friends are relied upon as a mitigation strategy.

## **Use of formal strategies to mitigate risk**

Almost 70% of households used formal institutions to mitigate risk (i.e., by using savings or insurance to prepare for risks, or taking out credit post-disaster), mainly through standard banks (33%) and MFIs divided by cooperatives (27%) and rural banks (20%) although there were significant differences between locations. In West Sumatra, only 62% of respondents used formal mitigation strategies compared to around 80% in Yogyakarta. This may reflect the relative sophistication of the financial product market in these areas.

The characteristics associated with drawing on formal institutions to support mitigation strategies varied greatly by type of financial institution. Standard banks were more likely to be used by richer households and if the head of the household has post-secondary education. Further, members of Mercy Corps partner MFIs (both users and non-users) were more likely to access formal financial services for risk mitigation at rural banks and cooperatives. Interestingly, respondents with younger heads of household were more likely to use formal mitigation strategies. This may be because younger generations are more likely to be familiar with formal financial products.

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